WELCOME MESSAGE

It is an honour to host the 20th WSCTS World Congress for the first time in India. We have detoured from the usual World Congress program by incorporating Cardiology as well as Basic Sciences.

A series of 'Big Fights' by excellent debaters on the ever-controversial topics given below, is sure to stimulate exciting interactions.

1. Multi-vessel Revascularization – Stent vs. Scalpel
2. Off-Pump versus On-Pump CABG
3. Reprocessing of Single Use Medical Devices – Ethical, Economical & Environmental Dilemma

An innovative one day workshop on 'OPCAB' has been designed for the re-training of cardiac surgeons, anesthetists and operating room nurses.

The 6th Global Forum on Humanitarian Medicine in Cardiology and Cardiac Surgery is being conducted alongside the World Congress giving it an important, new and relevant dimension. The Global Forum, which is being held for the first time outside Geneva, will offer us a platform to discuss the problems that we face in Asian and Pan-African countries. The participation of world renowned stalwarts will ensure memorable interactions filled with novel ideas and thought processes.

We are delighted that both these two global events will coincide with the inauguration of India's first National Medical Science Park at Frontier Mediville, our fully integrated medical village of the future with an eco-conscious infrastructure. It is thus significant that 2010 has been ear-marked for the awakening of a Global Green Consciousness, for which we have adopted ***'Global Green New Deal'*** as the underlying theme of these events. It is with great pleasure that we look forward to the participation of Mr. Al Gore, 45th Vice President of USA to share his green ideals as the Key Thematic Speaker during the Inaugural Function.

India is known for its vast wealth in arts and culture and Tamil Nadu, being the cradle of these activities, is known as the cultural capital of India. We look forward to welcoming you to Chennai for an exciting and immensely fulfilling event of global cardiac significance. With your active participation, let us together make it a success.

Jai Hind.

Dr. K.M.Cherian, MS, FRACS, DSc (Hon), DSc (HC)
Chairman, 20th WSCTS World Congress

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20th WSCTS World Congress & 6th Global Forum on Humanitarian Medicine

Inaugural Programme

INAUGURATION ON 20TH OCTOBER 2010, WEDNESDAY

TIME	PROGRAMME SCHEDULE
	Prayer - Tamizh Thai Valzhthu
16:00–16:15	Welcome Address by Dr. K.M. Cherian Chairman, 20th World Congress of WSCTS
16:15–16:25	Lighting of the Lamp
16:25–16:30	Address by Dr. Stuart Jamieson Chancellor, World Society of Cardio-Thoracic Surgery
16:30–16:35	Address by Dr. Afksendyios Kalangos President, Global Forum on Humanitarian Medicine
16:35–16:45	Address by Guest of Honour, Shri Ghulam Nabi Azad Hon'ble Minister of Health and Family Welfare, and Inauguration of 'Frontier Mediville' Medical Science Park & Medical Exhibition
16:45–16:50	Presidential Address & Inauguration of India's First Medical "Special Economic Zone"
16:50–16:55	Presentation of Mementos
17:00	National Anthem (Sung by school children from "The Study")
17:30 onwards	"THINKING GREEN" Key Thematic Oration by Vice President Al Gore

Programme Highlights

21-23 October 2010
Academic Programme

DAY 1, 21 OCTOBER 2010, THURSDAY
VENUE: 'DHANVANTRI' PLENARY HALL
MORNING SESSION

TIME	TOPIC	SPEAKER	CHAIRPERSON
9:00–9:30	Prelude: "A March to the Drummer"	Probal K. Ghosh *(Israel)*	
9:30–10:30	3rd JOHN W. KIRKLIN MEMORIAL ORATION		
9:30–9:45	Prologue	Lucio Parenzan *(Italy)*	
9:45–10:15	Modern Aspects of Surgical Mitral Valve Repair	Ottavio R. Alfieri *(Italy)*	Afksendiyos Kalangos *(Geneva)* Sampath Kumar, A. *(India)* Bojan Biocina *(Croatia)*
10:15–10:20	Questions and Discussion		
10:20–11:30	BIG DEBATE -1		
10:20–10:40	Multi-Vessel Revascularization: Stent versus Scalpel	Bernard J. Gersh *(USA)*	Erik W.L. Jansen *(Netherlands)* Roberto R. Favaloro *(Argentina)* Soma Raju *(India)* Upendra Kaul *(India)*
10:45–11:05		Marko Turina (Switzerland)	
11:10–11:20	Concluding Remarks	A. Pieter Kappetein *(Netherlands)*	
11:20–11:30	Verdict and Concluding Remarks		
	Each speaker will be allotted 5 minutes for rebuttal.		
11:30–11:45	Tea Break		
11:45–13:45	SYMPOSIUM 1: HEART FAILURE		
11:45–12:00	Key Note Address - Evolution of Continuous Flow: From Temporary Support to Total Heart Replacement	O. Howard Frazier *(USA)*	
12:00–12:05	Questions and Discussion		

TIME	TOPIC	SPEAKER	CHAIRPERSON
12:05–12:20	Myocardial Biomechanics in Mitral Regurgitation	David C. McGiffin *(USA)*	Wolfram–Hubertus Zimmermann *(Germany)* Jan Pirk *(Czech Republic)* T.S. Kler *(India)*
12:25–12:40	Vienna Experience with Ventricular Assist Devices	Ernst Wolner *(Austria)*	
12:45–13:00	Cardiac Resynchronization Therapy for Heart Failure	C. Narasimhan *(India)*	
13:05–13:20	Alternative Therapies for Heart Failure: A Look into the Future	Juan C. Chachques *(France)*	
13:25–13:40	Using Heat Energy to Treat Heart Failure	Tofy Mussivand *(Canada)*	
5 minutes will be allotted for discussion after every speaker			
13:45–14:30	INUDSTRY TALK 1 (with Lunch)		
	Advanced Intraoperative X-ray imaging for Surgical Guidance	Georg Nollert *(Germany)* Sponsor: SIEMENS	V. Prashanth *(India)* Sunil Agarwal *(India)*

DAY 1, 21 OCTOBER 2010, THURSDAY
AFTERNOON SESSIONS
'DHANVANTRI', 'SUSHRUTA', 'CHARAKA' & 'J.C. BOSE' HALLS

14:30 – 16:30 - FAST TRACK SESSIONS

TIME	'DHANVANTRI' HALL – CORONARY SESSION	DISCUSSANTS	CHAIRPERSONS
14:30–15:30	Coronary Off Pump	Vivek Jawali *(India)* Ramakant Panda *(India)*	Y.A. Naser *(India)* V.V. Bashi *(India)*
15:30–16:30	Coronary On Pump	Prashanth Vaijyanath (India) Prakash Hiremath (India)	V.M. Kurien *(India)* Ajeet Bana *(India)* Mohan Gan *(India)*

TIME	'SUSHRUTA' HALL – ADULT VALVE SESSION	DISCUSSANTS	CHAIRPERSONS
14:30–15:30	Valve: Mitral	Ashok Sharma *(Oman)* Sampath Kumar (India)	S. Muralidharan *(India)* V. Satyaprasad *(India)*
15:30–16:30	Valve: Aortic & Tricuspid	Jagdish Prasad *(India)* Ujjwal Kumar Chowdhury *(India)*	C.P. Srivatsava *(India)* S. Rajan *(India)*

TIME	'CHARAKA' HALL – CONGENITAL SESSION	DISCUSSANTS	CHAIRPERSONS
14:30–15:30	Pediatric Cardiac Surgery	Suresh G. Rao *(India)* B.R. Jagannath *(India)*	Dhiren Dave *(India)* Robert Coelho *(India)* P. Moorthy *(India)*
15:30–16:30	RVOT Reconstruction	Shivaprakasha *(India)* Krishna Manohar *(India)*	Ravi Agarwal *(India)* Rana Sandip Singh *(India)*

TIME	'J.C. BOSE' HALL – THORACIC & ESOPHAGUS	DISCUSSANTS	CHAIRPERSONS
14:30–16:30	Thoracic & Esophagus	Sabyasachi Bal *(India)* Bhabatosh Biswas *(India)*	Rajan Santhosam *(India)* Sashank *(India)* Subbarao *(India)*
Each discussant will comment on Fast Track Presentations for 5 minutes			
16:30–16:45	Tea Break		

16:45–18:30 INVITED LECTURES

'CHARAKA' HALL - CONGENITAL HEART DISEASE			
TIME	TOPIC	SPEAKER	CHAIRPERSON
16:45–17:10	The Ross Procedure in Children: The Saudi Experience	Zohair Y. Al Halees *(Saudi Arabia)*	Iman Alobaidy *(Iraq)* Suresh G. Rao *(India)* P.R. Bhima Shankar *(India)* Rana Sandip Singh *(India)* Joy M. Thomas *(India)*
17:15–17:40	Surgical Treatment of Arrhythmias in Adult with Congenital Heart Disease	Alessandro Frigiola *(Italy)* & Alessandro Giamberti *(Italy)*	
17:45–18:10	Management of Ebstein's Anomaly	Mei-Hwan Wu *(Taiwan)*	
5 minutes will be allotted for discussion after every speaker			
18:15–18:30	Concluding Remarks		

'DHANVANTRI' HALL - ADULT CARDIAC SURGERY			
TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
16:45–17:00	Pulmonary Endarterectomy; from Diagnosis to Current Management	Stuart W. Jamieson *(USA)*	G.B. Parulkar *(India)* Anil G. Tendolkar *(India)* Sami Kabbani *(Syria)*
17:05–17:20	Intraoperative Protection of the Myocadium: 2010	Sidney Levitsky *(USA)*	
17:25–17:40	Mitral Valve Repair	Rimantas Benetis *(Lithuania)*	
17:45–18:00	Evolving Management Strategies for Kommerell's Diverticulum	Sreekumar Subramanian *(Germany)*	
18:05–18:20	Medium-Term Angiographic Follow-up for Off-pump versus On-Pump CABG in a Randomised Controlled Study	Jawad Sajid Khan *(Pakistan)*	
	5 minutes will be allotted for discussion after every speaker		
18:25–18:30	Concluding Remarks		

'SUSHRUTA' HALL-AORTIC INTERVENTIONS			
TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
16:45–17:05	Thoracic Endovascular Aortic Repair (TEVAR) Meta-Analysis of Present Results	Marko Turina *(Switzerland)*	Ahmed Rajai Khoransani *(Iran)* Sunil Agarwal *(India)* C.S. Vijayshankar *(India)* Prashant Vaijyanath *(India)*
17:10–17:30	Surgical Experience with Aortic Arch Aneurysms	Anil Bhan *(India)*	
17:35–17:55	TEVAR for Acute Complicated Type B Aortic Dissection: Techniques and Results	Ali Khoynezhad *(USA)*	
18:00–18:20	Aortic Aneurysms – Indian Scenario	K.S. Neelakandhan *(India)*	
5 minutes will be allotted for discussion after every speaker			
18:25–18:30	Concluding Remarks		

'J.C. BOSE' HALL - BASIC SCIENCES			
TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
16:45–17:05	Cardiac Tissue Engineering; Implications for Pediatric Heart Surgery	Wolfram-Hubertus Zimmer-mann *(Germany)*	K. Satyamoorthy *(India)* A. Jayakrishnan *(India)* Mary Babu *(India)* A.B. Mandal *(India)*
17:10–17:30	Regeneration of Cardiac Tissues Assisted by Bioactive Implants	Juan C. Chachques *(France)*	
17:35–17:55	Future: Automated Anastomotic Vascular Coupling	Erik W.L. Jansen *(Netherlands)*	
18:00–18:20	Gene-Environment interactions in Congenital Heart Disease	Shoumo Bhattacharya *(United Kingdom)*	
5 minutes will be allotted for discussion after every speaker			
18:25–18:30	Concluding Remarks		
19:30–22:30	COCKTAILS & CULTURAL NITE		

DAY 2, 22 OCTOBER 2010, FRIDAY

VENUE: 'DHANVANTRI' PLENARY HALL
MORNING SESSION

TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
9:30–10:30	2nd ROBERT B. KARP MEMORIAL ORATION		
9:30–9:50	Prologue	Ottavio Alfieri *(Italy)* Pankaj K. Srivastava *(India)*	Jean Des Lauriers *(Canada)* Rimantas Benetis *(Lithuania)* Aftab Ahmad *(USA)*
9:50–10:20	Biological Insights from the History of Lung Transplantation	David C. McGiffin *(USA)*	
10:20–10:30	Questions & Discussion		

TIME	TOPIC	SPEAKER	CHAIRPERSON
10:30–11:30	THE BIG DEBATE - 2		
10:30–10:40	Off-Pump versus On-Pump CABG	Paul T. Sergeant *(Belgium)*	Sotirios N. Prapas *(Greece)* Sami Kabbani *(Syria)* Murali P. Vettath *(India)*
10:40–10:50		Ramakanta Panda *(India)*	
10:55–11:05		Erik W.L. Jansen *(Netherlands)*	
11:05–11:15		A. Pieter Kappetein *(Netherlands)*	
11:20–11:30	Verdict and Concluding Remarks	Marko Turina *(Switzerland)*	
Each team will be allotted 5 minutes for rebuttal.			
11:30–11:45	Tea Break		
11:45–13:30	SYMPOSIUM 2: SKIN TO HEART – ENDOVASCULAR AND TRANSCATHETER THERAPY		
11:45–12:10	Transcatheter Aortic Valve Replacement	Gerhard Schuler *(Germany)*	Erik W.L. Jansen *(Netherlands)* Ottavio Alfieri *(Italy)* Ashok Seth *(India)*
12:15 –12:40	TAVI: Technology and Direction	A. Pieter Kappetein *(Netherlands)*	
12:45–13:10	Video-Assisted Mitral Valve Repair	Noedir A.G. Stolf *(Brazil)*	
5 minutes will be allotted for discussion after every speaker			
13:15–13:30	Concluding Remarks		

TIME	TOPIC	SPEAKER	CHAIRPERSON
13:30–14:30	INDUSTRY TALK 2 (with Lunch)		
	Dusk to Dawn Mechanical Valve/ Bioprosthetic Valve	Naren Vyavahare *(USA)* Sponsor: ST. JUDE	G.S. Bhuvaneshwar *(India)* Venkatesh Balasubramanian *(India)*

DAY 2, 22 OCTOBER 2010, FRIDAY

AFTERNOON SESSION

'DHANVANTRI', 'SUSHRUTA', 'CHARAKA', 'J.C. BOSE' HALLS

14:30 – 16:30 - FAST TRACK SESSIONS

TIME	TOPIC	DISCUSSANTS	CHAIRPERSONS
'DHANWANTRI' HALL			
14:30–16:30	Heart Failure	Anil Jain *(India)* D. Janardhana Reddy *(India)* S. Thanikachalam *(India)*	Raghavan Subramanyan *(India)* Rimantas Benetis (Lithuania)
'SUSHRUTA' HALL			
14:30–16:30	Evolving Technology, Arrhythmias & Miscellaneous	Naren Vyavahare *(USA)* Anil G. Tendolkar *(India)* Amit Banerjee *(India)*	J.M. Tharakan *(India)* M.D. Dixit *(India)*
'CHARAKA' HALL			
14:30–16:30	Pediatric, Aorta and Vascular		
14:30–15:30	Pediatric Cardiology	Snehal Kulkarni *(India)* C. Shanthi *(India)*	Prem Sekar *(India)* Indrani Suresh *(India)*
15:30–16:30	Aorta and Vascular	Anil Bhan *(India)* Vijay Shankar *(India)*	G.B. Parulkar *(India)* K.S. Neelakanthan *(India)*
'J.C. Bose' Hall			
14:30–16:30	Basic Sciences	Soma Guhathakurta *(India)* H. Devaraj *(India)*	Satyamurthy *(India)* Saranya *(India)* Prema Gurumurthy *(India)*

Each discussant will comment on Fast Track Presentations for 5 minutes	
16:30–16:45	Tea Break

16:45- 18:30 INVITED LECTURES

'CHARAKA' HALL - Pediatric Cardiac Surgery – Corrected TGA			
TIME	**TOPIC**	**DISCUSSANTS**	**CHAIRPERSON**
16:45–17:10	Opening Remarks	Rajesh Sharma *(India)*	Raghavan Subramaniam *(India)* K.S. Murthy *(India)* Snehal Kulkarni *(India)*
17:15–17:40	Congenitally Corrected Transposition of Great Vessels (CTGA)	Jaya Deshpande *(India)*	
17:45–18:10	Single Ventricle Strategy for Hearts with AV/VA Discordance	Tom R. Karl *(Australia)*	
5 minutes will be allotted after every speaker for discussion			
18:15–18:30	Concluding Remarks		

'DHANVANTRI' HALL - Adult Cardiac Surgery			
TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
16:45–17:05	Mitral Regurgitation – A Mechanical, Cellular and Molecular Problem	David C. McGiffin *(USA)*	Jan Christenson *(Switzerland)* Rimantas Benetis *(Lithuania)* H.S. Pannu *(India)* Nirmal Gupta *(India)*
17:10–17:30	The Current Role of the Percutaneous Treatment of Mitral Regurgitation	Ottavio Alfieri *(Italy)*	
17:35–17:55	Comprehensive Aortic Root & Valve Repair (CARVAR) Operation	Meong Gun Song *(Korea)*	
18:00–18:20	Ongoing Myocardial Infarction Result of Acute PCI and Surgery	Erik W.L. Jansen *(Netherlands)*	
5 minutes will be allotted after every speaker for discussion			
18:25–18:30	Concluding Remarks		

'SUSHRUTA' HALL - ANAESTHESIA, THORACIC AND VASCULAR SURGERY			
TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
16:45–17:05	Risk Stratification in Acute Aortic Dissection	V. Rampoldi *(Italy)* S. Trimarchi *(Italy)*	V.V. Bashi *(India)* Mohan Varghese *(India)* R.C. Rathod *(India)* Dalbir Singh *(India)* Sadoon Al Obaidy *(Iraq)*
17:10–17:30	Cardiopulmonary Adjustments and Quality of Life after Pneumonectomy	Jean Des Lauriers *(Canada)*	
17:35–17:55	Adjuvant Therapies for Resectable Lung Cancer	Jean Des Lauriers *(Canada)*	
18:00–18:20	The Current Standing of Awake Cardiac Surgery	Murali Chakravarthy *(India)*	
5 minutes will be allotted after every speaker for discussion			
18:25–18:30	Concluding Remarks		

'J. C. BOSE' HALL - BASIC SCIENCES			
TIME	**TOPIC**	**SPEAKER**	**CHAIRPERSON**
16:45–17:05	Biological Ventricular Assist Devices	Wolfram-Hubertus Zimmermann *(Germany)*	Wiiliam F. Northrup *(USA)* K.R. Balakrishnan *(India)* Soma Guhathakurta *(India)*
17:10–17:30	Myocardial Assistance by Grafting a New Upgraded Bio-artificial Myocardium (MAGNUM Trial): Clinical Results at 2 Years	Juan C. Chachques *(France)*	
17:35–17:55	Unwinding of the Triple Helical Structure of Collagen & Helical Mystery & Biomedical Applications of Collagen and Some Biocompatible Nanomaterials	A.B. Mandal *(India)*	
18:00–18:20	Nanotechnology Strategies for Myocardial Infarction	Seeram Ramakrishnan *(Singapore)*	

5 minutes will be allotted after every speaker for discussion	
18:25–18:30	Concluding Remarks
19:30–22:30	GALA DINNER & LIVE MUSIC

DAY 3, 23 OCTOBER 2010, SATURDAY
VENUE: 'DHANVANTRI' PLENARY HALL
MORNING SESSION

9:30–10:30 1st JURO WADA ORATION

TIME	TOPIC	SPEAKER	CHAIRPERSONS
9:30–9:45	Prologue	Wolfgang R. Ade *(Japan)*	Lucio Paranzan *(Italy)* G.B. Parulkar *(India)* William F. Northrup *(USA)*
9:45–10:15	From the Magic Mountain to Rocket Science in Thoracic and Cardio-Vascular Surgery	Ludwig Karl von Segesser *(Switzerland)*	
10 :15–10:30	Questions and Discussion		

10:30–11:30 THE BIG DEBATE -3

TIME	TOPIC	SPEAKER	CHAIRPERSONS
10:30–10: 50	Reprocessing of Single Use Medical Devices – Ethical, Economical & Environmental Dilemma	Ganesh Mani *(India)*	Thomas Pezzella *(USA)* K.R. Shetty *(India)* Ahmed El Sayed *(Sudan)*
10:55–11:15		I.S. Viridhi *(India)*	
11:20–11:30	Verdict and Concluding Remarks		
Each speaker will be allotted 5 minutes for rebuttal.			
11:30 –11:45	Tea Break		

11:45–13:30 SYMPOSIUM – 3 - EDUCATION & TRAINING IN CARDIAC SURGERY

TIME	TOPIC	SPEAKER	CHAIRPERSONS
11:45–12:10	Education & Training of Cardiothoracic Surgery – The China Model	Thomas Pezzella *(USA)*	Ludwig Karl von Segesser *(Switzerland)* G.B. Parulkar *(India)* Sidney Levitsky *(USA)* James Thomas *(India)*
12:15–12:40	Let Us Implement the "Science of Learning" in Cardio-Thoracic Surgery Training	Paul T. Sergeant *(Belgium)*	
12:45–13:10	The Logic and Imperative of Biological Simulators in the Training of Cardiac Surgeons	William F. Northrup *(USA)*	
5 minutes will be allotted for discussion after every speaker			
13:15–13:30	Concluding Remarks		
INDUSTRY TALK 3 (with Lunch)			
13:30–14:30	A Stitch in Time - Technical Consideration during Coronary Bypass Surgery	Anil G. Tendolkar *(India)* Sponsor – ETHICON	Ravi Agarwal *(India)* Pankaj K. Srivatsava *(India)*

DAY 3, 23 OCTOBER 2010, SATURDAY
AFTERNOON SESSION
'CHARAKA' and 'J.C. BOSE' HALLS
14:30 – 15: 30 - FAST TRACK SESSIONS

TIME	TOPIC	DISCUSSANTS	CHAIRPERSON
14:30–15:30	'CHARAKA' Hall – Interesting Case Presentations	B.R. Jagannathan *(India)* Anil G. Tendolkar *(India)*	M.D. Dixit *(India)* Manoharan *(India)*
14:30–15:30	'J.C. BOSE' Hall – Scores and Database in Cardiac Surgery	Kathy Jenkins *(USA)* Saravana Ganesh *(India)*	Sivaprakasha *(India)* B.S. Murthy *(India)*
5 minutes will be allotted for commentary by each discussant after the Fast Track presentations			

DAY 3, 23 OCTOBER 2010, SATURDAY

PRACTICAL KNOWLEDGE CLUSTER
'DHANVANTARI' HALL
Workshop I – 'Interactive CME with Video Presentation'
(100 Participants - 80 Surgeons, 10 Anesthetists and 10 Nurses)

TIME	TOPIC	FACULTY	INSTITUTION/COUNTRY
15:30–17:30	Training of "New" & Retraining of "Old" Surgeons in Off Pump	Conducted by: Paul T. Sergeant Moderated by: Ashok Kumar Sharma	 Gasthuisberg University Hospital, Belgium Sultan Qaboos University Hospital, Oman

Work Shop II - WET LAB at Ethicon Institute of Surgical Education
(32 Participants)

TIME	TOPIC	FACULTY	INSTITUTION/COUNTRY
14:30–18:30	Aortic Root Anatomy and the Basic Technical Features of the Ross Procedure	Conducted by: William F. Northrup Moderated by: Zohair Y. Al Halees Alessandro Frigiola	 Cryolife Inc., USA King Faisal Heart Institute, Saudi Arabia Bambini Cardiopatici nel Mondo, Italy

"CHARAKA" HALL
Workshop III - Video Presentations

TIME	TOPIC	FACULTY	INSTITUTION/COUNTRY
15:30–16:30	Transfemoral Aortic Valve Implantation	Conducted by: Gerhard Schuler	 University of Leipzig, Germany
16:30–17:30	Vein – Often Used, Usually Neglected: Management of Venous Disorders	Conducted by: Ronald Bush	 Ohio, USA

"MOTHER TERESA" HALL
Workshop IV
(Targeted Audience: Physicians, Nurses & Paramedics interested in Humanitarian Care)

TIME	TOPIC	FACULTY	CONDUCTED BY
15:30–16:30	Mounting a Surgical Mission	Robin King Austin Ceeya Patton Bolman Bistra Zheleva	6th Global Forum in Humanitarian Medicine in Cardiology & Cardiac Surgery

6th Global Forum on Humanitarian Medicine in Cardiology And Cardiac Surgery

INVITED LECTURES & WORKSHOPS

Day 1 – 21st October 2010
VENUE: MOTHER TERESA HALL
14:30-14:40

Presidential Address	Afksendyios Kalangos	President, Global Forum, Switzerland
Secretary's Report	Jan T. Christenson	Secretary General, Global Forum, Switzerland.

POST-LUNCH SESSION 1

HEART DISEASE IN DEVELOPING COUNTRIES
Chair: Afksendyios Kalangos, Switzerland, K.M. Cherian, India and Christopher Roy, India

Hung-Chi Lue 14:40–14:55	National Taiwan University Hospital, Taiwan	Could Rheumatic Fever and Rheumatic Heart Disease be Eliminated?
John O.Omagino 14:55–15:10	Uganda Heart Institute, Uganda	Challenges of Establishing Cardiac Services in Uganda
Edward Kaplan 15:10–15:25	World Health Organization Collaborating Center for Reference and Research on Streptococci, USA	Implementing Control of Rheumatic Fever/ Rheumatic Heart Disease in the Industrializing World: Opportunity, Obligation and Reality
Kabir Jahangir 15:25–15:40	United Hospital, Bangladesh	Challenges of Setting Up Cardiac Surgery in Bangladesh
Elijah Verasimbo Ussiri 15:40–15:55	Muhimbili National Hospital- Dar es Salaam, Tanzania	Closed Mitral Valvotomy – A Life-Saving Procedure in a Facility Deprived Country
Evarist T.M. Nyawawa 15:55–16:10	Muhimbili National Hospital- Dar es Salaam, Tanzania	One Year Experience of Cardiac Surgery at Muhimbili National Hospital-Dar es Salaam, Tanzania
Wandwi 16:10–16:20	Muhimbili National Hospital- Dar es Salaam, Tanzania	Audit of Tanzania Open Heart Surgery: Too Much Value Replacements Instead of Repair
16.20–16:30	Discussion	
16:30–16:45	Tea break	

POST-LUNCH SESSION 2

HUMANITARIAN MISSIONS
Chair: B.S. Murthy, India and A. Thomas Pezzella, USA

A. Thomas Pezzella 16:45–17:00	International Children's Heart Fund, USA	Global Aspects of CT Surgery with Focus on Asia
Russell Lee 17:00–17:15	Sydney, Australia	25 years Experience in Humanitarian Medical Care
William M. Novick 17:15–17:30	University of Tennessee, USA	How to Maintain Standards in Humanitarian Pediatric Cardiac Surgical Missions
Kathy J. Jenkins 17:30–17:45	Boston Children's Hospital, USA	Quality Improvement Collaborative – An Overview
Marko Turina 17:45–18:00	University Hospital, Switzerland	EACTS Positions on the International Assistance in the Field of Cardio Thoracic Surgery
Alain Deloche 18:00–18:15	La Chaine de l'Espoir, France	Cardiac Surgery in Emerging Countries: Our Experience and the Future – Curing Children Together
Bernard Clot 18:15–18:30	La Chaine de l'Espoir, France	IMN – International Medical Network; Curing Children Together
18:30 onwards	Discussion	

Day 2 – 22nd October 2010
POST-LUNCH SESSION 3
PEDIATRIC CARDIAC CARE AROUND THE WORLD
Chair: William M. Novick, USA and Jan T. Christenson, Switzerland

Noedir A. G. Stolf 14:30–14:45	Heart Institute of University Sao Paulo, Brazil	Pediatric Cardiac Care in South America with Emphasis on Brazil for the Global Forum
Zohair Y. Al Halees 14:45–15:00	King Faisal Hospital, Saudi Arabia	Pediatric Cardiac Services in the Middle East
Mei-Hwan Wu 15:00–15:15	National Taiwan University Hospital, Taiwan	Pediatric Cardiac Care in Taiwan
Allensandro Frigiola 15:15–15:30	Bambini Cardiopatici nel Mondo, Italy	About 20 Years of Experience in Cardiac Pediatric Development Programs in Sub Saharian Africa
V.K. Subburaj 15:30–15:45	Department of Health & Family Welfare, Government of Tamil Nadu, India	Government Efforts in Cardiac Care with Emphasis on Free Pediatric Cardiac Surgery – Summing Up
15:45–16:00	Discussion	

POST-LUNCH SESSION 4
SCIENCE & ECONOMY
Chair: Kathy J. Jenkins, Boston, USA and Lucio Parenzan, Italy

T. Ramasami 16:00–16:15	Secretary to the Government of India, Department of Science and Technology New Delhi	Development of Infrastructure for Biotechnology in Developing Countries
Seeram Ramakrishnan 16:15–16:30	National Univerity of Singapore, Singapore	Global Energy Challenges: Opportunities for Nanotechnologists
Lucio Parenzan/ Gino Strada 16:30–16:45	Emergency NGO, Italy	The Salam Centre Project: State of The Art, Free of Charge Cardiac Surgery In Africa
D. Janardhana Reddy 16:45–17:00	Vijaya Heart Foundation, Chennai	Cost Containment in Developing Nations
S. Prakash 17:00–17:15	Medical Director, Star Health and Allied Insurance, Chennai	Health Insurance - Pan Indian Scenario
B.S. Murthy 17:15–17:30	Care Hospital, Hyderabad	Health for All, What are the Means Necessary
I.M. Rao 17:30–17:45	Innova Children's Hospital, Secunderabad	Impact of Government Health Insurance on Practice of CHD
Robin King Austin 17:45–18:00	World Heart Foundation, USA	International Symposium for Cardiac Care
Karim Sahiyyah 18:00 –18:15	Northern General Hospital, Sheffield Teaching Hospital NHS Foundation Trust, Sheffield, UK	Clinical and Economy Evaluation of Fast Track Recovery After Cardiac Surgery Through Recovery Unit
18:15–18:30	Discussion	

DAY 3 – 23RD OCTOBER 2010

WORKSHOP: (Targeted Audience: Physicians, Nurses & Paramedics interested in Humanitarian Care)

TIME	TOPIC	FACULTY
15:30–16:30	Mounting a Surgical Mission	Robin King Austin, Executive Director, World Heart Foundation, USA Ceeya Patton Bolman , MSN Team Heart Program Coordinator, USA Bistra Zheleva, International Programs Manager, USA

Oral Presentations
Fast Track Sessions

21 OCTOBER 2010

VENUE: 'DHANVANTRI' HALL
TIME: 14:30–15:30
SESSION: CORONARY OFFPUMP
DISCUSSANTS: VIVEK JAWALI, RAMAKANT PANDA
CHAIRPERSONS: Y.A. NASER, V.V. BASHI

TIME	TOPIC	PRESENTER
14:30–14:35	Totally Endoscopic Coronary Artery Bypass Grafting on Beating Heart	Changqing Gao
14:35–14:40	Total Arterial No-Touch Off-Pump Coronary Artery Bypass. Feasibility & Initial Results	Thomas Theologou
14:40–14:45	Off-Pump Coronary Artery Bypass Grafting in Emergency Procedures and Redo Surgery is Effective And Safe	Maximilian Y. Emmert
14:45–14:50	Multi-Vessel Re-Do Cabg on a Beating Heart	Harinder Singh bedi
14:50–14:55	Off-Pump versus On-Pump Coronary Artery Bypass Graft Surgery (Differences In Short-Term Outcomes and in Long-Term Mortality)	Sanjay pandey
14:55–15:00	**Invited Comments**	
15:00–15:05	Early Outcomes of Off-Pump Coronary Artery Bypass Grafting in 3028 Patients	Lokeswara Sajja
15:05–15:10	Midcab and Keyhole Cabg in Multi-Vessel Disease	Rajendra Vasaiya
15:10–15:15	Late Outcomes of On-Pump and Off-Pump Redo Coronary Artery Bypass Grafting	Giedre Nogiene`
15:15–15:20	Is Off Pump Complete Revascularization Feasible in All Patients Requiring Coronary Bypass Surgery	Deepak Puri
15:20–15:25	Quality of Life After Off Pump Coronary Artery By-Pass Surgery. Six Months Follow-Up From the Doors – Study	K Houlind
15:25–15:30	**Invited Comments**	

TIME: 15:30–16:30
SESSION: CORONARY ONPUMP AND STERNAL CLOSURES
DISCUSSANTS: PRASHANT VAIJYANATH, PRAKASH HIREMATH
CHAIRPERSONS: V.M. KURIEN, AJEET BANA, MOHAN GAN

TIME	TOPIC	PRESENTER
15:30–15:35	Forty-Year Outcomes After Coronary Artery Bypass Grafting with Intermittent Fibrillation Technique Without Use of Cardioplegia	Aftab Ahmad
15:35–15:40	Early and Mid Term Survival Following Isolated Coronary Artery Bypass Surgery in Patients with Chronic Dialysis Dependent Renal Failure	Uday Dandekar
15:40–15:45	Outcomes of Coronary Artery Bypass Grafts Versus Percutaneous Coronary Intervention in Multivessel Coronary Artery Disease: An Observational Study	Giovanni Andrea Contini
15:45–15:50	Perioperative Risk Factors of Surgery and Transcatheter Closure of Post-Infarction VSD	Qedra
15:50–15:55	Results of the Coronary Artery Bypass Grafting Alone and Combines with Surgical Ventricular Reconstruction for Ischemic Heart Failure	Andrey Marchenko
15:55–16:00	**Invited Comments**	
16:00–16:05	Impact of Low Body Mass on Outcomes Following Cabg Surgery in The Elderly	Gintaras Kalinauskas
16:05–16:10	Effect of Pre-Op Clopidogrel Exposure on Postoperative Bleeding in Patients Undergoing Elective Coronary Artery Bypass Surgery.	D. Charumathy
16:10–16:15	Grading of Atheroma in the Ascending Aorta Using Epiaortic Ultrasonography during Coronary Artery Bypass Surgery	Sujeeth Suvarna

16:15–16:20	Sternal Closure Technique To Reduce Infection Rates In Patients With Coronary Artery Bypass Grafting Using Bilateral Internal Thoracic Arteries.	Stefan Saenger
16:20–16:25	Twenty Years' Experience With Poststernotomy Mediastinitis After Coronary Artery Bypass Grafting: Risk Factors For Mortality And Outcomes After Negative Pressure Wound Therapy And Conventional Treatment	Artashes Navasardyan
16:25–16:30	Invited Comments	

21 OCTOBER 2010

VENUE: 'SUSHRUTA' HALL – ADULT VALVE SESSION
TIME: 14:30–15: 30
SESSION: MITRAL VALVE
DISCUSSANTS: ASHOK KUMAR, SAMPATH KUMAR
CHAIRPERSONS: MURALIDHARAN, SATYA PRASADH

TIME	TOPIC	PRESENTER
14:30–14:35	Clinical Results of Comprehensive Mitral Valve Apparatus Reconstruction	Meong Gun song
14:35–14: 40	Artificial Coaptation Surface in Mitral Valve Repair	Bojan Biocina
14:40–14:45	A New Idea to Repair Functional Mitral Regurgitation: A Helicoid Metallic Spring	Caterina Simon
14:45–14:50	Mitral Valve Repair by Chordal Transfer in Rheumatic Mitral Regurgitation Early Experience.	Shamsher Lochab
14:50–14:55	Effectiveness of Single-Size Self-Made PTFE Band for Mitral Valve Annuloplasty in Degenerative Mitral Regurgitation	Antonio Panza
14:55–15:00	**Invited Comments**	
15:00–15:05	Eagle Shape Patch to Restore Mitral-Aortic Continuity.	Samer kassem
15:05–15:10	Tent Shape Technique: Another Procedure to Repair P2 of Posterior Leaflet of Mitral Valve	Samer kassem
15:10–15:15	Results of Mitral Valve Repair Versus Mitral Valve Replacement for Isolated Active Infective-Mitral Valve Endocarditis: 22-Year Single Center Experience	Michele Music
15:15–15:20	The Effect of Mercedes Plasty on Giant Left Atrium in Patients Undergoing Mitral Valve Replacement	Rana sandip singh
15:20–15:25	Transesophageal Mitral Valve Quantification for Mitral Valve Surgery	Elena Golukhova
15:25–15:30	**Invited Comments**	

TIME: 15:30–16:30
SESSION: AORTIC, TRICUSPID AND MISCELLANEOUS
DISCUSSANTS: JAGDISH PRASADH, UJJWAL KUMAR
CHAIRPERSONS: C.P. SRIVATSAVA, RAJAN

TIME	TOPIC	PRESENTER
15:30–15:35	Long Term Results After Carpentier-Edwards Pericardial Aortic Valve Placement with Attention to the Impact of Age	Karl F. Welke
15:35–15:40	Prothesis-Patient Mismatch in an Aortic Valve Replacement Program with the New Generation of Stentless Prosthesis	Mario Jorge Amorim
15:40–15:45	Aortic Valve Replacement in Octogenarians in the Era of Percutaneous Aortic Valve Intervention: Risk Stratification with Euroscore	Benjamin Medalion
15:45–15:50	Long Term Results Following Aortic Valve Replacement in Octogenarians	Amit Modi
15:50–15:55	Ultrasound Decalcification of Aortic Stenosis	Rufus Baretti
15:55–16:00	**Invited Comments**	
16:00–16:05	Observant–Observational Study of Effectiveness of Avr-Tavi Procedures for Severe Aortic Stenosis Treatment	Fulvia Seccareccia
16:05–16:10	Biodegradable Annuloplasty Ring for the Treatment of Functional Tricuspid Regurgitation	Thomas Theologou
16:10–16:15	Repair of the Tricuspid Valve for Rheumatic Lesions: A 30-Years Experience	Jose M Bernal
16:15–16:20	Triple Delight-Triple Valve Repairs in Young Rheumatics-Narayana Experience	Vineet Mahajan
16:20–16:25	Ring Versus Suture Annuloplasty in Patients with Tricuspid Regurgitation	Vladimir Nazarov
16:25–16:30	Invited Comments	

21 OCTOBER 2010

VENUE: 'CHARAKA' HALL
TIME: 14:30–15:40
SESSION: PEDIATRIC CARDIAC SURGERY
DISCUSSANTS: SURESH G. RAO, B.R. JAGANNATHAN
CHAIRPERSONS: DHIREN DAVE, ROBERT COELHO, P. MOORTHY

TIME	TOPIC	PRESENTER
14:30–14:35	What Happens to the Pulmonary Artery that We Switched?	Eva Maria delmo walter
14:35–14:40	Primary and Two-Stage Repair of Transposition of the Great Arteries and Double Outlet Right Ventricle with Aortic Arch Obstruction	Tomas tlaskal
14:40–14:45	Rotation of the Truncus Arteriosus – Established Surgical Procedure	M. Hübler
14:45–14:50	Congenital Heart Surgery in Newborns Under 2500 g	M. Huebler
14:50–14:55	Aortic Arch Reconstruction Using Selective Cerebral Perfusion without Circulatory Arrest in Neonates and Infants	Anil dharmapuram
14:55–15:00	**Invited Comments**	
15:00–15:05	Closure of Ventricular Septal Defect, Continuous Versus Conventional Closure, Comparative Study	Moustafa Elsayed
15:05–15:10	Partial Sternotomy for Repair of Congenital Heart Defects	Karthik vaidyanathan
15:10–15:15	Surgical Treatment of Congenital Heart Diseases Combined with Tachyarrhythmias	Leo bockeria
15:15–15:20	Fontan Conversion with Arrhythmia Surgery for the Failing	Anuradha sridhar
15:20–15:25	Single Stage or Double Stage Repair for Univentricular Heart: Our Experience	Sadashiv Tamagond
15:25–15:30	Pulmonary Valve Preservation in Tetralogy of Fallot with a Mildly Hypoplastic Annulus-Should We Do It?	Sadashiv Tamagond
15:30–15:35	Use of Polytetrafluoroethylene Neochordae in Repair of Dysplastic Tricuspid Valves	Sudhep Varma
15:35–15:40	**Invited Comments**	

TIME: 15:40–16:30
SESSION 2: RVOT Reconstruction
DISCUSSANTS: SHIVAPRAKASHA, KRISHNA MANOHAR
CHAIRPERSONS: RAVI AGARWAL, RANA SANDIP SINGH

TIME	TOPIC	PRESENTER
15:40–15:45	Bovine Pericardium for the Correction Of Congenital Heart Diseases, 20 Years Experience	Maurici O. Soule
15:45–15:50	Intermediate Follow-Up of a Composite Stentless Bovine Valved Conduit of Bovine Pericardium and Valve From Glisson's Capsule of Liver in the Pulmonary Circulation for Treatment Complex Congenital Heart Malformations	Ehab Deigheidy
15:50–15:55	Valved Autopericardial Conduit Repair of the Complex Congenital Heart Defects (Conotruncus Malformations) in Early Infancy	Ehab Deigheidy
15:55–16:00	Right Ventricular Outflow Tract Reconstruction with an Allograft Conduit for Treatment Complex Congenital Heart Defects in Infants	Ehab Deigheidy
16:00–16:05	**Invited Comments**	
16:05–16: 10	Right Ventricular Outflow Tract Reconstruction with an Allograft Conduit in Cono-Truncus Malformations: Risk Factors for Allograft Dysfunction and Failure	Mikhail Zelenikin
16:10–16: 15	Early Results of Bovine Xenopericardial Valved Conduit Versus Bicuspid Allograft for Right Ventricular Outflow Tract Reconstruction	Leo Bockeria
16:15–16: 20	Autologous Reconstruction of Pulmonary Trunk at Reoperation After Extracardiac Conduit Repair for Congenital Heart Defects	Leo Bockeria
16:20–16:25	Early Results of Indigenous Decellularised Porcine Xenografts in Rvot Reconstruction	Sudeep Verma
16:25–16:30	**Invited Comments**	

21 OCTOBER 2010

VENUE: J.C. BOSE HALL
TIME: 14:30–16:30
SESSION: THORACIC AND ESOPHAGOS
DISCUSSANTS: SABYASACHI BAL, BHABATOSH BISWAS
CHAIRPERSONS: RAJAN SANTHOSAM, SASHANK, SUBBARAO

TIME	TOPIC	PRESENTER
14:30–14:35	Primary Bone Tumours of the Chest Wall	Tolusha Harischandra
14:35–14:40	Primary Middle Mediastinal Lymphoma Mimic Lung Cancer.	Hamid Davari
14:35–14:40	Scope of Chemotherapy as a Neoadjuvant Modality for Management of Non-Small Carcinoma of Lung: A Prospective Study from a Cancer Belt (Kashmir)	Ghulam Nabi Lone
14:40–14:45	Thoracic Tumors in Childhood and Adolescence:long-Term Results of Multimodal Treatment	Olavo Rodrigues
14:45–14:50	Congenital Lobar Emphysema: 30 Years Reviewed Series	Olavo Rodrigues
14:50–14:55	**Invited Comments**	
14:55–15:00	Comparable of Suture Methods of Stump of Main Bronchus: Experience of 20 Years	Algirdas Jackevicius
15:00–15:05	Triple Reinforcement of the Bronchial Stump: Decreases Chances of Post–Resection Bronchopleural Fistula	Prashant Mohite
15:05–15:10	Prediction of Post-Operative Pulmonary Function after Pulmonary Lobectomy using Quantitative CT Volumetric Analysis Derived Equation	Chee Fui chong
15:10–15:15	Uniportal Vats: Experience from a Single Centre	Amit Modi
15:15–15:20	Effectiveness Of Vats Decortication And Intrapleural Antibiotic Washout In The Management Of Empyema Thoracis	Amit Modi
15:20–15:25	Vats Systematic Mediastinal Nodal Dissection And Stage Migration: Impact on Clinical Pathway	Imthiaz Manoly
15:25–15:30	Is Thoracoscopic Lobectomy Safe in Octogenarians?	Imthiaz Manoly
15:30–15:35	**Invited Comments**	
15:35–15:40	Vats in the Surgical Treatment of Pulmonary Hydatid Cysts	Tarek Kilani
15:40–15:45	Surgical Treatment Of Pulmonary Hydatid Cyst: A Report of 2794 Operated Cases	Tarek Kilani
15:45–15:50	Pulmonary Hydatid Disease: Is Capitonnage Mandatory Following Cystotomy?	Muhammad Shoaib Nabi
15:50–15:55	Minimally Invasive Single Stage Approach For Multi Systemic Abdomino Thoracic Hydatidosis: A Viable Alternative	G.N. Lone
15:55–16:00	**Invited Comments**	
16:00–16:05	Ivor Lewis Esophagectomy with Two-Field Lymphadenectomy for Carcinoma of the Thoracic Esophagus-10 Years Experience in a Tertiary Care Hospital	Nadeem Kawoosa
16:05–16:10	Complications Requiring Reoperation after Oesophagectomy for Oesophageal Carcinoma: 10 Years Experience in a Tertiary Care Hospital in Kashmir	Nadeem Kawoosa
16:10–16:15	Our Experience with the Diagnosis and Treatment of Esophagus Perforation	Calin Tunea
16:15–16:30	**Invited Comments**	

22 OCTOBER 2010

VENUE: 'DHANVANTRI' HALL
TIME: 14:30–16:30
SESSION: HEART FAILURE
DISCUSSANTS: ANIL JAIN, JANARDHANA REDDY, D.S. THANIKACHALAM
CHAIRPERSON: RAGHAVAN SUBRAMANYAN, RIMANTAS BENETIS

TIME	TOPIC	PRESENTER
14:30–14:40	Use of Echocardiography in Predicting the Clinical Course of Patients with Cardiomyopathy and Those on Assist Devices	Michael Dandel
14:40–14:45	Assessment of Electro-Mechanical Dissynchrony in Patients with Ischemic Heart Failure	Elena Golukhova
14:45–14:50	Everolimus Prevents Endomyocardial Remodeling after Heart Transplantation	Corinna Proch

14:50–14:55	Stanford Type B Lesions in Coronary Angiography Indicate Microvascular Dysfunction after Heart Transplantation	Corinna Proch
14:55–15:00	Adaptive Growth and Remodelling of Transplanted Hearts in Children	Eva Maria Delmo Walter
15:00–15:05	**Invited Comments**	
15:05–15:10	Hyperthrophic Cardiomyopathy: A Modern Look on the Development and Stages Of Treatment	Kostyantyn Rudenko
15:10–15:15	Isolated Extended Myectomy to Correct Mitral Disease and Left Ventricular Outflow Gradient in Hypertrophic Obstructive Cardiomyopathy	Caterina Simon
15:15–15: 20	**Invited Comments**	
15:20–15: 25	Ecmo for the Treatment Of Severe Respiratory and Heart Failure Following Cardiac Surgery	Robertas Samalavicius
15:25–15:30	Biventricular Circulatory Support with Two Implantable Assist Devices	T. Krabatsch
15:30–15:35	Anticoagulation Management During Centrimag Right Ventricular Assist Device Support After Heartmate Ii Implantation	Alexander Stepanenko
15:35–15:40	**Invited Comments**	
15:40–15:45	Radio Frequent Markers for Optimization of Dor Procedure in Patients with Ventricular Tachycardia	Vadim Babokin
15:45–15:50	Dilated Cardiomyopathy: Is Suture Annuloplasty Really Forgotten?	Zivojin Jonjev
15:50–15:55	Mid Term Results of Surgical Ventricular Restoration: Left Ventricular Shape And Size Influence on Cardiac Function, Clinical Status and Survival	Vishal Gupta
15:55–16:00	Ischemic Mitral Regurgitation in Patients with Left Ventricular Dysfunction	Andrey Marchenko
16:00–16:05	LV Reconstructive Surgery: Prognostic Value of Myocardial Viability Recognized by Low-Dose Dobutamine Echocardiography	Irena Butkuviene
16:05–16:10	Mid Term Results of Mitral Ring Annulopalsty for the Surgical Treatment of Functional Mitral Regurgitation in Ischemins Dialted Cardiomyopathy.	Rajan Modi
16:10–16:15	The “Lociman” Syndrome: Diagnosis, Treatment, and Outcomes	
16:15–16:20	**Invited Comments**	
16:20–16:30	26 Years of Heart Transplant Program in Ikem	Jan Pirk

22 OCTOBER 2010

VENUE: ‘SUSHRUTA’ HALL
TIME: 14:30–16:30
SESSION: EVOLVING TECHNOLOGY, ARRHYTHMIAS & MISCELLANEOUS
DISCUSSANTS: NAREN VYAVAHARE, ANIL G. TENDOLKAR, AMIT BANERJEE
CHAIRPERSON: J.M. THARAKAN, M.D. DIXIT

TIME	TOPIC	PRESENTER
14:30–14:40	Eecp Reverse the Left Ventricle Remodeling in Patient with Moderate Left Ventricular Dysfunction by Improving Myocardial Perfusion	Ramasamy
14:40–14:45	Safety and Efficacy of Stem Cell Transplant in Cardiac Diseases: Early Results	Supreet Chopra
14:45–14:50	Myocardial Shock Wave Therapy for Non-Invasive Cardiac Revascularization	Gitana Zuozienė
14:50–14:55	Initial Clinical Experience with Incor Superior Left Ventricular Assist Device	Alexander Stepanenko
14:55–15:00	**Invited Comments**	
15:00–15:05	First Experience of Tri-Leaflet Heart Valve Prostheses Tricardics in Patients With Aortic and Mitral Heart Disease	Ivanov Victor
15:05–15:10	A New Stented Bioprosthesis to Optimize The Effective Orifice Area and Hemodynamic Performance of a Porcine Valve: Design and Preclinical Evaluation	Thomas Theologou
15:10–15:15	Performance of Russian Mechanical Valve Brands	Vladimir Nazarov
15:15–15:20	Performance of a New Annuloplasty Ring Prototype In Vivo Implantation for Annular Dilatation in an Animal Model of Chronic Tricuspid Regurgitation	Eva Maria Delmo Walter
15:20–15:25	Transapical Aortic Valve Implantation: Excellent Results in Very High-Risk Patients	Axel Unbehaun
15:25–15:30	**Invited Comments**	
15:30–15:35	Aortic Surgery in Octogenarians	Christof Stamm

15:35–15:40	Cardiac Surgery in Octogenarians is Associated with Acceptable Mortality and Above Average Quality of Life	Uday Dandekar
15:40–15:45	Combined Surgery for Heart Disease and Severe Pectus Excavatum	Christof Stamm
15:45–15:50	Minimally Invasive Pectus Excavatum Repair in Adults	Hannes Vogt
15:50–15:55	Our Experience in Diagnosis and Treatment of Symptomatic Myocardial "Bridges	Olena Gogayeva
15:55–16:00	Use of Flouro to Facilitate a Really Minimally Invasive and Safe Open Heart Surgery	Harinder Singh Bedi
16:00–16:05	**Invited Comments**	
16:05–16:10	Surgical Treatment of Atrial Fibrillation Combined with Rheumatic Valve Disease Using a Bipolar Radiofrequency Ablation System	Bruno Marques
16:10–16:15	Left Atrial Versus Complete Maze Ablation Procedure During Valve Surgery	Alexandr Bogachev-Prokophiev
16:15–16:20	Clinical Outcomes of Minimally Invasive Surgical Ablation for Isolated Atrial Fibrillation	Mehul Patel
16:20–16:25	Concomitant Atrial Fibrillation Ablation Using Epicardial High Intensity Focused Ultrasound	Samer Bazerbashi
16:25–16:30	The Outcomes of Bipolar Radiofrequency Modified Maze Procedure for Treating Concomitant Atrial Fibrillation in Valve Surgery	Zhiyong Liu
16:30	**Invited Comments**	

22 OCTOBER 2010

VENUE: 'CHARAKA' HALL
TIME: 14:30–15:30
SESSION: PEDIATRIC CARDIOLOGY
DISCUSSANTS: SNEHAL KULKARNI, SHANTHI, C
CHAIRPERSON: PREM SEKAR, INDRANI SURESH

TIME	Topic	Author name
14:30–14:35	Myocardial Performance Index in The Assessment of Cardiac Function in Patients after Surgical Correction of Tetralogy of Fallot	Girish Sharma
14:35–14:40	Multi Slice Cardiac CT Imaging in Congenital Heart Diseases	Periyanarkunan Ramaiya Murugesan
14:40–14:45	Fetal Echocardiography in a Developing Country: Referral Patterns and Impact on Outcomes of Congenital Heart Disease	Balu Vaidyanathan
14:45–14:50	Adults With Congenital Heart Disease is an Expanding and Underestimated Population. Can We Predict The Future Demand?	Nicolas Nikolaidis
14:50–14:55	Preliminary Results of Using Stem Cells Transplantation for Pediatric Patients in Case of Dilated Cardiomyopathy	Lacis
14:55–15:00	**Invited Comments**	
15:00–15:05	Congenital Heart Surgery: Surgical Performance According to the Aristotle Complexity Score	Nicodème Sinzobahamvya
15:05–15:10	Mid-Term Results of the Screening and Treatment of Congenital Heart Disease at High Altitude: The Touching Hearts in Tibet Program	Matthew Geppert
15:10–15: 15	Bringing the West to the East: A Fruitful Combination to Help Children in Vietnam With Cardiac Disease	T. Theologou
15:15–15:20	Detection of Congenital Heart Disease Using 5 Minute Exercise Screening for High Altitude, Rural Tibetan Children	Bradley Keller
15:20–15:25	Flash Pulmonary Edema Following TOF Repair	Sudeep Verma
15:25–15:30	**Invited Comments**	

VENUE: 'CHARAKA' HALL
TIME: 15:30–16:30
SESSION: AORTA & VASCULAR
DISCUSSANTS: ANIL BHAN, VIJAY SHANKAR
CHAIRPERSON: G.B. PARULKAR, K.S. NEELAKANDHAN

TIME	TOPIC	AUTHOR NAME
15:30–15:35	Hybrid Management in Patients with Complex Aortic Pathology – Single Center Experience	Dimitar Petkov
15:35–15:40	Pitfalls in Sizing of Stent-Grafts for Acute Traumatic Aortic Rupture by Diameter Changes with Hypotension	Burkhart Zipfel

15:40–15:45	Importance of Distal Aortic Stump Construction in the Surgical Repair for Stanford Type A Aortic Dissection	Yoshimasa Seike
15:45–15:50	Aortic Root Repair: Alternative of Valve Spearing and Florida Sleeve	Paata Kalandadze
15:50–15:55	Contemporary Application of Cryopreserved Allograft Aortic Valves for Aortic Root Procedures	Charles Yankah
15:55–16:00	**Invited Comments**	
16:00–16:05	Repair of Large Aneurysm of the Distal Arch and Descending Thoracic Aorta-Analysis of the Technical Aspects of the Procedure	C.J. Ashok Kumar
16:05–16: 10	Follow Up of Patients after Aortic Root Reconstruction Operations with Toronto Root and Stentless Aortic Valve and Evaluation of Early and Midterm Clinical and Hemodynamic Outcomes	Ruta Jurgaitiene
16:10–16: 15	Alternative Techniques in Surgical Approach to Chronic Total Occlusion of Abdominal Aorta	Ömer Tetik
16:15–16:20	Initial Experience with The Jetstream™ Pathway Device for Femoro-Popliteal Disease	Imran Javed
16:20–16:25	The Radial Artery as a Conduit in Femoro-Popliteal Bypass	Harinder Singh Bedi
16:25–16:30	Efficacy and Safety of a Low Molecular Weight Heparin Bemiparin in Vascular Trauma Patients in the Disturbed State of Kashmir	Abdulmajeed Dar
16:30	**Invited Comments**	

22 OCTOBER 2010

VENUE: 'J.C. BOSE' HALL
TIME: 14:30–16:30
SESSION: BASIC SCIENCES
DISCUSSANTS: SOMA GUHATHAKURTA, H. DEVARAJ
CHAIRPERSON: SATYAMURTHY, SARANYA, PREMA GURUMURTHY

TIME	TOPIC	AUTHOR NAME
14:30–14:35	Spontaneously Contractile Three-Dimensional Artificial Myocardium for Repair of Large Myocardial Defects	Bijoy Chandapillai Karikkineth
14:35–14:40	The Impact of Age on the Outcome of Cardiac Cell Therapy	Christof Stamm
14:40–14:45	Hypoxic Environment Influences the Immunomodulatory Properties of Adipose Tissue-Derived Human Mesenchymal Stem Cells	Christof Stamm
14:45–14:50	Influence of Bone-Marrow Derived Progenitor Stem Cells on Cardiac Remodelling on A Placebo-Controlled Clinical Trial Involving Patients with Congestive Heart Failure	Tea Kakuchaya
14:50–14:55	Modulation of Inflammation Associated with Cardiac Ischaemic Injury using a Novel Anti-Human Monoclonal Antibody	Ishtiaq Ahmed
14:55–15:00	Artificial Nanoemulsion Carrying Paclitaxel Decreases The Cardiac Allograft Vasculopathy in a Rabbit Model	Noedir Stolf
15:00–15:05	Implantation of a Functional Tissue Engineered Stentless Pulmonary Valve Using Bone-Marrow-Derived Mesenchymal Stem Cells and Circulating Endothelial Progenitor Cells	Eva Maria Delmo Walter
15:05–15:15	**Invited Comments**	
15:15–15:20	A Computational Approach Towards Improving Hemodynamics in an End-To-Side Anastomosis	Meena Sankaranarayanan
15:20–15:25	Electrospun Polymeric Nanofiber Reinforced Porcine Pulmonary Xenograft as a Versatile Conduit in Cardiovascular Surgery	Satish Galla
15:25–15:30	Spontaneous Differentiation of Chicken Embryonic Stem Cells Towards Beating Cardiomyocytes	Dillip Kumar Bishi
15:30–15:35	Screening For Mutation in Nkx2.5 (Exon 1, 2) and Gata 4 (Exon3, 4) Gene in Congenital Heart Disease Patients Among Fll Population	Anbarasan Chakrapani
15:35–15:40	LQT Syndrome – Scope For Molecular Study Based Personalized Medicine	Bhimashankar
15:40–15:45	Genetic Variation on Apolipoprotein B and Risk of Coronary Artery Disease Among South Indians	M. Ashok Kumar
15:45–15:50	Effect Of Green Tea on Copper Induced Oxidation of Low Density Lipoprotein	Sheela Sasikumar
15:50–15:55	Use of Ischemic Conditioned Media for the Differentiation of Human Mesenchymal Stem Cells Towards Precursor Cardiomyocytes: A Novel Approach	Balasundari Ramesh
15:50–16:00	Evaluation of In-Vivo Reactivity of Indigenously Processed Xenografts in Human	Santhosh
16:05–16:10	Morpho-Physiological Aspects of Bio-Prosthesis in Valvular Heart Disease: Applying the Experience to Improve Durability of Bio-Prostheses	Ravishankar Polisetty

16:10–16:15	The Understanding of Fundamentals of Cardiac Regeneration and Role of Immunomodulation: A Novel Approach in Treating Ischemic Heart Disease	Ravishankar Polisetty
16:15–16:30	**Invited Comments**	

23 OCTOBER 2010

VENUE: 'CHARAKA' HALL
TIME: 14:30–15:30
SESSION: INTERESTING CASE PRESENTATIONS
DISCUSSANTS: B.R. JAGANNATHAN, ANIL G. TENDOLKAR
CHAIRPERSON: DIXIT, MD, MANOHARAN

TIME	Topic	Author name
14:30–14:35	Desending Necrotizing Mediastinitis	Hamid Davari
14:35–14:40	Primary Cardiac Lymphoma Causing Right Atrial Occlusion	Thomas Theologou
14:40–14: 45	Case Reports of Two Patients with Acute Pulmonary Embolism Undergoing Trendelenburg Operation Procedures	Stefan Saenger
14:45–14:50	Case Report: Acute Thrombosis of a Mechanical Mitral Valve Prosthesis in a 45 Year Old Woman with Missed Abortion After 4 Weeks of Pregnancy	Stefan Saenger
14:50–14:55	Undiagnosed Acute Coronary Heart Disease Concealed by Acute Type B Dissection	Jack Parker
14:55–15:00	**Invited Comments**	
15:00–15:05	Tako-Tsubo Like Syndrome After Coronary Artery Bypass Surgery	Ibrahim yassin
15:05–15:10	An Unusual Site of Aorta-Left Ventricular Tunnel: A Case Report	S.L. Girish Gowda
15:10–15:15	An Interesting of Coronary AV Fistula	shivan Raj Ayyanathan
15:15–15:20	Emergency Surgical Intervention after Unsuccessfully Pta and Stenting of Aortic Coarctation.	Dimitar Nikolov
15:20–15:25	Successful Surgery for Two Valve Prosthetic Endocarditis Joined with Mediastinitis in a Child	Tomas Tlaskal
15:25–15:30	**Invited Comments**	

23 OCTOBER 2010

VENUE: J.C. BOSE' HALL
TIME: 15:30–16:30
SESSION: SCORES AND DATABASE IN CARDIAC SURGERY
DISCUSSANTS: KATHY JENKINS, SARAVANA GANESH
CHAIRPERSON: SIVAPRAKASHA, B.S. MURTHY

TIME	Topic	Author name
15:30–15:35	Prospective Risk Stratification in Adult Cardiac Surgical: Cases Using the Euroscore Model in North Indian Population	B.S. Pillai
15:35–15:40	Evolution of the Max Cardiac Surgical Database Project: Achievements and the Road Ahead	Neerav Bansal
15:40–15:45	The Logistic Cardiac Surgery Score: A New Severity Scoring System for Outcome Prediction in Intensive Care Unit Patients after Open Heart Surgery.	Fabian Doerr
15:45–15:50	Serial Evaluation of the Logistic Organ Dysfunction Score (LODS) in Patients Undergoing Cardiac Surgery	Fabian Doerr
15:50-16:00	**Invited Comments**	
16:00-16:05	Evaluation of Sequential Organ Failure Assessment (SOFA) Subscores in 2801 Cardiac Surgery Patients	Akmal M.A. Badreldin
16:05-16:10	The "2nd Italian Cabg Project": Short-Term Outcomes in Patients with Coronary Artery Bypass Graft Surgery	Fulvia Seccareccia
16:10-16:15	Impact of Age on the Performance of an Empirically Derived Risk Stratification Model for Patients Undergoing Coronary Surgery: Should Risk Assessment Modeling for Elderly Patients be Improved?	Fulvia Seccareccia
16:15-16:30	**Invited Comments**	

FACULTY ABSTRACTS

21 Programme Invited Lectures

Plenary Hall Lectures 21st October 2010

PRELUDE TO 20TH WSCTS

Probal Ghosh
Israel

A March to the Drummer

I, on behalf of Dr. Cherian and his group welcome you all to the feast of knowledge in this 20th congress of WSCTS (world society for cardiothoracic surgery) and the meeting of GFHM (global forum of humanitarian medicine).

The program in this meeting attempts to reflect the contemporary efforts in different directions of cardiothoracic surgery (CTSx). Its horizons have both expanded and contracted in different areas over last 60 years.

Growth and evolution of CTSx over last 60 years – from its infancy to current maturity – is a story of translation of ideas and innovations to cardiac care service of the mankind. Not all ideas were great. It paralleled almost the Sermon on the Mount – many were called but few were chosen. If you plod through the US Patents history or archives of PTO, you would find a large examples of stupid patents. At the same time I personally know of several patent applications from many corners of the world which were not granted. We do not underestimate the importance of chasing apparently expensive ideas (in today's terms) if there is enough room of R & D to make it more available to billions of humanity. The determinants of success of ideas/innovations were not just fruitful commercialization or early commercial success but also the locale/s, time frame, changing epidemiology and changes in patient subsets, perceived ideas, local health care reimbursement policies, market volume, technologies in transition, political and legal standards of individual country.

CTSx, as it stands today is mostly a spin-off of the 20th century efforts – mostly in USA and Europe. Though it started in many Soth American and Asian Countries nearly 60 years ago, the lessons learned there, were studiously ignored many times. Several years back Global Forum on Health Research (GFHR) enunciated its now-famous 90-10 principle (which states that 90% resources were dedicated to 10% maladies). A schism seems to appear in the priorities of the affluent world and not-so-affluent parts of the world. TAVI (transcutaneous aortic valve implantation) is just one example – it may be innovative in the aging population in the West but is of little relevance today to the rest of the 4.5 billion inhabitants of the globe.

CTSx today is still a work in progress. Einstein once wrote about the Americans – always becoming, not being. The same is true about CTSx. Perhaps it is a victim of its own success. Criteria of successful CTSx 60 years back were vastly different from what it is today as it has impacted its sister disciplines too namely Cardiology and to a lesser extent, pulmonology.

D in R&D is as important as the preceding R as in Research. Development is often accompanied by greater awareness of the alternative options and greater tolerance and a heightened

commitment to increased quality of treatment and cost-efficiency making it available to greater number of patients. Enhanced cost of treatment does not denote quality of service. Profit from cardiac care industry is not the sole parameter of success.

Rating Agencies

Has the time come for international rating agency for determining the country-wise quality and quantity of cardiothoracic surgery? In the world of finance we have S&P, Moody's Fitch, several European agencies, Chinese agency and Indian just to name a few. In reality the world had been dominated by the opinion-makers at 3 US agencies – just as in CT Surgery. As the great world recession has shown over the last 18 months, the opinion-makers at S&P, Moody's and Fitch are not sacrosanct – in fact their analysis may even had been colored a little. In the realm of CT surgery, many of us have thought the same way for a long time.

I early August, the Newsweek described: To be creative requires divergent thinking (generating many unique ideas) and then convergent thinking (combining those ideas into the best results). That divergent thinking comes from exposure to divergent cultures and peoples and cultural disciplines. The next step is assimilation of ideas and lateral thinking to initiate synthesis. Modernity is an openness to change, an ability to accommodate newness and a willingness to shed the past. There is a furious search for self-definition these days. That openness, that pulse of perpetual urge for reinvention will be seen in the debates and the workshops in the program of WSCTS and the GFHM to eke out new pathways.

I shall address the next point to our younger colleagues in these meetings. Is there a message to take home? Yes. The basic message in CT surgery is: DO NOT PRESUME. Presumptions are the banes on the way to finding facts which change on the grounds continually. As the program adequately indicates, there are rooms to acquire maturity and understanding. The key questions remains: What works in your hands, in your center? It is not just can we do it? If yes, next question is: should we do it? If you think, maybe, think again. Are the results better? In the short term? In the long term? Who pays for it? No one dimensional answer suffices any more. The final endpoints So absorb the information and ponder.

Welcome to the feast of knowledge that ensues.

Thank you all.

MODERN ASPECTS OF SURGICAL MITRAL VALVE REPAIR

John W. Kirklin Memorial Oration

Ottavio Alfieri, Italy

In patients with degenerative mitral regurgitation (MR), the goal of mitral valve repair is to neutralize the disease, that is to say to offer a survival and a quality of life similar to the matched population. Early surgery and appropriate techniques are crucial to achieve neutralization of the disease. This statement will be substantiated by the evidence of the data.

Rheumatic MR can be treated with conservative surgery in selected patients, but long-term results remain suboptimal.

In regard to functional MR, the role of undersized annuloplasty will be discussed and the patients likely to benefit from concomitant procedures will be identified.

Also patients in whom mitral valve replacement is necessary will be recognized as well as patients for whom percutaneous methods represent a reasonable option.

PCI VS CABG FOR PATIENTS WITH MULTIVESSEL DISEASE

Bernard J. Gersh
USA

In regard to the randomized trials of CABG and medical therapy, the major benefit of CABG on survival was in "sicker" patients based upon the severity of symptoms and ischemia, left ventricular dysfunction, LMCA/proximal LAD disease, and multivessel disease.

The trials of CABG and PCI, however, demonstrated no differences in the "hard" endpoints of death and MI; the only exception being in the diabetic subgroup in the BARI trial in which there was a substantial reduction in mortality with CABG. The explanations are multifactorial and may relate in part to the greater severity of disease in diabetic including diffuse disease, chronic total occlusions and left ventricular dysfunction. Diabetics comprise a "sicker" subgroup characterized by aggressive disease progression and diffuse disease and as such anatomically, may experience a greater benefit from CABG versus PCI in that surgery bypasses not just "culprit" lesion but also "future culprits." The comparison between randomized and non-randomizable patients in the BARI registry provides additional explanations for the mortality difference noted in the randomized trials. It would appear that the process of randomization resulted in patients undergoing PCI but when the decision was left to the discretion of the physician as was the case in the registry; such patients were much more likely to undergo CABG. In other words, the superiority of CABG in the BARI trial may be due to an independent effect of diabetes (diffuse and severe progressive diseases, etc.), but the magnitude of the difference was enhanced by the baseline characteristics related to the process of randomization. This is an interesting example of the different types of information that can be obtained from registries versus randomized trials.

The management of coronary artery disease in both diabetics and nondiabetics is changing as the benefits of secondary prevention become increasingly appreciated. The clinical impact of aggressive risk factor reduction in addition to the widespread use of drug-eluting stents are being evaluated in ongoing trials of CABG/PCI and medical therapy, including several confined to diabetics.

References

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MULTI-VESSEL REVASCULARIZATION–STENT VS. SCALPEL

A.P. Kappetein, F. Mohr, M.C. Morice, S. Garg, P.W. Serruys
Netherlands

Recent years have seen an ongoing debate as to whether coronary artery bypass graft (CABG) surgery or percutaneous coronary intervention (PCI) is the most appropriate revascularisation strategy for patients with coronary heart disease (CAD). The Synergy between Percutaneous Coronary Intervention with TAXUS and Cardiac Surgery (SYNTAX) study was conducted with the intention of defining the specific roles of each therapy in the management of de novo three-vessel disease or left main CAD. Interim results after 12 months show that PCI leads to significantly higher rates of major adverse cardiac or cerebrovascular events compared with CABG (17.8 versus 12.4; $P = .002$), largely owing to increased rates of repeat revascularisation. However, CABG was much more likely to lead to stroke. Interestingly, categorisation of patients by severity of CAD complexity according to the SYNTAX score has shown that there are certain patients in whom PCI can yield results that are comparable to, if not better than, those achieved with CABG. Careful clinical evaluation and comprehensive assessment of CAD severity, alongside application of the SYNTAX score, can aid practitioners in selecting the most suitable therapy for each individual CAD patient.

Since their inception, both PCI and CABG have undergone significant developments that have reduced rates of morbidity and mortality despite the increasing age and prevalence of comorbidities in the patient population receiving revascularisation. Advances in cardiac surgery include off-pump CABG, enhanced myocardial preservation, improvements in anaesthesia, preoperative risk assessment and post-operative care, and an increased use of arterial conduits, which have reduced the rate of graft occlusion. In patients treated with PCI, improvements in technology and antiplatelet therapy coupled with landmark studies have effectively led to the replacement of balloon angioplasty with coronary artery stenting, which is the current preferred method of PCI.

The selection of appropriate therapy for CAD has been the subject of continuing debate for many years. Several studies comparing the use of bypass surgery and coronary bare-metal stents (BMS) in patients with multivessel disease have revealed higher rates of repeat revascularisation at five years in patients treated with BMS, while those patients treated with CABG have higher rates of stroke. Nevertheless, overall survival has been comparable between both groups. However, seminal improvements in treatment options have now rendered these studies historical in their applicability to contemporary practice. The introduction of drug-eluting stents (DES) has greatly enhanced the PCI approach to managing CAD, with demonstrated superiority in reducing restenosis over their bare-metal predecessors while maintaining similar rates of death and myocardial infarction (MI). These reductions in restenosis and re-intervention have also been reproduced in patients with multivessel disease and left main disease, such that the use of PCI has expanded to the treatment of patients with severe CAD. Nevertheless, to date the use of PCI in this patient population has not been supported by adequate data from evidence-based medicine or sufficiently powered randomised clinical trials. Indeed, current guidelines state that CABG remains the gold standard and treatment of choice for patients with severe CAD, including three-vessel disease and left main CAD.

The SYNTAX Study

The Synergy between Percutaneous Coronary Intervention with TAXUS and Cardiac Surgery (SYNTAX) study was designed to assess the optimum revascularisation strategy for patients with de novo three-vessel or left main CAD. To avoid criticism that patients enrolled would be non-representative of real-world patient cohorts, the SYNTAX trial adopted an all-comers design in which all eligible patients with de novo three-vessel or left main CAD were included.

Two year results

Two-year results from the on-going SYNTAX trial show significantly higher rates of MI with PCI when compared to CABG.

At two years the long term durability of CABG is starting to show. The early, higher rate of some complications associated with CABG in the first year, including stroke, have now reversed. In the first year MI occurred in 3.3% of CABG patients compared to 4.8% of PCI patients. In the second year only 0.1% of CABG patients had a MI, compared to 1.2% of PCI patients.

Differences between the two groups were small in patients with low SYNTAX scores and much bigger in patients with high SYNTAX scores. Patients with a SYNTAX score in the top tercile had event rates of 28.2% in the PCI group compared to 15.4% in the CABG group ($P < .001$).

Almost 96% of the original trial numbers were included in the two-year analysis: 836 in the CABG arm and 885 in the PCI arm. At two years, MACCE rates were significantly different between the two groups, driven by a repeat revascularization rate in PCI-treated patients that was more than double that of the CABG-treated group. The significantly higher rate of strokes seen in CABG-treated patients at one year was also seen by two years, but the difference appeared to be a carryover from the first 12 months, since very few strokes occurred between the one- and two-year mark in either group. For the hard end point of death/stroke/MI, there were no significant differences between the two groups.

Two-year outcomes for SYNTAX

End point	CABG (%)	PCI (%)	*P*
All-cause death	4.9	6.2	.24
All stroke	2.8	1.4	.03
Stroke before 1 y	2.2	0.6	.003
Stroke after 1 y	0.6	0.7	.82
MI	3.3	5.9	.01
MI before 1 y	3.3	4.8	.11
MI after 1 y	0.1	1.2	.008
All-cause death, stroke, MI	9.6	10.8	.44
Repeat PCI	8.6	17.4	<.001
MACCE	16.3	23.4	<.001

The rates of MACCE were no different between the two revascularization strategies for patients who were low risk by SYNTAX score at baseline (17.4% for CABG, 19.4% for PCI; $P = .63$). But as that risk rose, so too did the curves begin to separate: in patients with intermediate risk by SYNTAX, MACCE rates were 16.4% for CABG-treated patents and 22.8% for PCI-treated patients, just missing statistical significance ($P = .06$). In high-risk patients, CABG was clearly the winner, with MACCE rates of 15.4% versus 28.2% in the PCI-treated group ($P < .001$).

As with the one-year results, the two-year outcomes differed according to whether the patients were enrolled in the study for treatment of three-vessel disease or for left main stenting. The subset analysis included low numbers and was not appropriately powered, so it had to be considered only hypothesis-generating. But at least for the primary MACCE end point, event rates were significantly lower in CABG patients with three-vessel disease—14.4% versus 23.8% ($P < .001$)—but were no different, statistically, between the groups for patients with left main disease—19.3% for CABG, 22.9% for PCI ($P = .27$)

Longer follow-up is needed and the patients will be followed up until 5 years. At the time of the meeting the 3 years results will also be available and presented.

EVOLUTION OF CONTINUOUS FLOW: FROM TEMPORARY SUPPORT TO TOTAL HEART REPLACEMENT

Howard Frasier
USA

The introduction of nonpulsatile cardiopulmonary bypass initiated controversy over the importance of pulsatility, which was thought to be a required physiologic component of the circulatory system. Although nonpulsatile support was shown to be feasible for short-term use, its longer-term use was less accepted. The Hemopump, introduced clinically in 1988, was the first implantable, continuous-flow circulatory support device to be used for periods of up to one month within the circulatory system. The demonstration of the feasibility of continuous flow with the use of a rapidly rotating (25,000 RPM) pump encouraged further development of implantable continuous-flow pumps for long-term support. Experimental, in-vivo studies of the Jarvik 2000 pump showed the feasibility of blood-washed bearings, providing evidence for the potential clinical use of this technology. Before this, it was believed that the use of non-lubricated bearings in the blood stream was not feasible. Early experience using this technology in bridge-to-transplant patients was successful, and the Jarvik pump was implanted in the first patient as destination therapy in June of 2000. This patient survived 7½ years and died of causes unrelated to the pump. The pump, after 7½ years of use, showed minimal bearing wear. The durability of the Heartmate II and the Jarvik, two of the most widely used continuous-flow implantable pumps, is believed to be greater than 15 years. On the basis of this experience, efforts have been directed toward total heart replacement. Continuous-flow pumps respond to the normal Starling mechanism, and this technology seems to be ideal for total heart replacement. Since 2005, studies in our laboratory involving total heart excision and replacement with continuous-flow pumps have shown the potential of this technology.

MYOCARDIAL BIOMECHANICS IN MITRAL REGURGITATION

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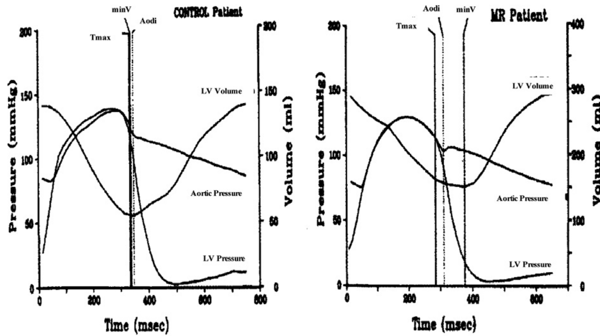
Abnormal coaption of mitral valve leaflets during systole creates a regurgitant orifice. The systolic pressure gradient between the left ventricle and the left atrium acts as the driving force for regurgitant flow resulting in a regurgitant volume. Given that the regurgitant volume represents a percentage of total left ventricular ejection, it may be expressed as a regurgitant fraction. The regurgitant volume creates a form of hemodynamic stress of pure left ventricular stretch in the absence of high pressure systolic load. The degree of volume overload depends on the area of the regurgitant orifice, regurgitant gradients and duration of systole (Torrecilli orifice equation). The eccentric left ventricular hypertrophy seen in mitral regurgitation is typically less severe than in aortic regurgitation despite a usually larger gradient and orifice. In mitral regurgitation the left ventricle is unloaded in both early and late systole via ejection into the low pressure left atrium whereas in aortic regurgitation the result of excess volume is ejected into the high pressure aorta. These inherent differences in volume overload states are reflected by the lower left ventricular mass and mass-to-volume ratio in patients with mitral regurgitation compared to patients with aortic regurgitation.

In mitral regurgitation the simultaneous left ventricular pressure volume relationship (figure) demonstrates the loss of isovolumic contraction and the separation of end systole defined by aortic dicrotic notch (Aodi), minimum volume (minV) and maximum tension (Tmax) due to ejection into the low pressure left atrium. The decrease in systolic load causes a marked increase in left ventricular end diastolic volume that over time outpaces the increase in left ventricular mass resulting in an increase in systolic wall stress as a late development in the cause of mitral regurgitation.

Patients with mitral regurgitation may remain compensated without symptoms of heart failure for many years. The eccentricity index demonstrates a progressive increase in left ventricular sphericity over time. Only in the very late stages of chronic mitral regurgitation does the chamber stiffness and pressure volume curve shift towards reduced ventricular compliance. Given the

prevalence of mitral regurgitation and the potential for progressive myofiber damage even in the absence of symptoms, understanding the pathophysiology of mitral regurgitation is essential for the rational timing of mitral valve surgery.



VIENNA EXPRIENCE WITH VENTRICULAR ASSIST DEVICES

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Austria

Since the wordwide first succesful clincal use of the Micromed DeBakey VAD as bridge to transplantation in our unit in Vienna (Circulation 2000),more than 200 pulsless VAD were used at the departement of cardiothoracic surgery at the university of Vienna. The following VAD are in clinical use:

- Micromed DeBakey
- Heartmate 2
- Dura Heart
- Heartwere

We will discuss the physiology of pulsless circulation, own results and same international studies.

CARDIAC RESYNCHRONISATION THERAPY FOR HEART FAILURE

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Introduction

Despite optimal pharmacologic treatment, prognosis of patients with heart failure remains poor. Annual mortality among patients with (NYHA) class II Heart failure is approximately 5%-15%, but rises steeply to 20%-50% among those with functional class III-IV symptoms. A subset of patients with heart failure develop left bundle branch block which results in dysynchrnous contraction of the ventricle. Cardiac Resynchronisation therapy (CRT) improves hemodynamics in these patients. Several randomized controlled studies have demonstrated improvement in symptoms, exercise capacity and systolic left ventricular (LV) function, resulting in reduction of hospitalization and better survival with CRT as compared with optimal medical therapy alone.

Indications for CRT include

1. Dilated cardiomyopathy (Ischaemic or idiopathic).
2. LVEF 35% or less
3. Wide QRS ≥120 msecs
4. CHF symptoms class III/IV despite optimal medical therapy (max tolerated dose of ACEI/ Beta blockers)

The Caveats in present criteria are:

1. Wide QRS may not always identify Dyssynchrony. Some of these patients may have other correctable factors like (CAD/LV aneurysm etc.)
2. Patients with Narrow QRS may also have Dyssynchrony (this is restricted to a small percentage of patients and the benefit from CRT is unclear in this subset).

Patient selection and site of LV pacing are important factors for successful outcome. Echocardiography (in particular, tissue Doppler imaging, Strain and Strain rate imaging) is useful in identification of potential responders to CRT. LV Lead has to be in the mid lateral aspect of LV for optimal results.

CRT is an integral part of heart failure management In combination with an ICD, it significantly reduces morbidity and mortality in patients with advanced heart failure.

ALTERNATIVES THERAPIES FOR HEART FAILURE: A LOOK INTO THE FUTURE

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Chronic heart failure (HF) is one of the major health care issues in terms of increasing number of patients, rate of hospitalizations and costs. Heart transplantation is the best established therapy for patients with severe heart failure. However, the number of donors limits the activity to 5000 heart transplants performed annually worldwide. This limitation has generated alternative treatments. The increase of the interest in the reversibility of the HF and the application of new biological alternatives has generated therapeutic strategies designed to integrate biology and medical technologies in order to act through the biomechanical, the molecular and the neurohormonal mechanisms of heart failure. These treatments include biological approaches (stem cell therapy), tissue engineering using nano-bio-technologies, ventricular constraint, surgical left ventricular restoration as well as mechanical ventricular assistance as destination therapy, bridge to recovery or bridge to transplantation. Great interest exists in the revival of Cardiac Bioassist procedures. The integrated development of these approaches could offer hopeful treatments.

Emerging therapeutic strategies which integrate biology with mechanical assist devices could offer hopeful HF therapy. Immunoadsorption (IA) seems to be useful for the treatment of patients presenting idiopathic dilated cardiomyopathy (DCM). Activation of the humoral immune system, simultaneous to the production of cardiac autoantibodies, could play a functional role in the ventricular dysfunction occurred in DCM patients. Influencing the humoral immune system through immunoadsorption could offer a hopeful therapy by intervention into the autoimmune process in DCM patients with symptomatic HF.

Left Ventricular Remodeling Process

The chronic effect of the compensatory changes of the ventricular chamber to HF is known as “remodelling”. This process includes ventricular dilation and neurohormonal activation. LV

dilation increases wall stress according to Laplace´s Law. Increased wall stress secondary to ventricular dilation results in increased oxygen consumption, decreased subendocardial blood flow, and reduced systolic shortening. Therefore, patient's prognosis keeps a straight relation with LV dilation.

Ventricular chamber dilation is associated with changes from elliptical to spherical shape, in these cases systolic torsion is reduced. In elliptical ventricles the normal myofibril shortening of 15% generates an EF of 60%, but in spherical ventricles the generated EF is only of 30%. In ischemic cardiomyopathy, LV volume increases after infarction with loss in EF. Importantly, the increase of wall stress induces changes in gene expression and stimulation of neurohormonal activity with promotion of myocyte apoptosis and adverse effects on the extracellular matrix.

The treatment for HF patients must consider the biomechanical mechanisms of heart failure, treatments should be conceived to correct neurohormonal activation, myocyte apoptosis and changes in the extracellular matrix. In order to reach these objectives, the therapeutic strategy must integrate the reduction of the LV volume, restoration of the ventricular geometry and improve myocardial viability and extracellular matrix condition.

USING HEAT ENERGY TO TREAT HEART FAILURE

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Background: Heart failure cases are increasing with estimates of 50,000 per year in Canada, 550,000 per year in the U.S.A. and over 8 million worldwide with a projected yearly cost near a trillion dollars. Despite all the scientific advancements, current heart failure treatments are limited, inadequate, expensive, invasive, have limitations and side effects. The search for a modality that is more effective, non-invasive, affordable and safe continues. Thermal therapy utilizes slight increases (0.5-3˚C) in body core temperature and has been reported to lead to beneficial clinical outcomes in patients with heart failure. It is suspected that the positive impact from the heat treatment originates at the molecular level leading to structural and functional recovery.

Method: A literature review was conducted which consisted of 200 scientific papers that were published in English up until the end of 2008 involving humans, animals, and cell cultures. The papers included clinical trials and research using far infrared radiation (FIR) saunas and/or warm water immersion (WWI) with heart failure patients of all ages, gender and disease severity. Generally, patients were exposed to heat which allowed their core body temperature to increase for a short period (10-15 minute session per day), and this procedure was done daily for days and/or weeks. Various indicators were assessed such as: endothelial function, blood pressure as well as the size, geometry and ejection fraction. Molecular mechanisms of action were also assessed by investigating levels of nitric oxide (NO), nitric oxide synthase (NOS), heat shock proteins (HSPs), various antioxidant enzymes and other important signaling molecules.

Results: Thermal therapy was associated with clinical benefits in patients with heart failure. Almost all heart failure indicators were improved including 1) systolic and diastolic blood pressures, 2) ejection fraction, 3) vascular resistance, 4) cardiac index, 5) cardiac geometry, and 6) arrhythmias. Biomarkers also improved such as brain natriuretic peptide (BNP), NOS and NO, HSPs, antioxidant enzymes and others. Improvements were observed across a wide cross section of heart failure patients (NYHA Class II-IV) including those of all ages and genders. No negative side effects were reported.

Conclusion: Thermal therapy has a positive outcome on heart failure patients by improving the structural and functional properties of the heart. The observed positive outcomes with thermal therapy have been attributed to changes at the molecular, cellular, tissue and organ levels. Thermal therapy may provide an important, low cost and non-invasive modality with significant benefits for heart failure patients. However, the results are generally from a relatively small number of single centre studies. A well controlled, multi-centre clinical study is planned to assess in a scientifically rigorous manner, the potential of thermal therapy as a viable treatment for heart failure patients.

Key Words: Heart Failure, Thermal Therapy, Heat Energy

Congenital Heart Disease Invited Lectures-21 October 2010

THE ROSS PROCEDURE IN CHILDREN: THE SAUDI EXPERIENCE

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Background: Among all valve substitutes available today, when it comes to replacing the aortic valve in pediatric age group, the pulmonary autograft (Ross procedure) comes the closest to the ideal.

Material and Methods: Since January 1990, 512 Ross procedures were performed at King Faisal Heart Institute of the King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia. Age ranged from 1 week to 59 years (mean age 17 ± 13). Among those, there are 212 children with a mean age of 11.5 ± 4.4 years. Forty-nine percent had rheumatic etiology and 46% had congenital etiology. Thirty nine patients (19%) had annular ± left ventricular outflow tract enlargement by our own modification of the Ross/Konno procedure [mini-Ross/Konno].

Results: Overall Ross, hospital mortality was 1.2% with a 2% late mortality. Mean follow up for the whole group was 9.6 ± 9 years. For the pediatric group, the freedom from autograft failure at 10 years was 77 ± 5%. For patients with aortic stenosis 92%, aortic regurgitation 64% and mixed lesions 93% ($P < .0001$ for regurgitation versus others). On multivariable analysis, risk factors for autograft failure requiring reoperation were: regurgitation $P < .0001$, rheumatic etiology $P = .0002$ and concomitant cardiac surgery $P = .02$.

Conclusions: The Ross procedure in children is associated with excellent survival. Late autograft reoperation may be required however this is more common in rheumatic patients with pure

aortic regurgitation (AR). Patients with aortic stenosis or stenosis + AR have much better long term outcomes and may be the best candidates for Ross procedure.

SURGICAL TREATMENT OF ARRHYTHMIAS IN ADULTS WITH CONGENITAL HEART DEFECTS.

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Background: Supraventricular and ventricular arrhythmias are a major cause of morbidity and mortality in adult patients with congenital heart disease (CHD). Intraoperative ablation offers an alternative to the complex surgical Cox-Maze procedure for these patients. We present the results of our preliminary experience with intraoperative monopolar irrigated radiofrequency ablation (IRA) in adults with CHD undergoing elective cardiac surgery.

Methods: Since September 2002, 70 adults with a mean age of 39 years with CHD underwent IRA during cardiac surgery. We performed 42 right-sided Maze procedures, 20 Cox-Maze III procedures and 8 right ventricular ablations. In addition, we implanted a pace-maker into 14 patients.

Results: Three patients died (3 of 70; 4%) of causes not related to the intraoperative ablation. Over an average follow-up period of 44 months the remaining 67 patients are alive in NYHA class I or II. All patients were discharged on antiarrhythmic oral treatment for 3 months. All patients underwent Holter testing 3 and 6 months after the ablation procedure and five underwent programmed ventricular tachycardia stimulation 6 months postoperatively. Fifty-six patients are still in spontaneous sinus rhythm, four are in sinus rhythm on chronic oral antiarrhythmic treatment for recurrence of atrial fibrillation, four are in stable atrial fibrillation, one has pacemaker rhythm, one had reablation on EPS lab, and one had ICD implanted. There were no complications from the IRA.

Conclusions: Intraoperative IRA is a safe and effective procedure to control arrhythmic problems in adults with CHD. This procedure should be taken into consideration when transcatheter ablation fails or when elective cardiac surgery is planned.

MANAGEMENT OF EBSTEIN'S ANOMALY

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First described by Wilhelm Ebstein in 1866, Ebstein's anomaly is a rare (0.047/1000 live births in Taiwan national database) form of congenital cardiac anomaly and is characterized by a downward-displacement of the septal and posterior leaflets of the tricuspid valve. The clinical manifestation varies widely. Cyanosis, right heart failure, and tachyarrhythmia may occur during the newborn stage or develop after adolescence. The age for the onset of symptoms is related to the degree of leaflet tethering, apical displacement, the severity of tricuspid valve regurgitation, and the degree of functional hypoplasia of right ventricle. Because the pulmonary arterial pressure remains high at the age of two weeks, the degree of tricuspid regurgitation would be augmented by, and even result in, functional pulmonary stenosis or atresia.

Patients with early onset during the newborn stage may be palliated by tricuspid valvuloplasty with an optional atrial septum fenestration and surgical shunts, and, subsequently, by a staged one-and-half ventricle operation or a Fontan-type operation in patients with true pulmonary atresia or stenosis. At the neonatal stage, "circular shunt" should be avoided. This is caused by a shunt from aorta and back to aorta without transversing a capillary bed, mostly through patent ductus arteriosus, pulmonary regurgitation, right ventricle, tricuspid regurgitation, right atrium, left atrium, left ventricle and then to aorta again. Neonatal or infant surgeries, with yet unsatisfactory results, are often performed due to severe cyanosis, GOSE Score 3 or 4 with mild cyanosis, cardiothoracic ratio > 0.80 and severe tricuspid insufficiency. For those with a late onset of symptoms, surgical correction is aimed to ameliorate the right heart failure and atrial arrhythmias. The most common initial symptom is exercise intolerance related to tricuspid regurgitation, ventricular dysfunction, right-to-left shunt and reduced cardiac output. In addition, associated accessory pathways are found in 6-36% of the patients and may result in supraventricular tachycardia. Atrial tachycardias secondary to atrial stretch (ectotic atrial tachycardia, atrial flutter and fibrillation) are also common. Myocardial fibrosis may increase the risk of ventricular tachycardia.

From our 26 years database, we found one-third of the patients were symptomatic during the neonatal period, but with medical support, including anti-congestive medication and prostaglandin E1, the cyanosis and heart failure was improved after the decline of the pulmonary arterial pressure in those without anatomical pulmonary atresia. The surgical results of neonatal systemic-to-pulmonary shunt were poor, but tricuspid valvuloplasty at the newborn stage, if indicated for severe heart failure, could be performed with satisfactory results. Beyond the neonatal stage, surgeries involving tricuspid valvuloplasty or concomitant Glenn shunt were required in over half of the patients at the age 40 years. The EKG abnormalities, including preexcitation and right bundle branch block, were common. Supraventricular tachycardia occurred in half of the patients at the age of 33 years. Radiofrequency ablation could be performed with fair success rate (81%) but high recurrence rate (33%).

In conclusion, symptomatic newborns of Ebstein's anomaly, except those with anatomical pulmonary atresia, may be satisfactorily managed by medical support and occasionally by surgery. For the rest, symptoms of heart failure and tachyarrhythmias appeared late and could be satisfactorily managed by surgery and ablation.

Adult Cardiac Surgery-Invited Lectures-21 October 2010

PULMONARY ENDARTERECTOMY; FROM DIAGNOSIS TO CURRENT MANAGEMENT

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Acute pulmonary embolism (PE) has been said to result in more than 600,000 symptomatic episodes in the United States each year, and to be the principal cause of death in 200,000 patients. However, this may be a low estimate since autopsy studies have shown that the diagnosis of acute PE was unsuspected in 70 80% of those patients in whom it was the principal cause of death. The majority of surviving patients appear to gradually resolve their pulmonary emboli over time. Complete resolution of embolic material does not always occur; the pulmonary clots then organize, and narrow or occlude the pulmonary arterial branches. Pulmonary hypertension results.

Pulmonary thromboendarterectomy (PTE) can provide a surgical cure for the pulmonary hypertension of chronic pulmonary embolism (PE). This form of pulmonary hypertension often goes unrecognized, yet it is progressive and carries a high mortality. PTE is technically demanding for the surgeon, and requires careful dissection of the pulmonary artery planes and the use of circulatory arrest. Excellent short and long term results can be achieved however, and increased awareness of both the prevalence of this condition and the possibility of a surgical cure should avail more patients of the opportunity for relief from this debilitating and often fatal disease.

Although the surgical operation for acute pulmonary embolism remains controversial, operation for chronic pulmonary embolism is now well established. As Trendelenburg first described in 1908, the bronchial circulation protects the lung parenchyma from ischemia when a thrombus occludes a pulmonary vessel. The lungs can thus sustain an embolic event without parenchymal necrosis, in contrast to the heart or brain which lack this supplemental blood supply. Resolution or removal of embolic occlusion even years afterwards will therefore result in resumption of functional oxygenation in the affected portion of the lung.

Most patients referred for PTE surgery have a pulmonary vascular resistance higher than 1,000 dynes/sec/cm-5, and many have supra systemic pulmonary artery pressures. The patients we have operated upon for this condition have ranged in age from 8 to 83 years. The documented history of pulmonary vascular occlusion has been as brief as a few months to as long as 24 years. Prior to PTE surgery, an inferior vena cava filter is always placed. Patients are thereafter treated with anticoagulants indefinitely.

The PTE operation as performed at our center, the University of California San Diego, has been described in detail elsewhere. In our experience of more than 2,500 cases completed since 1990, three guiding principles have determined success. First, the operation must be performed on both lungs, since patients with significant chronic embolic pulmonary hypertension invariably have bilateral disease. Second, cardiopulmonary bypass (CPB) with periods of circulatory arrest is essential to achieve adequate exposure in the face of the copious bronchial blood flow. Third, a true endarterectomy in the plane of the media must be accomplished.

Meticulous post operative management is essential to the success of this operation. All patients are mechanically ventilated for at least 24 hours, and all are subjected to a vigorous diuresis. Most patients can be extubated on the first post operative day.

In the majority of patients the postoperative course is uneventful, and the median hospitalization is 10 days. A reduction in pulmonary pressures and resistance to normal levels and a corresponding improvement in pulmonary blood flow are generally both immediate and sustained. Echocardiography shows that right ventricular geometry rapidly reverts to normal, with the elimination of tricuspid regurgitation. More than 90 percent of operative survivors attain NYHA function class I or II status at two-year follow-up. The operative mortality in our last 1,000 patients is less than 4%.

Pulmonary endarterectomy is thus a curative operation for chronic, thromboembolic, pulmonary hypertension. This is a disease that is a commonly overlooked cause of shortness of breath and physical incapacity. Though the operation is technically demanding and requires experience, its application for the manifestation of thromboembolic pulmonary hypertension should be encouraged. The prognosis for affected patients without intervention is poor. Transplantation for the condition is not appropriate, and medical therapy is ineffective.

INTRAOPERATIVE PROTECTION OF THE MYOCARDIUM: 2010

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Despite meticulous adherence to presently known principles of surgical myocardial protection using advanced cardioplegic technologies, some patients require inotropic support and/or mechanical assist devices postoperatively, when none were required preoperatively. There is good clinical evidence to support the concept that all patients undergoing cardiac surgery utilizing induced ischemic cardiac arrest associated with aortic cross-clamping have varying degrees of myocardial stunning, occasionally requiring inotropic support, which after abatement over hours or days after surgery have no objective evidence of myocardial infarction. However, a significant downside to the use of inotropic agents is recent evidence that therapeutic levels of inotropic support in the post ischemic heart increases intracellular calcium and subsequent apoptosis resulting in cell death. Furthermore, the senescent heart has a significantly greater decrease in myocardial contractility following surgically induced ischemia that is related to increased DNA nicking that inhibit reparative proteins during the reperfusion

period. Alternative explainations include the concept of lethal reperfusion injury defined as death of myocardial cells that were viable immediately before reperfusion. Cardioprotective strategies to manage this injury utilizing reperfusion injury salvage kinase pathways (RISK) and targeting mitochodrial permeability transition pores (PTP) to avoid mitochondrial calcium overload, are suggested. Cyclosporine, a potent inhibitor of mitochondrial PTP, has recently been shown to limit infarct size following percutaneous coronary intervention (PCI) during acute myocardial infarction. There is evidence that other techniques such as miniplegia (whole blood cardioplegia), the addition of diazoxide, a mitochondrial ATP-sensitive potassium channel opener, and ischemic preconditioning, postconditioning and remote conditioning may diminish the use of postoperative stunning. Recently, we have developed autogenous mitochodrial transplantation as a means of ameliorating postoperative stunning. Together, these new technologies offer the potential of decreasing postoperative inotropic support and the need for mechanical assist devices.

EVOLVING MANAGEMENT STRATEGIES FOR KOMMERELL'S DIVERTICULUM

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Background: Kommerell's diverticulum is an uncommon aortic anomaly that is increasingly approached with endovascular techniques. The objective of the present report is to review our open and endovascular treatment strategies and outcomes for Kommerell's diverticulum.

Methods: From 2000 to 2009, 29 patients were treated for a symptomatic Kommerell's diverticulum. A retrospective chart review was performed to identify the demographics, management strategies and outcomes.

Results: Mean age was 35 years (range 2 months-75 years). 83% (20/29) presented with dysphagia. The predominant pathology was a right aortic arch, associated with an aberrant left subclavian artery arising from the diverticulum, occurring in 69% (20/29). Cardiopulmonary bypass (CPB) and deep hypothermic circulatory arrest were used in 12/29 patients, CPB alone in 4/29 patients, and 13/29 patients were treated without CPB. 27/29 patients were treated in open fashion via right thoracotomy (6/29), left thoracotomy (12/29), and sternotomy (7/29), with 2 patients treated in a hybrid fashion. Hospital mortality was 1/29 (3%). Morbidity included 1 subxiphoid window, 1 intra-operative chylous leak, and 1 re-operation at 6 weeks for recurrent chylothorax. 1 hybrid patient required a brachial artery thrombectomy, while the other hybrid patient had transient vocal cord paresis.

Conclusion: Kommerell's diverticulum may present within the entire age spectrum. The operative approach and use of circulatory support is primarily dependent on age, and co-existent pathology. Early results of endovascular and hybrid therapies are promising, but longer follow-up will be required to validate the use of this approach.

MEDIUM-TERM ANGIOGRAPHIC FOLLOW-UP FOR OFF-PUMP VERSUS ON-PUMP CORONARY ARTERY BYPASS GRAFTING IN A RANDOMISED CONTROLLED STUDY

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Background: Previous trials on off-pump coronary artery bypass (OPCAB) have been patient selective and evaluated only short-term graft patency with variable outcomes in a limited data when compared with on-pump (ONCAB). The aim of this study was to undertake a prospective, randomized, controlled study of patients with multiple vessel disease and compare graft-patency rates and clinical outcomes in OPCAB with ONCAB surgery in a single centre-single surgeon setting.

Methods: The trial randomized 792 consecutive non-selected cardiac surgery candidates into group A (OPCAB; n = 451) and group B (ONCAB; n = 341) in the period between 1st January 2006 and 31 March 2007. Surgical and anaesthetic techniques were standardized for both groups. A composite of outcomes of 30-day mortality, postoperative renal failure, intensive care unit length of stay [>2 days], neurological complications, use of intra-aortic balloon pump, and conversion to cardiopulmonary bypass were used as the primary outcomes. Follow-up coronary angiography was performed on patients within a period of 18 months to establish lesion patency as a secondary endpoint. In addition, completeness of revascularization was compared in both groups.

Results: The mean age of the patients was 53.9 years, and 87% were men. The ONCAB group received a mean of 3.4 grafts, and the OPCAB group 3.1 (P = .41). A Cox regression analysis showed that composite outcomes were not significantly different between OPCAB and ONCAB surgery. A time-to-event analysis using Kaplan Meier survival curves indicated that the patency rates for the grafted arterial vessels although slightly higher in the OPCAB group compared with ONCAB group, this was not statistically different P = .069).

Conclusions: In this randomized single-surgeon trial among unselected patients with angiographic follow-up, OPCAB provided complete revascularization in multiple vessel disease, the results of which in terms of morbidity were comparable with ONCAB. In addition, OPCAB had similar graft patency rates as compared with ONCAB, after adjusting for age and weight.

Aortic Interventions-Invited Lectures-21 October 2010

THORACIC ENDOVASCULAR AORTIC REPAIR (TEVAR): META-ANALYSIS OF PRESENT RESULTS

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On behalf of the ad-hoc Endovascular Surgery Resources Group of the EACTS. Other group members: Claudio Muneretto, Stephan Schueler, Ludwig von Segesser, Paul Sergeant, Hanni Shenib

Background: The role of thoracic endovascular aortic repair (TEVAR) versus open surgery remains unclear. Meta-regression guides uptake of new technologies by utilizing evidence from existing trials.

Objective: Does TEVAR reduce death and morbidity compared to open surgical repair for thoracic aortic disease?

Methods: All data from controlled trials of TEVAR versus open repair of thoracic aortic pathologies was ascertained from medical databases plus conference abstracts up to October 2008, and combined through meta-analyses. Meta-regression was performed to evaluate the impact of baseline risk factor imbalances, study design, and thoracic pathology.

Results: Forty-one studies involving 4918 patients were included [4 multicentre (MC) studies, 32 single-centre studies (SC), 5 registries]. Characteristics were balanced except for age [TEVAR patients were average 1.3 years older than open re-pair patients (*P* = .001)]. Due to significant heterogeneity across study designs, results were analyzed by study type.

Death at 30 days was reduced for TEVAR versus open surgery in MC trials (OR 0.24, 95% CI 0.13 to 0.44) and SC studies (OR 0.52, 95% CI 0.38 to 0.73), but did not reach significance in registries (OR 0.30, 95% CI 0.09 to 1.04). Survival differences did not persist at 1 year and 3 years. Paraplegia was reduced for TEVAR versus open surgery in MC studies (OR 0.44, 95% CI 0.23 to 0.84) and SC studies (OR 0.46, 95%CI 0.29 to 0.74), and was insufficiently reported in registries. Stroke was reduced in MC studies (OR 0.46, 95% CI 0.25 to 0.85), but not in SC studies or registries. Arrhythmias, myocardial infarction, transfusion, renal insufficiency, and overall ischemic events were reduced for TEVAR versus open surgery, but aortic reinterventions did not differ. Meta-regression by baseline age imbalance and aortic pathology did not materially change these results. Analysis by type of stent showed non-commercial stents tended to have worse outcomes versus commercial stents.

Conclusion: Current data suggest that TEVAR, regardless of type of pathology, reduces early death and ischemic events including stroke, paraplegia, renal insufficiency, and myocardial infarction compared with open surgery. Sustained benefits on survival have not been proven.

SURGICAL EXPERIENCE WITH AORTIC ARCH ANEURYSMS

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One hundred and ten consecutive patients were operated for Aortic Arch Aneurysms at three centres by single surgeon between 1994 and 2010. All patients were operated with the aid of Cardiopulmonary bypass . All patients had Deep Hypothermic circulatory arrest and Retrogrde Cerebral Perfusion for brain protection during the Aortic Arch Repair.Of these 21 patients had Total Arch replacement, 39 patients had Hemi-Arch procedure and 42 patients had Distal Aortic Arch aneurysm repair.61 of these patients had concomitant Aortic Root replacement. The overall 30 day mortality was 6.3% and the stroke rate was 2.72%.

Conclusions: The present data suggests that Aortic Arch aneurysms can be operated upon with predictable outcomes.

TEVAR FOR ACUTE COMPLICATED TYPE B AORTIC DISSECTION: TECHNIQUES AND RESULTS

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Objective: The management of patients with complicated acute type B aortic dissection (CAAD) is challenging. Recently, thoracic endovascular aortic repair (TEVAR) of CAAD has gained increased interest as an initial treatment option. The goal of this therapy is to exclude the primary entry site, obliterate the false lumen, prevent aortic rupture, and relieve visceral and lower body malperfusion. The purpose of this study is to review the techniques and contemporary outcome of patients undergoing endovascular management for CAAD in North America.

Methods: A literature search was performed, and the articles were assessed for their validity, correct pathology and patient cohort. The exclusion criteria included type A, uncomplicated acute type B, and chronic type B aortic dissections, penetrating ulcer or intramural hematoma of the descending thoracic aorta, patients treated outside of the North America and studies with nine or less subjects. Six studies were found that were using standard definitions in reporting TEVAR outcomes for CAAD in last twelve years. These publications were reviewed and data collected in data sheets.

Results: 166 patients were included in the analysis (Table 1). The indication for emergency endografting was malperfusion in 83 (50%) patients. Primary technical success was obtained in 156 (94%) patients. 15 (9%) patients experienced temporary or permanent paraparesis or paraplegia. 20 patients died early (12%). Actuarial one-year survival was approximately 85%. 25% of patients (n_41) had treatment failure according to Stanford criteria in the follow-up. Partial or complete thrombosis of the false lumen in the thoracic aorta was achieved in 89 surviving cohort (78%).

Conclusions: TEVAR as primary method compares favorably with the open-surgical outcome. TEVAR for CAAD can be performed with a relatively low postoperative morbidity and mortality in experienced hands, and should be standard of care in institution offering such expertise. Endovascular approach to life-

threatening CAAD appears to have a favorable outcome in mid-term follow-up. Long-term follow-up is necessary in establishing longevity of outcome and durability of the stent-grafts.

Author	Number of patients	Number of patients with malperfusion	Primary technical success rate (%)	Postoperative spinal cord injury	Early mortality	1-year survival	Follow-up (months)	Treatment failure in follow-up	Reverse aortic remodeling of the descending thoracic aorta
Conrad et al.	33	17 (53%)	32 (97%)	2 (6%)	4 (12%)	76%	12	8 (24%)	19 (88%) [a]
Freezor et al	33	11 (33%)	30 (91%)	8 (24%)	7 (21%)	n/a	6	14 (42%)	15 (75%) [b]
Khoyne-zhad et al.	38	20 (53%)	35 (92%)	1 (3%)	4 (11%)	81%	38	7 (18%)	25 (89%)
Szeto et al.	35	17 (49%)	33 (94%)	3 (9%)	1 (3%)	93%	13	5 (14%)	20 (74%)[c]
Vedantham et al.	11	11 (100%)	10 (91%)	0	0	100%	16	2 (18%)	n/a
Verhoye et al.	16	7 (44%)	16 (100%)	1 (6%)	4 (25%)	73%	36	5 (31%)	10 (63%)
All studies	166	83 (50%)	156 (94%)	15 (9%)	20 (12%)	85%	20	41 (25%)	89 (78%)

[a]Defined as thrombosis along the treated aorta at one year (four patients are missing postoperative imaging).

[b]At one month (six patients are missing postoperative imaging)

[c]Four patients are missing postoperative imaging.

AORTIC ANEURYSMS-INDIAN SCENARIO

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Aortic aneurysms continue to be an under diagnosed and under treated entity in India even now. Aortic aneurysm surgery started in India more than 40 years ago. Even today, there are only a handful of surgeons who have the expertise to handle all the varieties of aortic aneurysms.

One important reason why only a small percentage of aneurysms come for treatment is the lack of awareness among the general physicians and the public regarding the disease. Most of them are picked up when the patient visits the doctor for some unrelated complaints. For every diagnosed aneurysm, there will be hundreds of undiagnosed patients who would have died of a ruptured aneurysm.

With the easy availability of Ultrasound and CT scan machines more aneurysms are being diagnosed now. But a significant number of primary physicians still think that aneurysm surgery carries a very high risk; hence they do not recommend surgery to the patient.

There are no reliable statistics in India regarding the incidence of aortic aneurysms. Similarly we do not have the figures as to how many aneurysms are subjected to interventions every year.

According to a rough estimate, about 700 aortic aneurysms were operated last year. Out of these about 200 were endovascular repairs and the rest, open surgery. In a few centers, both open and endovascular repairs are performed regularly, with results comparable with most centers in the world. By improving public awareness regarding the fatal nature of the disease, we should be able to save many more patients from death from aneurysm rupture.

Basic Sciences-Invited Lectures-21 October 2010

CARDIAC TISSUE ENGINEERING: IMPLICATIONS FOR PEDIATRIC HEART SURGERY

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Cardiac malformations can be observed in approximately 1% of live births. They are, in severe cases, incompatible with life, requiring early and subsequent surgical interventions. Advances in surgical technologies have helped to markedly improve life expectancy in affected children. As a consequence, however, the number of patients presenting with complications during adolescence or adulthood is steadily increasing. It appears therefore essential to develop novel strategies to "add" functional myocardium to failing hearts already in the newborn or even prenatally. Myocardial tissue engineering has advanced to a stage where human force-generating myocardium can be constructed. Despite being still in an early preclinical stage, the principle technologies to reconstitute myocardium in situ exist, but clearly need refinement to enable a clinical translation. Here I will discuss the potential of tissue engineering in pediatric myocardial repair as well as associated hurdles and risks.

BIOLOGICAL VENTRICULAR ASSIST DEVICES

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Biological repair of failing hearts may be achieved by the implantation of therapeutic cells or tissue engineered myocardium. The latter approach may be advantageous when aiming at the reconstitution of complex myocardial structures in situ. Based on our original technology to generate engineered heart tissues (EHT) we have developed a set of novel approaches to either partially or fully repair scarred myocardium. Alternatively, we have developed myocardium embracing tissue engineered myocardium that may function as biological ventricular assist device (BioVAD). Key caveats that may delay or even preclude a clinical exploitation of tissue engineering concepts, including the lack of an "ideal" therapeutic cell and safety concerns related to the risk of teratoma formation and arrhythmia induction, will be discussed.

REGENERATION OF CARDIAC TISSUES ASSISTED BY BIOACTIVE IMPLANTS

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Cell transplantation has emerged as a novel strategy for myocardial regeneration. Progenitor cells may provide the biological substrate for myocardial repair. Preliminary clinical results showed that cell bio-retention and engraftment within infarct is low and that extracellular matrix degradation and myocardial fibrosis contributes to LV dilatation and adverse remodeling. Thus, the failing cardiac muscle needs to be better supported to decrease ventricular wall stress. The stem cell niche (a specialized environment surrounding stem cells) supply crucial support needed for stem cell maintenance. If the stem cell niche has aged or has been modified by a disease, it might not be capable of supporting stem cells grafted for local myocardial treatments. The goal of this clinical study was to evaluate intrainfarct cell therapy associated with a 3D cell-seeded collagen scaffold grafted onto infarcted ventricles.

Methods: In 20 patients (aged 55.2 ± 3.9 years) presenting LV postischemic myocardial scars and with indication for a single OP-CABG, autologous mononuclear bone marrow cells (BMC) were implanted during surgery in the scar. A 3D type I collagen matrix (5 x 7 x 0.6 cm) seeded with BMC was added on top of the scarred area.

Results: There was no mortality and any related adverse events (follow-up 25 ± 3.8 months). NYHA FC improved from 2.3 ± 0.5 to 1.3 ± 0.3 (P = .005). LV end-diastolic volume evolved from 142 ± 24 to 115 ± 3 mL (P = .03), LV filling deceleration time improved from 162 ± 7 ms to 198 ± 7 ms (P = .01). Scar area thickness progress from 6±1.4 to 9 ± 1.8 mm (P = .005). EF improved from 25 ± 7 to 34 ± 5.2% (P = .04).

Conclusions: Simultaneous injection of BMC and fixation of a cell-seeded matrix onto the epicardium is feasible and safe. The matrix seems to increase the thickness of the scar with viable tissues and help to normalize wall stress, thus limiting remodelling and improving diastolic function. Associating stem cell transplantation with tissue engineering for myocardial repair seems to be beneficial to re-establish an efficient milieu for cell survival, multiplication, differentiation and function.

Perspectives: Cellular and tissue engineering associating a regenerative biological approach with a prosthetic support device should play a positive role in the treatment of ischemic heart failure. The application of bioactive molecules and the recent developments of nano-bio-technologies should open the door for the creation of «bioartificial myocardium».

FUTURE: AUTOMATED ANASTOMOTIC VASCULAR COUPLING

Erik W.L. Jansen, W. Suijker
Netherlands

Objective: To enable less invasiveness in vascular surgery including coronary arteries, facilitated anastomotic couplers are indispensable.

Methods: Current and future concepts are studied, based on end-to side and side-to-side coupling. Physically, the coupling can be based on mechanical (stitched, stapled, and fitting, and many others), chemical (glued), thermal (welding tissue with laser) and magnetic techniques.

Results: Over seventy patented ideas exist, basically experimental, and occasionally very few were in early clinical trial.

Conclusion: The concepts are fascinating. Few are promising and may become a reality for clinical application in the future.

GENE-ENVIRONMENT INTERACTIONS IN CONGENITAL HEART DISEASE

Shoumo Bhattacharya

Deficiency of the transcription factor Cited2 in mice results in cardiac malformation, adrenal agenesis, neural tube, placental defects, and partially penetrant cardiopulmonary laterality defects resulting from an abnormal Nodal->Pitx2c pathway. Here we show that a maternal high-fat diet more than doubles the penetrance of laterality defects and, surprisingly, induces palatal clefting in Cited2 deficient embryos. Both maternal diet and Cited2 deletion reduce embryo weight and kidney and thymus volume. Expression profiling identified 40 embryonic transcripts including Pitx2 that were significantly affected by embryonic genotype-maternal diet interaction. We show that a high-fat diet reduces Pitx2c levels >2-fold in Cited2 deficient embryos. Taken together, these results define a novel interaction between maternal high-fat diet and embryonic Cited2 deficiency that affects Pitx2c expression and results in abnormal laterality. They suggest that appropriate modifications of maternal diet may prevent such defects in humans.

22 Programme Invited Lectures

Plenary Hall Invited Lectures-22 October 2010

DR. ROBERT KARP ORATION: BIOLOGICAL INSIGHTS FROM THE HISTORY OF LUNG TRANSPLANTATION

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The history of lung transplantation is a fascinating story. The early results of lung transplantation were discouraging but, progressively the barriers to successful lung transplant fell and the results substantially improved. Although lung transplantation is imperfect therapy it has the capacity to improve the quality of life of patients with end stage lung disease and for some diagnoses, extend life. One of the spinoffs of the unique "model" of lung transplantation is the contribution that it has made to biological knowledge.

Aging, Fibrosis And Bronchiolitis Obliterans Syndrome: There is a relationship between older donor age and the probability of bronchiolitis obliternas syndrome (BOS). Aging may be associated with telomere dysfunction which results in cellular senescence. This may influence the fate of epithelial and mesenchymal cells in the adult lung as well as the fibrotic response which is dependent on telomerase activity. Certain genes may function in an antagonistic pleiotropic manner (genes are beneficial at an early age but harmful at an older age) and the process of fibrosis under the influence of these genes in the older donor lung may result in progressive adverse fibrosis such as that seen in BOS.

Tissue-Resident Mesenchymal Stem Cells: There is evidence from bronchoalveolar lavage fluid from lung transplant recipients that non-hematopoietic mesenchymal stem cells are resident in the human donor lung (even many years after the transplant). The demonstration that these mesenchymal stem cells are donor derived suggest that they reside and self-renew in the lung and this has implications for the repair of lung injury, with special implications for BOS.

Decreased Incidence of Cardiac Rejection in Heart/Lung Transplant Recipients Versus Heart Recipients: The well demonstrated immune protection of the heart in heart/lung transplant recipients (versus heart alone recipients) may be due to a number of possible mechanisms including immune modulation through the introduction of donor hematopoietic elements, inducing a state of tolerance. The induction of a generalized state of anergy from the large burden of foreign tissue may also be a mechanism.

These are examples of the intriguing biological insights that have been gained from the unique model of lung transplantation.

OFF-PUMP VERSUS ON-PUMP CABG

Paul Sergeant
Belgium

Coronary surgery using extra-corporeal circulation allowed the distribution of access to surgical therapy down to the smallest surgical units. The surgical and cognitive skills required were well within the capacities of every normally trained surgeon with vascular expertise. This was a perfect therapeutic solution when only anti-thrombotic therapy could avoid the occlusion of stenotic lesions. At the end of the 20th century the percutaneous coronary intervention gradually developed into a therapy with similar distribution of access and with comparable early but inferior or comparable (in certain subsets) late results. This PCI is perceived by patient and society as lesser invasive and demands certainly less human interface. The patient population currently proposed for surgery has an increased co-morbidity and will, theoretically at least, suffer from a higher procedural mortality and morbidity. It is the task of the surgical community to respond to these challenges or accept that the surgical domain will rapidly telescope.

The University of Leuven (Belgium) decided in October 1999 to reengineer completely towards OPCAB surgery in all patients and has been able to do so with nearly annihilation of early mortality and morbidity. The actual application rate of OPCAB to the complete spectrum has been stable around 99% of the non-acute infarct (same day infarct in cardiogenic shock) patients. The conversion rate was around 3% in the first 500 patients but fell rapidly to less than 0.2% in the last 3000 patients. The procedure follows extremely strict surgical and anesthesiological concepts, written down in protocols (see http://www.opcab-training.eu) . These include strict core body temperature control without any heat loss, absolute avoidance of inotropic medication, extremely rare use of blood products, well-described surgical methodology involving sling support and apical suction, optimal use of arterial and sequential grafting, complete revascularisation at whatever anastomotic site is optimal for graft function whether intra-septal or intra-mural, avoidance of aortic manipulation, clamping or touching, standardized anastomotic shunting, postoperative flow measurement, strict hemodynamic stability, optimal surgeon-anesthesia interface.

Simultaneously with this reengineering, an even stricter quality control database was constructed versus our earlier versions, allowing real time full multivariate modeling. The Bayes concept of a “prior” was adopted using the performance of 1997-1999 (1500 patients) as the optimal quality obtainable with an on-pump approach. Saturated propensity scoring corrects for any variability in patient selection and surgical technique, different from the on- versus off-pump approach. The minimal patient follow-up used is 3 months for all patients. This covers the complete early risk interval. In addition to hospital and early mortality, early stroke dialysis and infarct rates are followed up. A dramatic reduction of all major events has taken place beyond expectation. The exceptionally low observed versus predicted mortalities were halved, just as the stroke rates and the risk of dialysis. No reduction was observed in the infarct rates.

The KULeuven has set up an International Training Center where today up to 890 surgeons and anesthesiologists have undergone an individualized three-day re-training process using all aspects of modern adult teaching and knowledge transfer.

OFF-PUMP VS. ON-PUMP CABG

Erik W.L. Jansen
Netherlands

The clinical introduction of the heart-lung machine was in the fifties of last century.

John Gibbon performed the first procedure on total cardiopulmonary bypass in 1953.

Since that time, there was an enormous technological evolution, which enabled the evolution of cardiovascular surgery.

At the present time, cardiac surgery can be performed safely, while relying on total or partial cardiopulmonary bypass, while maintaining perfect homeostasis during the procedure.

This enables total correction of complex and multiple lesions, up to anastomotic microsurgery of bloodvessels by creating the perfect conditions for handicraft (or automated-craft or robot-craft) with smooth recovery.

In the future, this modality will guarantee proceeding evolution of all new technologies.

In the mid-1990s, interest emerged in performing coronary artery revascularization without cardiopulmonary bypass, in order to reduce the complications associated with the use of the heart-lung machine and to facilitate and improve recovery of the procedure for the patient.

To position OPCAB, cardiac surgeons performed a unique summit of scientific work in centres all over the world, including randomized trials and finally the meta-analyses. As we all know, the outcome did not show major differences. Actually, the trials are still going on, ie now 15 years!

The key is that we wish to salvage myocardium for the patient, in the elective but also in the acute situation: it is a ‘take the chance’, considering even pathophysiology in some patients, ie stunning and hibernating of myocardium. It is all about an optimal revascularization, a perfect patency rate.

Nevertheless, in all patients we have to evaluate the impact of a procedure, considering associated risks. The most obvious risk for a stroke caused by cardiopulmonary bypass is a severe atheromatous ascending aorta. Therefore, extensive pre- and intraoperative analysis by the cardiologist, anaesthesiologist and surgeon should be among the protocol: just to adapt the strategy *at any time.*

Finally, and obviously, also considered must be individual factors such as surgical expertise, team expertise including anaesthesiologist and perfusionist, and economical factors.

It is clear that in a dedicated heart clinic off-pump coronary revascularization can be performed with a favourable cost-benefit ratio, in a selected group of patients.

Indeed, the surgical armamentarium has grown enormously.

A proper application of the surgical tool is the new challenge.

DEBATE ON PUMP VERSUS OFF PUMP SURGERY

A.P. Kappetein

Cardiopulmonary bypass (CPB) support during CABG surgery could worsen long-term cognitive function. But recent trials show that cognitive outcomes aren’t any better following off-pump bypass surgery, a prospective longitudinal study with several control groups suggests that any post-CABG declines in mental

function are related more to the underlying vascular disease than to any particular management strategy.

The results of the 2203-patient, 18-center Randomized On/Off Bypass (ROOBY) trial, showed no difference between the on-pump and off-pump approaches in neuropsychological outcomes. The study also showed a consistent trend toward better overall outcomes after one-year post-surgery with the on-pump approach.

There was no significant difference between the on-pump and off-pump groups in the 30-day composite outcome, and the on-pump group did slightly better in the one-year composite outcome. There was also no difference between the groups in neuropsychological outcomes or use of major resources.

Follow-up angiography in 1371 patients and a total of 4093 grafts showed that the on-pump group had a higher graft patency rate (87.8% versus 82.6%; $P < .001$). Also, 36.5% of the off-pump group had at least one occluded graft compared with 28.7% of the on-pump group.

The recent study in Circulation by Hu et al. also addressed concerns with off pump surgery. OPCAB accounts for >70% of all coronary artery bypass graft (CABG) surgeries done in centers in China or India, a proportion that is 3 times as high as that reported in other populations such as the United States. Still with of pump surgery in these experienced hands showed that compared with conventional CABG, OPCAB is associated with small short-term gain but increased long-term risks of repeat revascularization and major vascular events, especially among high-risk patients. Moreover, OPCAB consumes more resources and is less cost-effective in the long run.

Up until now only cohort studies have shown a possible benefit for off pump surgery but all randomized studies have never been able to proof a benefit for this technique. Maybe in other patients then the ones addressed in the Rooby or other trial may benefit from off pump surgery but as ever, what is required in a situation where the risks and benefits to patients are finely balanced is a large-scale prospective randomized trial in the high risk patient population.

TRANSCATHETER AORTIC VALVE REPLACEMENT

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In many centers transcatheter aortic valve replacement has been established as integral part of daily routine. Implantation success and survival rates have increased remarkably as a result of improved implantation procedures, refinement of device design, and selection of appropriate patients. As the mean age of patients undergoing this procedure is well above 80 years a number of comorbidities have to be taken into account; frailty, a term unknown in younger patient groups, plays a predominant role in this segment of patients. Measurement of iliac vessel size, annular dimension, and distance between valvular plane and coronary ostia need to be done in a reproducible and highly precise fashion. Significant coronary artery disease should be treated by PCI prior to valve replacement.

A hybrid operating room equipped with a full size digital angiographic and hemodynamic monitoring system is the appropriate surrounding for performing these complex procedures. The importance of high quality imaging cannot be overemphasized.

The implantation procedure itself has become very safe and predictable due to careful orchestration and synchronisation between the individual players; each step is pre-assigned, precise timing of rapid pacing during balloon angioplasty and device deployment is essential, corrective manoeuvres have been defined beforehand and can be executed without delay. Deployment of a self-expanding Corevalve prosthesis can be performed without haste allowing ample time for adjustment of position because blood flow is impaired only very briefly during the process. For a balloon expandable frame the position has to be selected with great precision anticipating movements during deployment which are unique for each model; deployment is usually straightforward and does not allow correction of the final position. We found it quite useful to have two operators handle the crucial moments of balloon expansion: one operator is responsible for stepwise inflation of the balloon, whereas the other operator concentrates on maintaining position and apply corrections during the last moments of deployment before the final position is reached. Closure of the femoral artery is routinely achieved by a suture device with a high degree of success. In the near future reduction of device size will benefit handling characteristics even further.

TAVI: TECHNOLOGY AND DIRECTION. DO WE NEED A TRIAL TO COMPARE SURGERY WITH TRANSCATHETER VALVES?

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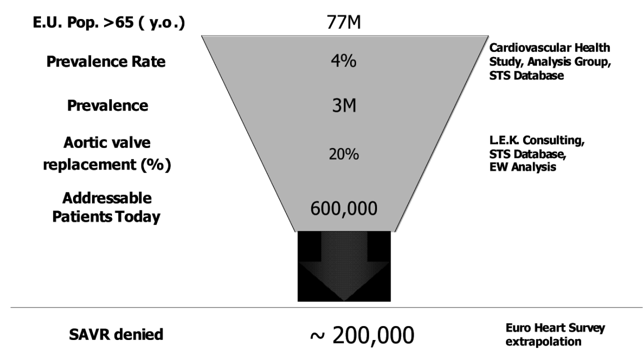
Introduction

Aortic valve stenosis (AS) is the most prevalent valve disorder in the adult population in developed countries affecting approximately 2 to 4% of people over 65 years of age [1,2]. This corresponds to approximately 3 million people with AS in Europe alone. One in five will eventually progress to symptomatic AS representing 600,000 patients.

Prevalence of Aortic Stenosis
European Union 2008



Patients with severe AS face a grim prognosis once they become symptomatic. The landmark paper on symptomatic AS by Ross and Braunwald in 1968 highlighted this premise: median survival

averages only 2, 3, and 5 years after symptom onset of angina, syncope and heart failure respectively [3]. Furthermore mortality is already substantial in the months following the first symptoms [4]. Both, the ESC and ACC/AHA cardiology societies have endorsed guidelines on valvular heart disease emphasizing the need for surgical aortic valve replacement (SAVR) once symptoms develop or in case of impaired LV function (Level of evidence grade 1) [5,6]. Despite these well-established guidelines, one in every three patients with symptomatic AS is denied surgery mostly because of age, left ventricular dysfunction and co-morbidities [7]. Nevertheless no medical treatment has any impact on survival. If we would assume that only two in every three patients with symptomatic AS would be referred for SAVR and there are 600000 patients with symptomatic AS in Europe alone, this means that hypothetically about 200000 patients would not be considered for intervention [8]. This unmistakably underscores an unmet clinical need. Undoubtedly this reality and patients' and physicians' preferences for lesser invasive strategies have fuelled the ongoing interest in developing minimally invasive transcatheter therapies.

Alain Cribier pioneered the transcatheter aortic valve implantation (TAVI) technology and reported the first in man experience of TAVI in a patient with symptomatic AS who was deemed inoperable in 2002 [9]. Subsequent feasibility studies validated the proof of concept [10,11]. The Edwards-SAPIEN valve (Edwards Lifesciences, Irvine, CA, USA) and the Medtronic-Corevalve system (Medtronic Corporation, Minneapolis, MN, USA) are the only two TAVI platforms with CE mark approval since 2007. Numerous single-center and multi-center observational registries followed with dazzling speed suggesting the safety and efficacy of the TAVI technology [12-16] . Especially the 30-day mortality of around 8% in patients with high or prohibitive operative risk appears promising and resembles short-term outcome in high-risk cohorts in the surgical literature [17-22]. The TAVI technology comes with its own specific hurdles and complications [23], not necessarily overlapping with those of SAVR: vascular injury; stroke, cardiac injury such as heart block, coronary obstruction, and cardiac perforation; paravalvular leak; and valve misplacement. The non-uniformity in presenting respective data makes comparison of results from different centers hazardous and impractical [24,25]. The Valvular Academic Research Consortium, a FDA approved collaboration between academic research organizations and professional societies in the United States and Europe is an initiative to generate a consensus statement on TAVI related definitions aiming to create order and uniformity making data more prone to analysis and comparison.

Technical refinements and commercial entrepreneurship have made the technology accessible to many centers worldwide. This might pose future implications especially in the current era where randomized trials with TAVI are strikingly lacking.

Grossly, there are three types of medical practices: the first is the institution with on-site interventional cardiologic and cardiothoracic activity and with close inter-disciplinary collaboration where interventional cardiologists and cardiothoracic surgeons try to reach a consensus on which patients to select for a specific surgical or interventional treatment strategy [8]. These centers would reasonably respect and adhere to the so-called CE mark labeling indications. Secondly there are centers where interventional cardiologists and cardiothoracic surgeons don't really convene and work as two separate departments. Finally there are practices running an interventional cardiology program without on-site cardiothoracic surgery, estimated to make up 37% of all PCI centers in the European Union. Expectedly, these kinds of organizations without intimate collaboration between cardiothoracic surgeons and interventional cardiologists will look to broaden their interventional activities with an attractive innovation like TAVI. If this kind of explosion and widespread distribution of a new technology is appropriate and well-timed is highly debatable. The flipside would be a worldwide practice being less controllable, potentially clouding the safety and efficacy profile of the procedure. Needless to say that provoked criticism by the medical community and health authorities could jeopardize future reimbursement policies [26,27].

Regardless, with the compelling data presented by multiple registries and leading centers, randomized clinical trials comparing TAVI with SAVR should be the logical next step. This next step in establishing a new treatment strategy should not be taken for granted as governmental authorities entitled to grant premarket approval to cardiovascular devices are under increased scrutiny and quality control [28].

The PARTNER trial (Placement of Aortic Transcatheter Valve Trial) is the first to randomize patients with high or prohibitive operative risk to SAVR, TAVI or medical therapy following an operative assessment of the patient: inoperable patients are randomized to TAVI or medical therapy whereas patients with high operative risk are randomized to SAVR or TAVI. The trial completed its randomization early 2009. One-year outcome results will be reported in the forthcoming months. By study design, findings will only apply to this highly selected patient cohort representing only a fraction of the global AS burden.

While anticipating the results of this first randomized trial, over 18000 patients worldwide have been treated with TAVI by May 2010. Inevitably, with increased operator experience and access to the device, physicians will shift their attention to younger patients with a less pronounced operative risk. Similar to what happened in the coronary revascularization arena [29], the blending of surgical and interventional expertise has created unique interdisciplinary dynamics reinforcing these new endeavors and paving the way for a randomized trial comparing TAVI with SAVR in a surgical moderate to high-risk patient population.

In this spirit the SURTAVI trial (Surgical and Transcatheter Aortic Valve Implantation) is conceived. The interdisciplinary approach and consensus of the so-called Heart Team (the cardiothoracic surgeon, interventional cardiologist and other treating physicians if necessary) is crucial. This aspect of decision making cannot be over-emphasized and is essential for the quality of current medical practice in general and any planned randomized trial of TAVI versus SAVR in particular. The upcoming VARC document on TAVI definitions and the accumulating TAVI expertise in Europe has created a unique momentum for such a European randomized initiative.

To summarize, for a new technology to be accepted as a new asset in the armamentarium for treating symptomatic AS several essential questions need to be answered: does the technology work? Which patients are likely to benefit (patient selection)? How does this new strategy compare with the alternatives? And what's the cost of the intervention? The proof of concept has been validated. The innovative less invasive transcatheter strategy should be at least as effective

but safer than traditional SAVR or have proof of superiority for both safety and efficacy compared to medical therapy.

Theoretical benefits of these transcatheter instrumentations in a beating heart avoiding the need of musculoskeletal incisions, cardioplegic arrest, aortic cross clamping, full cardiopulmonary bypass (including subsequent LV septal motion abnormality) seem evident. Ultimately the cost-effectiveness will determine whether the new treatment strategy is a valid option to be considered for reimbursement by governmental health institutions. The price–tag of the device is essential and will ideally cover the company's capital investment made during research and development. The cost-effectiveness relationship will only become favourable once competitive companies enter the market and introduce alternative devices at lower prices.

Surtavi Criteria - Patient Characterization

Risk assessment is essential in the complex strategy to approach patients with valvular heart disease in general and AS in particular. Various risk models primarily focusing on short-term mortality have been validated for AS patients [30-38]. Some were initially derived from a broader patient population undergoing any type of cardiac surgery, others were more explicitly tailored to patients with AS. Most notably, contemporary scoring models tend to be consistent in lower risk patients but diverge with increasing risk profile. This can be partly explained by the fact that these models were extracted from large databases where the average patient risk is fairly low. Therefore such models are less well validated for higher risk patients and expectedly perform less well in the "outlier" population currently considered for TAVI [39].

An in-depth reappraisal of existing scoring models reveals some concordant risk factors (eg, age, gender…) but also established risk factors that are clearly missing (eg, mediastinal radiation, porcelain aorta and frailty) [20,40,41]. Furthermore definitions of individual components are not uniform and do not correspond to current suggested guidelines/definitions by respective professional societies.

The goal of the SURTAVI criteria is to establish a new comprehensive yet transparent and updated scoring model to identify and characterize the contemporary patient population considered for aortic valve therapy. Subsequently it can be used for benchmark testing to compare institutional, operator or device performance and eventually be validated for its discriminating performance to determine which patients would fare better with TAVI or SAVR and vice versa, becoming a tool for patient counseling on procedural risk.

The SURTAVI criteria consist of baseline clinical characteristics and predictive features from the standard preoperative work up, notably ECG, biochemistry, echocardiography and Multislice Computed Tomography (MSCT). The rationale to select an item in this new scoring model is based on a critical reappraisal of prior risk scoring models and clinical judgment/expert opinion.

We first identified those components recurring in the previously published scoring models and looked for updated definitions by international professional societies. We then added missing risk factors, identified in the literature, which we felt, were essential. We grouped the components in 5 headings (demographic, cardiac, non cardiac, imaging, biochemistry). The weighting process followed a pragmatic and simplified approach based on data from established scoring models (eg, Odds Ratios from STS, EuroSCORE…) and subjective appreciation of impact. Each item was granted a numerical score from 0-4. Initially discrimination was deemed more important than calibration as the proposed model could be recalibrated (adjusting the weights to the studied population) in the future.

Patients at intermediate risk (EuroScore of ≥6 (eg, 75 yrs+ and at least 1 co-morbidity; 80 yrs+) and ≤30) will be screened for Aortic will be screened by the local Heart Team.

Surgical risk algorithms (Logistic EuroScore and Society of Thoracic Surgeons – Predicted Risk of Mortality (STS-PROM), and frailty scores (Lee score and Charlson scores) must be recorded to guide but will not dictate patient allocation. The final decision of the local Heart Team will be documented and signed on a Heart Team Decision Form.

The primary objective of the SURTAVI trial is to assess whether in patients with symptomatic severe aortic stenosis and at intermediate risk, Transcatheter Aortic Valve Implantation (TAVI) is non-inferior to Surgical Aortic Valve Replacement (SAVR) with respect to the event free survival time of the combined endpoint of all-cause mortality and stroke at a median follow-up duration of 2 years.

Secondary Objectives is to compare patients with symptomatic severe aortic stenosis and at intermediate risk treated with Transcatheter Aortic Valve Implantation (TAVI) to Surgical Aortic Valve Replacement (SAVR) with respect to quality of life, clinical benefit, and health economics.

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VIDEO-ASSISTED MITRAL VALVE REPAIR

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Minimally invasive valve surgery is not a new concept. In the nineties aortic valve surgery started to be performed through partial upper sternotomy in L inverted shape incision with safe and good quality of repair results as conventional approach. In this same period several services specially in Cleveland Clinic, mitral valve surgery has been done through longitudinal right paraesternal incision or L shape partial upper sternotomy with good results but using routine canulations for cardiopulmonary bypass, conventional surgical instruments and the approach to the valve requiring different incisions in the right and left atria with potential arrhythmias.

Later on the concept of minimally invasive video assisted surgery (MIVA) was developed in several Centers in USA and Europe for mitral valve surgery. There was some differences in the procedure among Centers and Surgeons. The most extensive series of patients are from the services of Dr. Wanersman, Aalst/Belgium, Dr. Mohr, Leipzig/Germany and Grossi, New Yourk/USA, showing excellent results. Two metha-analysis with more than 2000 patients comparing MIVA mitral surgery with conventional surgery have shown similar mortality, less reoperations for bleeding, similar length of stay, longer cardiopulmonary bypass and clamping time shorter intubation.

In our experience at the Heart Institute –Univ. of São Paulo we have operated on 44 mitral patients with this technique, 28 mitral comissurotomy, 13 replacements and 3 reconstruction. There was no mortality, one comissurotomy patient was reoperated successfully for valve replacement. The results were excellent in regard for esthetic and level of pain, showing that the procedure is safe and reproducible.

DUSK TO DAWN: MECHANICAL VALVE/BIOPROSTHETIC VALVE

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Heart valve replacement surgery is commonly used to replace diseased or dysfunctional heart valves. Currently used devices, such as mechanical valves and xenograft valves, are sub-optimal. Patients with mechanical valves need a chronic anticoagulation therapy. Bioprosthetic valves (BHV) face problems of degeneration and pathologic calcification especially in younger adults. Many new technologies have emerged and available to prevent BHV calcification. This presentation will discuss failure mechanisms of BHVs and current approaches to make valves more durable. We will closely look at the structure and complexity of BHVs and challenges faced by engineers to optimize valve stabilization. One of the anti-calcification strategies, namely Linx, available on St. Jude Medical's Epic valve will be discussed in detail. The talk will then conclude with discussion about challenges beyond prevention of calcification in BHVs.

Pediatric Cardiac Surgery Invited Lectures-22 October 2010

CONGENITALLY CORRECTED TRANSPOSITION OF GREAT VESSELS (CTGA)

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Congenitally Corrected Transposition of Great vessels (CTGA) is a rare anomaly wherein the right atrium is connected to the morphological left ventricle and the left atrium is connected to the morphological right ventricles. Though the entity was described in the late 19th century, the terminology/nomenclature and understanding of conditions like transposition, corrected transposition, malposition has evolved through various phases of interpretation and confusion. Sequential segmental analysis has simplified the description of such group of conditions as it also incorporates the various associated malformations so often present in CTGA. The right ventricle supports the systemic circulation–hence blood flows in an effective sequence thereby justifying the term corrected.

The four chambers of the heart have distinct morphological features irrespective of there spatial relationship .In terms of looping of ventricles, corrected transposition results because of L looping of ventricles.

CTGA when presenting as an isolated anomaly is compatible with a reasonably long life span, but more frequently CTGA is associated with the more common periemembranous VSD, left ventricular tract outflow obstruction, conduction system anomalies, coronary artery anomalies and tricuspid valve abnormalities, (particularly in autopsy series). All these conditions are important in planning surgical correction.

SINGLE VENTRICLE STRATEGY FOR HEARTS WITH AV/VA DISCORDANCE

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AV/VA discordance includes lesions with heterogeneous morphology, including anomalies of atrial anatomy, systemic and pulmonary venous connections, ventricular and AV valve-tensor apparatus, coronary arteries, ventricular septum, conduction tissue, outflow tracts, and other features. "Anatomic" repairs (Senning-Switch and Senning-Rastelli) have been useful for restoration of concordant connections, and in good candidates, have favourably altered the natural history. However reported early results, while excellent in selected units, have a selection bias, and there are many children with AV/VA discordance who are unsuitable for biventricular repair. Even for suitable candidates, reported mortality and morbidity probably over-estimates what can be achieved in smaller or less experienced units, especially for children who require left ventricular re-conditioning prior to definitive repair. A univentricular strategy (BCPS +/- Fontan) may

be appropriate for children with anatomic features that preclude or complicate a biventricular strategy (straddling AV valves, major coronary anomalies, unbalanced ventricles, remote or multiple VSDs), Results for the Fontan operation in complex biventricular hearts have been favourable in terms of early and late re-operation free survival, and many patients with AV/VA discordance who are unsuitable for biventricular repairs will meet Fontan criteria with or without appropriate staging procedures. In children with AV/VA discordance, VSD, and LVOTO, Fontan results are competitive to those of Senning Rastelli in candidates suitable for either approach, and possibly better in borderline biventricular candidates. The best strategy remains debatable, and requires an individualised approach.

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Adult Cardiac Surgery Invited Lectures-22 October 2010

MITRAL REGURGITATION: A MECHANICAL, CELLULAR AND MOLECULAR PROBLEM

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Chronic left ventricular volume overload from isolated mitral regurgitation results in increased diastolic wall stress and eccentric hypertrophy promoting an initial adaptive left ventricular chamber enlargement. A combination of increased preload and ejection into the low pressure left atrium results in favorable loading conditions which falsely elevate left ventricular ejection fraction despite underlying cardiomyocyte contractile impairment. It is for that reason that mitral valve surgery is currently recommended for severe mitral regurgitation in the absence of symptoms if the left ventricular ejection fraction is less than 0.60. Following mitral valve surgery, left ventricular end diastolic dimensions may decrease and left ventricular end systolic dimensions may remain unchanged, decreasing ejection fraction. The decrease in left ventricular ejection fraction has been attributed to a decrease in preload and a relative increase in afterload due to the correction of regurgitation into the low pressure atrium. In a study at UAB of patients undergoing mitral valve repair for chronic mitral incompetence, MRI derived volumes demonstrated reverse diastolic remodelling while left ventricular end systolic remodelling was essentially unchanged following surgery. Myocardial strain rates, which are relatively independent of preload and more dependent on afterload were normal prior to mitral valve repair due to the favorable loading conditions of mitral regurgitation. However, in the face of unchanging left ventricular end systolic wall stress both longitudinal and circumferential strain rates decreased below normal following mitral valve repair strongly suggesting a decrease in left ventricular contractile performance. Left ventricular biopsies demonstrated deposition of lipofuscin, a non-degradable material primarily composed of oxidatively modified protein and lipid degradation residues. Lipofuscin accumulation is an end product of excessive oxidative stress and overwhelmed protective mechanisms and may have a deleterious effect on cellular function including triggering of mitochondrial pro-apoptotic pathways in cardiomyocytes. These biopsies also demonstrated cardiomyocyte vacuolization and extensive myofibrillar degeneration, also evidence of oxidative stress.

Despite normal left ventricular ejection fraction prior to surgery, patients with isolated mitral regurgitation may have a significant decrease in left ventricular ejection fraction following surgery with an underlying impairment in myocardial strain rate indicative of myocardial dysfunction. This information further supports the recommendation for early correction of severe mitral regurgitation.

THE CURRENT ROLE OF THE PERCUTANEOUS TREATMENT OF MITRAL REGURGITATION

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Although a variety of methods of percutaneous mitral valve repair are currently under experimental and clinical investigation, the MITRACLIP system reproducing the surgical edge to edge technique is the only method which has been used extensively and shown to be associated with an effective and sustained reduction of mitral regurgitation (MR) in selected patients.

Selection criteria are reviewed for degenerative and functional MR.

The procedure is safe, with rare adverse events in the worldwide experience.

Only high risk patients with degenerative MR are currently considered for the MITRACLIP. On the contrary, patients with functional MR and depressed left ventricular function represent the category most likely to benefit from the procedure.

The European experience is reported, focusing on the indications and results.

COMPREHENSIVE AORTIC ROOT AND VALVE REPAIR OPERATION

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Comprehensive aortic root and valve repair (CARVAR) operation is a new surgical technique in repairing aortic root and valve. CARVAR operation addressing the three main components of the aortic root; sinotubular junction (STJ), annulus and leaflet for various aortic root wall and valve disease. For leaflets correction, bovine pericardial leaflets tailored over a specially constructed template were implanted and the STJ and annulus were reduced by implanting specially customized artificial rings and strips, respectively.

The development process of CARVAR operation is composed of four stages: (1) basic research; anatomical and functional characteristics of aortic root, pathology of leaflets in aortic stenosis and regurgitation (2) development of aortic root wall structure repair (3) development of aortic valve leaflets repair and (4) improvement through clinical experiences. The development of the CARVAR operation has been completed and the method is now applicable to all aortic valve diseases with very durable results.

The steps of the CARVAR technique consists of (1) annulus diameter determination (2) STJ diameter determination (3) leaflet profile measurement (4) annulus reduction (5) sinus reduction (6) aortic leaflet repair or reconstruction (7) commissure reduction (8) STJ reduction (9) new leaflets coaptation sutures.

From Oct 2007 to May 2010, a total of 410 patients underwent CARVAR operation. The patients were divided into 4 groups according to type of pathology; aortic root wall diseases group which included annuloaortic ectasia and ascending aortic aneurysm (AAR n = 41); aortic regurgitation (AR) with leaflet disorder group (IAR n = 151); aortic stenosis group (IAS n = 219), and previous AVR group (PAVR n = 9). The mean age was 53 ± 15 (11 to 85) years. There were 2 hospital deaths and 2 late deaths. There were 2 re-operations for AR recurrence. The mean aortic sinus diameter was reduced from 54.2 ± 8.4 mm to 37.5 ± 4.1 ($P < 0.05$) mm in the AAR group, the mean AR grade was decreased from 3.0 ± 0.8 to 0.2 ± 0.5 ($P < 0.05$) in IAR group, and the mean pressure gradient decreased from 40.7 ± 22.9 mmHg to 11.2 ± 7.4 mmHg ($P < 0.05$) in IAS group. The CARVAR procedure showed favorable early results on various aortic root wall and valve diseases.

In conclusion, CARVAR technique is anatomical and physiological repair, universally applicable for almost all kinds of AV diseases, very predictable operative result, technically easy and safe, minimizes aortic root functional impairment, hemodynamic superiority in small aortic root, especially useful for future pregnancy, obviates anticoagulation, improves quality of life by improving exercise tolerance, and cost efficiency.

ONGOING MYOCARDIAL INFARCTION: RESULT OF ACUTE PCI AND SURGERY

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Objective: Ongoing myocardial infarction requires emergency restoration of the coronary circulation by percutaneous intervention and/or surgery, to prevent lifethreatening complications and salvage of myocardium.

Methods: Over the last five years, the referral of patients with acute coronary syndrome (ACS) to the district hospital Isala-clinics was studied. An analysis was made in 5802 patients. Of these, 1819 patients had NSTEMI and 3983 STEMI.

Acute intervention included 4315 percutaneous interventions (of these 3583 = 78.4% plus stent) and 457 (10.6%) off/on-pump CABG.

Results: Following the acute intervention 4315 patients (99.2%) survived in the first admission.

The great majority of patients (95.8%) was treated surgically with on-pump coronary surgery.

Mechanical support of the circulation with IABP (preoperatively) was necessary in 6.8%, and a Ventricular Assist Device (postoperatively) in 11 (0.2%) patients (10 Left VAD and 1 Right VAD). Of these patients, who needed a LVAD for low-output, five patients died (45%).

The total in-hospital mortality was 34/4315 (0.8%), and increased to 48 (1.1%) at six months follow-up.

Conclusions:

1. The key of invasive treatment in the ACS with ongoing myocardial infarction is emergency "refuelling" of the myocardium, a joint venture of interventional cardiologist and surgeon.
2. The on-pump technique was the main modality in surgery.
3. In this strategy, the role of LVAD is very modest in our experience.

Thoracic and Vascular Invited Lectures-22 October 2010

RISK STRATIFICATION IN ACUTE AORTIC DISSECTION

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Aim: Acute Aortic Dissections (AAD) are still cardiovascular emergencies with high rate of in hospital mortality. Despite new managements and surgical techniques, the outcome is not improved consistently over the last 2 decades. Our aim was to stratify the in hospital risk of mortality for both type A and B, according to the age, clinical presentation and management.

Methods: To stratify AAD patients, we utilized the International Registry of Acute Aortic Dissection (IRAD), which is an ongoing international multi-centre registry started in 1996 that actually have included more than 2500 consecutive patients with acute aortic dissection at 24 large referral centers. Data have been collected on a standard questionnaire form having 290 variables regarding demographics, history, clinical presentation, physical findings, imaging study results, medical and surgical management, in-hospital clinical events, length of stay, and hospital mortality.

Results: In AAD type A patients, the overall in-hospital mortality is 23.8% among patients treated surgically versus 59.3% among patients managed medically ($P < .0001$). The in-hospital mortality rate for patients managed surgically increases with increasing age, while the in-hospital mortality rate of patients treated medically remains roughly stable. Age ≥ 70 results an independent predictor for in-hospital mortality among patients with type A (38.2 versus 26.0%; $P < .0001$, OR 1.73), as well as further preoperative signs of unstable conditions such as coma and/or cerebrovascular accident (OR 2.93), preoperative acute renal failure (OR 2.46), hypotension/shock at presentation (OR 3.21), abrupt onset of symptoms (OR 2.10), and ischemic peripheral neuropathy (OR 3.34). In IRAD type A cohort, mortality in patients presenting preoperative unstable clinical conditions resulted double compared with stables (31.4% vs 16.7%, $P < .001$).

In patients affected by AAD type B, the overall in-hospital mortality in IRAD is 12.4%, with a significant difference between complicated and uncomplicated patients (20.0% vs 6.1%, $P < .001$). Predictors of in-hospital mortality among patients with complicated ABAD result age older than 70 years old (OR 6.6, 95% CI 1.9-22.8), hypotension/shock at admission (OR 10.0, 95% CI 2.8-36.3), and pre-operative limb ischemia (OR 5.4, 95% CI 1.4-20.9). In the same complicated ABAD cohort, mortality rate after endovascular treatment is slightly reduced when compared with surgical and medical treatment (15.1%, 18.7% and 20.3%, respectively, P = ns).

Conclusions: Age and clinical conditions at presentation play a basic role in determining in hospital outcome of acute type A and B aortic dissection.

CARDIOPULMONARY ADJUSTMENTS AND QUALITY OF LIFE AFTER PNEUMONECTOMY. RESULTS OF THE PNEUMONECTOMY PROJECT

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The pneumonectomy project was designed to be a descriptive study whose primary objective was to evaluate cardiopulmonary adjustments and Quality of Life (QOL) in long-term pneumonectomy patients.

Among 523 consecutive patients who underwent pneumonectomy for lung cancer at our institution between 01-92 and 09-01, 117 were alive in 2006 and 100 were eligible for study. Four hundred and six patients died during the follow-up period including 31 operative deaths (operative mortality of 5.9%), 318 patients who died of cancer recurrence and an additional 26 patients who died of cardiopulmonary causes. Over a one-day period each study patient underwent complete medical history, chest radiographs, dynamic thoracic MRI, pulmonary functions studies, resting arterial blood gases, 6-minute walk test, and Doppler echocardiography. All patients also completed four QOL questionnaires including the ATS recommended respiratory questionnaire.

Most patients (N = 73) had no or only minimal dyspnea. Based on predicted values, functional percentage losses in FEV_1 and FVC were 30 ± 22% and 14 ± 30% respectively and DLCO decreased by 31 ± 18%. There was a significant correlation between pre and postoperative FEV_1 ($P < .01$) and more hyperinflation was associated with better lung function ($P < .01$ for FEV_1). Gas exchange was normal at rest (PaO_2 = 88 ± 10 mmHg; $PaCO_2$ = 42.3 mmHg) and exercise tolerance (6-minute walk) was also normal (83 ± 17% of predicted values). Thirty two patients had some degree of pulmonary hypertension but in most cases, it was mild to moderate (mean systolic pressure of 36 ± 9 mmHg) and not associated with significant differences in lung function ($P = .57$ for FEV_1), gas exchange ($P = .08$), and exercise capacity ($P = .66$).

Quality of Life outcomes (SF-36 health survey, Geriatric depression scale, Spielberger) show that long-term survivors have similar QOL scores as other men and women of similar age but without cancer and with their two lungs. The results of the SF-36 health survey suggest that men may have more difficulties to adjust to pneumonectomy than women.

Lung Volume Reduction Surgery

The main objective of Lung Volume Reduction Surgery (LVRS) in to remove redundant air spaces thought to interfere with hyperinflated but more functional adjacent lung tissue. This will improve elastic recoil in the remaining lung, which in turn will increase radial traction on terminal bronchioles, allowing them to remain open throughout the respiratory cycle. Another objective of LVRS is to improve the mechanical efficiency of important respiratory muscles, such as the diaphragms, the intercostals (chest wall mechanics), and even the scalenes, by correcting the hyperinflation that places such muscles at a disadvantageous position for adequate function.

Although selection criteria may vary, important prerequisites are the presence of severe airway obstruction with FEV_1 decreased to 20% to 35% of predicted value, severe hyperinflation with TLC greater than 130% of predicted; and heterogeneity of disease where non functional target areas can be identified on CT. In addition, the patient must have stopped smoking for at least 6 months preoperatively and must be able to complete a rehabilitation program which will improve strength and aerobic conditioning making surgery less morbid and postoperative recovery faster.

The operative technique involves staple resection of 20% to 30% of the volume of each lung, target areas having been identified preoperatively by CT scanning or V/Q isotopic scans. In general, bilateral procedures, whether they are done by sternotomy or bilateral thoracoscopic approaches, are associated with better results than unilateral reductions are.

Table 1. Worse Profile for LVRS Surgery

Clinical Guidelines
Bronchitic symptoms or asthma
Age > 70 years
Severe cachexia or obesity
Previous pleurodesis or thoracotomy
Severe left ventricular function or coronary artery disease
Alcohol dependency
Acquired thoracic deformity

Physiologic and Morphologic Guidelines
Homogeneous distribution of disease
Inability of residual lung to ventilate and perfuse
$PaCO_2$ > 55 mmHg
Pulmonary hypertension (mean > 35 mmHg)
DLCO < 20% of predicted
FEV_1 < 20% of predicted
Ventilator dependency

As a rule, LVRS should be considered palliative. It can, however, offer significant benefits in rigorously selected patients who have exhausted other more conservative treatment options. Keys to good postoperative outcomes include proper understanding of the abnormal physiology related to emphysema, exclusion of patients with worse profiles (Table 1), meticulous surgical technique, and optional postoperative care.

ROLE OF ADJUVANT THERAPIES IN THE SURGICAL MANAGEMENT OF NSCLC

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Worldwide, lung cancer is the leading cause of cancer deaths as it accounts for more deaths than colon, breast, and prostate cancers combined. Although surgery is generally regarded as the best treatment option, less than 25% of NSCLC are suitable for complete resection, and of these, only about 30% are expected to be long-term (> 5 years) survivors. In this population, treatment failures are mainly due to the development of distant metastasis. There is thus considerable interest in determining wether induction or adjuvant therapies added to pulmonary resection give any survival advantage over resection alone.

We now know that induction chemotherapy or chemoradiotherapy benefit selected patients with CN_2 disease by downstaging the tumor, reducing tumor size, and possibly eradicating clinically undetectable distant metastasis. In a recently published meta analysis (2006), preoperative chemotherapy was shown to improve survival over resection alone with a hazard ratio of 0.82 (95% confidence interval, 0.69-0.97; $P = .02$) which is the equivalent of an absolute benefit of 6 %. The overall results strategies are better in patients with smaller primary tumors (lower T status), in patients with complete pathological response to induction treatments, and in patients where a complete resection was possible.

The need for adjuvant postoperative chemotherapy is also based on the fact that multiple studies have shown that the incidence of patients developing extrathoracic metastasis within 2-3 years after curative resection was in the range of 60% to 80% even in stage I and II tumors. Unfortunately, earlier trials comparing adjuvant chemotherapy to best supportive care following surgery failed to show a survival benefit. In there trials, an inability to deliver the planned chemotherapy in the postoperative setting was also thought to contribute to the negative findings. Several recent phase III trials have, however, established adjuvant chemotherapy as the standard of care in completely resected early-stage NSCLC. The JBR.10 study conducted by the National Institute of Canada randomized 482 patients with completely resected stage IB or II NSCLC to either observation or adjuvant chemotherapy. The 5-year overall survival rates were 69% in the chemotherapy arm compared with 54% in the surgery alone arm ($P = .03$). In subset analyses, patients with stage II disease had a more significant survival benefit than did patients with T2N0 disease. Postoperative radiation therapy in completely resected patients may improve local control but a study carried out by the Lung Cancer Study Group reported no survival advantage over surgery alone.

In conclusion and based on the results of recent induction and adjuvant trials, the addition of preoperative chemotherapy in selected patients with CN_2 disease and of chemotherapy following surgery for patients with stage II NSCLC provides an overall survival benefit.

THE CURRENT STANDING OF AWAKE CARDIAC SURGERY

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Awake cardiac surgery was first described during early 2000. After the initial report by Karagoz and coworkers, few groups including our own, reported successfully carrying out cardiac surgery under thoracic epidural anesthesia. In the past decade, more groups have reported carrying out similar surgeries in various subsects of patients. The patients who underwent awake heart surgery typically suffered from multiple comorbid conditions; most of them respiratory. We have reported successful conduct of awake heart surgery in patients with other comorbidities such as tracheal stenosis, myasthenia gravis, pulmonary silicosis, end stage renal failure and repeat surgeries. Although increasing number of authors have been reporting awake heart surgery, the overall increase in the number does not seem to justify the benefits proclaimed. The major reason why the clinicians are not ready to embrace this technique probably stems out from the fear of symptomatic epidural hematoma. Additionally, awake heart surgery is quite a paradigm shift from the conventional heart surgery under general anesthesia; therefore, it is pretty much surgeon centric. Most surgeons do not want to shift gears from the 'cruise mode' of general anesthesia. It is true that evidence of benefits of awake heart surgery and use of epidural is not overwhelming mainly because of the reluctance to use epidurals in cardiac surgery. In my talk, I will be touching upon various issues concerning the smooth conduct of awake heart surgery, improvement in the acceptance among surgeons and anesthesiologists.

Basic Sciences Invited Lectures-22 October 2010

BIOLOGICAL VENTRICULAR ASSIST DEVICES

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Biological repair of failing hearts may be achieved by the implantation of therapeutic cells or tissue engineered myocardium. The latter approach may be advantageous when aiming at the reconstitution of complex myocardial structures in situ. Based on our original technology to generate engineered heart tissues (EHT) we have developed a set of novel approaches to either partially or fully repair scarred myocardium. Alternatively, we have developed myocardium embracing tissue engineered myocardium that may function as biological ventricular assist device (BioVAD). Key caveats that may delay or even preclude a clinical exploitation of tissue engineering concepts, including the lack of an "ideal" therapeutic cell and safety concerns related to the risk of teratoma formation and arrhythmia induction, will be discussed.

MYOCARDIAL ASSISTANCE BY GRAFTING A NEW UPGRADED BIOARTIFICIAL MYOCARDIUM (MAGNUM TRIAL): CLINICAL RESULTS AT 2 YEARS

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Purpose: Progenitor cells may provide the biological substrate for myocardial repair. Cell transplantation for myocardial regeneration is limited by poor graft viability and low cell retention. The stem cell niche (a specialized environment surrounding stem cells) supply crucial support needed for stem cell maintenance. If the stem cell niche has aged or has been modified by a disease, it might not be capable of supporting stem cells grafted for local myocardial treatments. The goal of this clinical study was to evaluate intrainfarct cell therapy associated with a 3D cell-seeded collagen scaffold grafted onto infarcted ventricles.

Methods: In 20 patients (aged 55.2 ± 3.9 years) presenting LV postischemic myocardial scars and with indication for a single OP-CABG, autologous mononuclear bone marrow cells (BMC) were implanted during surgery in the scar. A 3D type I collagen matrix (5 x 7 x 0.6 cm) seeded with BMC was added on top of the scarred area.

Results: There was no mortality and any related adverse events (follow-up 25 ± 3.8 months). NYHA FC improved from 2.3 ± 0.5 to 1.3 ± 0.3 (*P* = .005). LV end-diastolic volume evolved from 142 ± 24 to 115 ± 3 mL (*P* = .03), LV filling deceleration time improved from 162 ± 7 ms to 198 ± 7 ms (*P* = .01). Scar area thickness progress from 6 ± 1.4 to 9 ± 1.8 mm (*P* = .005). EF improved from 25 ± 7 to 34 ± 5.2% (*P* = .04).

Conclusions: Simultaneous injection of BMC and fixation of a cell-seeded matrix onto the epicardium is feasible and safe. The matrix seems to increase the thickness of the scar with viable tissues and help to normalize wall stress, thus limiting remodelling and improving diastolic function. Associating stem cell transplantation with tissue engineering for myocardial repair seems to be beneficial to re-establish an efficient milieu for cell survival, multiplication, differentiation and function.

UNWINDING OF THE TRIPLE HELICAL STRUCTURE OF COLLAGEN, A HELICAL MYSTERY AND BIOMEDICAL APPLICATIONS OF COLLAGEN AND SOME BIOCOMPATIBLE NANOMATERIALS

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The mutual interaction of cat-fish collagen with sodium dodecylsulfate (SDS) and urea was studied at various temperatures. The results suggest that the aggregation of collagen is facilitated by the presence of SDS, whereas hindered by urea. The various thermodynamic parameters were estimated and the transfer of collagen into SDS micelles, urea and the reverse phenomenon was analyzed. These transfer properties are temperature-dependent. Our thermodynamic results are also able to predict the exact denaturation temperature as well as the structural order of water in the collagen in various environments. The hydrated volumes, Vh of collagen in buffer, SDS, and urea environments using Simha-Einstein equation and intrinsic viscosity [n] were also calculated. The low [n] and high Vh value of collagen in an SDS environment compared to buffer and other environments suggested a more workable system in cosmetic and dermatological preparations. The one and two-hydrogen-bonded models of this collagen in various environments have been analyzed. The calculated thermodynamic parameters varied with the concentration of collagen as well as concentration of additives. The change of thermodynamic parameters from coiled-coil to random-coil conformation upon denaturation of collagen were calculated from the amount of proline and hydroxyproline residues and compared with viscometric results. Denaturation enthalpy of the cat-fish collagen in buffer, SDS and urea environments has also been determined by differential scanning calorimetric (DSC) measurements, and the results are in good agreement with the viscosity – derived values. The asymmetry and molecular geometry of this collagen in buffer, SDS and urea environments are also computed. Overall, our hydrodynamic and thermodynamic results suggest that the stability of the collagen in the additive environments is in the following order: SDS >buffer>urea [1,2].

The potential of monomeric collagen used in the collagen-chitosan-platelet-derived growth factor (CCP) and, therefore, exogenous collagen was readily accepted by the wound surface of the rat as part of the provisional matrix. The exogenous collagen supplementation enabled faster migration of cells that are involved in cutaneous wound healing. Since the collagen is molecular in nature [1,3] and supplants endogenous collagen in vivo, it readily integrates with the wound tissue and facilitates the attachment, migration and proliferation of cells on the wound site [4].

The films of soluble RTT collagen were studied at the solid-solution interface, and the surface energy of the films was evaluated. The films transferred onto solid substrates using the Langmuir-Blodgett film (LB film) technique were characterized using FT-IR attenuated total reflectance spectroscopy and atomic force microscopy. The properties of the protein in contact with different structure modifiers like basic chromium sulfate (BCS) and formaldehyde (HCHO) were also analyzed using differential scanning calorimetric and above techniques [5]. Non-enzymatic glycation of collagen is generally used in modern biomaterials science. The *in vitro* studies on the effects of amino guanidine (AG) and aspirin in the non-enzymatic glycation [NEG] of collagen using thermal, conformational, fluorescence, turbidity and powder XRD measurements. There is no significant change in the fluorescence emission spectra for different concentrations of AG treated NEG of collagen, whereas the emission intensity decreases as the concentration of aspirin increases. Circular dichroism (CD) revealed the disappearance of the positive peak at 220 nm for glycated collagen in the presence of AG and aspirin suggesting the collapse of triple helical configuration. Nearly 15oC, decrease is observed in shrinkage temperature of glycated RTT collagen fibres in the presence of aspirin. Powder XRD of glycated collagen nanofibrils in the presence of AG reveals high crystalline nature and the enhancement of self-assembly processes when compared to aspirin. To the best of our knowledge, we have reported for the first time the power XRD of the self-assembly of collagen nano-fibrils without mineralization. Our experimental results suggest that in the NEG of collagen, both AG and aspirin play a pivotal role in the aggregation and self-assembly processes. From the present investigation, it is possible to conclude that while AG significantly influences the self-assembly processes, aspirin facilitates the aggregation processes [6]. Interaction of collagen with bleomycin will also be highlighted in this presentation [7].

We have reported for the first time the new biomaterial silver-doped hydroxyapatite nanocomposite and its biocompatible antibacterial properties for medical application, which was synthesized by ex-situ method [8]. The growth of hydroxyapatite on physiologically clotted fibrin capped gold nanoparticles is reported for the first time by employing a wet precipitation method [9].

Bovine collagen (principally type 1 collagen) as such and after necessary chemical modification on its side chains and taking advantage of its physicochemical and biological properties offers an excellent opportunity for biomaterial development for wound management and other tissue engineering applications. Collagen bi-layer dressing with drugs, collagen scaffolds with bioactive molecules, growth factors, microspheres and collagen composites with keratin and other polymeric materials are being developed at CLRI for a number of therapeutic applications. Study is being conducted at the cellular level to know the effect and mode of action of certain herbal based natural products like *M. Charantia, E. Officinals*, in the treatment of diabetes to replace the conventional drugs presently used.

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NANOTECHNOLOGY STRATEGIES FOR MYOCARDIAL INFARCTION

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World Health Organization estimates that heart failure initiated by coronary artery disease and myocardial infarction (MI) leads to 15% of deaths worldwide. Changing lifestyles and stress caused by urbanization are further contributing to the increased prevalence of heart failures. Occluded arteries lead to MI which sets off a series of complicated processes including cell death, remodeling and dilation of ventricular chamber, scar formation, and ventricular fibrillation. Over the past few decades coronary stent placement and coronary artery bypass grafting have become the commonly applied clinical treatment procedures following acute MI. These interventional procedures seek to revascularize the myocardium and restore the blood pumping ability of heart. Motivated by the desire to develop minimally invasive procedures, the recent ten years saw growing efforts to develop injectable biomaterials with and without cells to treat cardiac failure. Biomaterials evaluated include alginate, fibrin, collagen, chitosan, self-assembling peptides, and a range of synthetic hydrogels. Growing scientific literature suggests that mechanical effects of biomaterials are beneficial in repairing myocardium independent of cellular delivery. It

is our hypothesis that injectable biocompatible nanofibers provide optimal mechanical effects. Our research team is fabricating non-invasive nanofibrous scaffolds (nanofibers, coreshell nanofibers) and injectable hydrogels (synthetic, natural and photopolymerized hydrogels) with growth factors and mesenchymal stem cells for restoring normal function of infarcted myocardium. We are also systematically investigating the relative merits of mechanical structural changes brought about by injectable nanofibers and functional activities of cells in the repair of infarcted myocardium. Building on this knowledge we are also developing in vitro engineered nanofibrous cardiac patch for the regeneration of infarcted myocardium. The ultimate goal of this research is to generate biocompatible, non-immunogenic heart muscle tissue with morphological and functional properties similar to natural myocardium to alleviate infarcted myocardium.

23 Programme Invited Lectures

FROM THE MAGIC MOUNTAIN TO ROCKET SCIENCE

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The story of thoracic and cardio-vascular surgery starts at the beginning of the 20th century, when patients with pulmonary tuberculosis were sent to the mountains in places like Davos, Switzerland. This is where Thomas Mann (1875–1955) stayed in 1921 ahead of the publication in 1924 of his famous work "Magic Mountain". Since this period when the most popular methods of treating tuberculosis were therapy with rest, sun, and later on, thoracic surgery, ahead of the advent of antibiotics, a lot has happened in our fields of expertise.As a amtter of fact, thoracic and cardio-vascular surgery has evolved into a technological and device-driven discipline, including more and more sophisticated instrumentation in addition to cardio-pulmonary bypass, vascular grafts, prosthetic heart valves, pacemakers, stents, coverd stents, valved stents, ventricular assist devices etc, to name just a few. Interestingly enough, many of the technological concepts used in thoracic and cardio-vascular surgery today have been around for a long time, but for some reason could not be implemented earlier on. As an example, today's axial flow pumps for mechanical circulatory support are derived from fuel pumps used in rocket engines, even though the concept of the screw pump was devised a long time ago by Archimedes in Syracuse (287–212 BC).

REPROCESSING OF SINGLE USE MEDICAL DEVICES: ETHICAL, ECONOMICAL & ENVIRONMENTAL DILEMMA

Ganesh Kumar Mani

Contemporary surgical practice involves usage of large number of plastic disposables as in beating heart surgery. Some of these disposables namely stabilizers and intra luminal shunts are labeled as single use device ((SUD), but there is large prevalence of reuse in many parts of the world without untoward complications ! Original Equipment Manufacturers (OEM) do not recommend reuse. The Food & Drug Administration of USA (FDA) have set up protocols for reuse of SUD depending on the criticality of the device.

A. Critical reprocessed SUD intended to contact normal sterile tissue or body space during reuse.
B. Semi-critical reprocessed SUD intended to make topical contact and not penetrate intact skin.
C. Non-critical reprocessed SUD intended to make topical contact and not penetrate intact skin.

FDA has additionally recommended guidelines for submission of validation data including cleaning and sterilization data, functional performance data and maximum number of times the device is reprocessed. FDA has recommended formation of "Reuse Committee" which includes staff from materials management, Risk Management, Infection Control, Clinical Patient Care, Safety, Administration, Legal and Public Relations.

Alternatively Third Party Reprocessors who fulfill Quality System Requirements (QSR) of FDA 2000 Guidelines are also allowed to reprocess with reporting capability. (Eg, type of Quality Reports, Certificate of liability insurance & Device Tracking Capability.

For a developing economy like India and also with a view to reduce the burden of biomedical waste, totally transparent and validated reprocessing of SUDs complying to FDA Guidelines, is fully justified. The details of cleaning, disinfecting and resterilisation by Plasma Steriliser or Ethylene Oxide Steriliser is to be strictly adhered to and validated.

"REPROCESSING OF SINGLE USE MEDICAL DEVICES – ETHICAL, ECONOMICAL & ENVIRONMENTAL DILEMMA"

I.S. Virdhi

The reuse of single use devices is the practice of reprocessing the device for use on another patient. It evolved from a time when hospitals asked for disposable products to cut down on reprocessing costs and risk of infections, but over the time it was overtaken by the financial pressure to contain the cost.

The ethical, economic and environmental impact of this practice is a matter of much debate and no consensus. In Asia 95% of healthcare services reprocess SUMD. First and foremost among these varied concerns is the ethical impact of this practice.

SUMD's by nature of their design philosophy are not fabricated to be disassembled, sterilized and reassembled. SUMD's are validated and designed for one use only. The materials chosen for their construction are guided by the need for maximum performance for the intended single use. In spite of a definite understanding of this key concept, world over the practice of reprocessing and reuse continues with all its attendant risks.

The complexity of the design of these devices render them inaccessible to normal cleansing procedures resulting in residual contamination with blood and organic residues, infectious agents including prions and resistant endotoxins. Moreover the functional and mechanical integrity of these delicate instruments are jeopardized by the reprocessing cycle.

Although there is a worldwide debate about the practice of reprocessing, till date there has been no evidence that this process is 100% safe. It is a basic principle of medical treatment that the patient should consciously agree to the form of treatment, particularly if it involves surgery and puts them at risk, the consent should always be informed.

However, in countries where reuse of SUMD is tolerated, patients are not told that they will be treated with a reprocessed product against the manufacturer's instructions, or informed of the related risks.

The false sense of financial gains by the reuse of SUMD's is mitigated by the fact that the apparent gain is eaten into by the possible cost of treating hospital acquired infections, cost of the refurbishment activity and that in itself yielding suboptimal results and the costs resulting from hospital liability when reprocessed SUMD causes harm.

The environmental impact of SUMD's is a much neglected and poorly researched aspect of this debate. An ever increasing amount of medical waste causes a strain on the fragile ecological balance and also contributes to the cost of clinical waste disposal. The environmental consequences of a product's life cycle needs to be minimized by integrating the product development with the disposal dynamics into a 'closed-loop' system that addresses the following:

1. The eco-design of products, so that the life cycle impacts are minimized.
2. The application of the "polluter pays principle" in deciding product price.
3. Ensuring consumers are making informed choices based on environmental data.

The nature of the beast demands a organized international consensus with phased-in enforcement, backed with equitable responsibility sharing by the manufacturer and the hospital. And as responsible medical professionals it is our onus to err on the side of safety and absolutely ban reusage.

EDUCATION AND TRAINING IN CARDIOTHORACIC SURGERY- THE CHINA MODEL

Angelo Thomas Pezzella

China has witnessed an accelerated growth in its economy. The population of China is over 1.3 billion people. Healthcare is evolving from a totally socialized government funded system to a hybrid of government and privatization. The medical education system beyond medical school, ie, graduate medical education, is not centrally organized or controlled in China. It is estimated there are more than 8 million Chinese citizens in need of cardiac surgery. There are presently approximately 100,000 open heart operations performed in over 160 centers annually. The exact number of cardiac surgeons is unknown, but estimated at over 1,000. Individual centers have developed their own "in-house" residency programs. There is no formal speciality board certification or credentialing. In July, 2005 a three year cardiothoracic residency program was initiated at Shanghai Chest Hospital, in cooperation with the World Heart Foundation. Modeled after the two North American Systems, and modified for China, this system was designed to provide a defined period of training with graduated responsibility and subsequent written/oral examination, and credentialing by the Shanghai Health Bureau, Shanghai Chest Hospital, and the World Heart Foundation. A review of the planning, initiation, implementation, and the five year experience of this effort is presented. Hopefully lessons learned will help future efforts in developing a centralized graduate medical education program for all of China.

A. Thomas Pezzella MD, Director, Special Projects

World Heart Foundation Corrupt Practices in Chinese Medical Care: The Root in Public Policies and a Call for Confucian-Market Approach

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Ruiping Fan - Corrupt Practices in Chinese Medical Care: The Root in Public Policies and a Call for Confucian-Market Approach - Kennedy Institute of Ethics Journal 17:2 Kennedy Institute of Ethics Journal 17.2 (2007) 111-131 Muse Search Journals This Journal Contents Corrupt Practices in Chinese Medical Care: The Root in Public Policies and a Call for Confucian-Market Approach Ruiping Fan Abstract This paper argues that three salient corrupt practices that mark contemporary Chinese health care, namely the over-prescription of indicated drugs, the prescription of more expensive forms of medication and more expensive diagnostic

work-ups than needed, and illegal cash payments to physicians -- ie, red packages -- result not from the introduction of the market to China, but from two clusters of circumstances. First, there has been a loss of the Confucian appreciation of the proper role of financial reward for good health care. Second, misguided governmental policies have distorted the behavior of physicians and hospitals. The distorting policies include (1) setting very low salaries for physicians, (2) providing bonuses to physicians and profits to hospitals from the excessive prescription of drugs and the use of more expensive drugs and unnecessary expensive diagnostic procedures, and (3) prohibiting payments by patients to physicians for higher quality care. The latter problem is complicated by policies that do not allow the use of governmental insurance...

LET US IMPLEMENT THE SCIENCE OF LEARNING IN CARDIOTHORACIC SURGERY

Paul Sergeant
Belgium

Background: For many years, surgical practice and residency programs were based on dogma and experience rather than scientific evidence, often on a medieval master-apprentice concept. As we have entered the current century, the original model began to show signs of stress as a result of recent converging trends. Surgical safety and limiting resident work hours as part of the European regulations, increasing emphasis on surgical skills training and assessment, perception of surgical careers and associated reduction in superior candidates for surgical residency programs are seen by many as huge threats for the future of our profession.

Aim: Based on the knowledge of business analysis, strategy and execution, continuous medical education, learning processes, adult teaching, cognitive processing and knowledge management, we attempted to reengineer and consolidate the strengths of (cardio-)surgical residency programs.

Material and Methods: A SWOT-analysis (strengths, weaknesses, opportunities and threats) of surgical residency was performed. The two major strengths of current (cardio-)surgical training that could be identified were the fact that most surgeons are good professionals and that training is mostly done in the real world. As it will turn out, one of these strengths will become at least a weakness, if not even a threat. The weaknesses focus around learning environment, variability, insufficient parameterization and finally teacher's motivation. An operating theatre is indeed a training-hostile environment. It is similarly clear that scholar and teacher selection parameterization is absent, equal to parameterization of cognitive and motor skill progress as the parameterization of the balance between both. The evaluation of professional readiness at the end of (cardio-)surgical training is a mockery versus existing evaluation platforms used in other professional training environments. The variability of scholar, teacher and institution adds variability to the training performance, in addition to the variability in scholar-teacher relationship. Finally salary and promotion of teachers are not based on educational skills or educational realizations. Threats are possibly having a major impact on operational and strategic issues. The economical pressure of operating room time further enhances the training-hostile environment. The European Commission Working Hours directives forces scholars and teachers to restructure completely their activities, this in combination with an explosion of non-training related tasks and in technical complexity of the procedures, seem to annihilate training expectations. The evolutions in the science of knowledge transfer and in the strategy building provide opportunities we will have to exploit for the future of our profession.

The science of knowledge and of the transfer of knowledge forces any scholar or teacher to question his educational performance. Indeed scientists as Halsted (1904), Polanyi (1966), Bandura (1969, 1986), Kopta (1971), Reznik (1990, 1993), Ericsson (1993-1996) and Payton (1998) advanced the in depth understanding of the nature, the creation, their triggers as well as the transfer of knowledge. Knowledge creation became a dynamic process interacting with the individual's autonomy and learning style. Most of this knowledge never became integrated into surgical training. Educational goals should be classified by their taxonomy. There are three categories: knowledge, skills and attitude. All three are of equal importance and reinforce one another. Knowledge is divided into tacit and codified knowledge. Codified knowledge is stored in formal language (tables, text, videos and sound) and is easily transferable. Tacit knowledge is hidden within an organization, often rooted in action and therefore difficult to convey. Both are not mutually exclusive and exist along a spectrum. It is the task of the teacher to present or formalize as much as possible the knowledge into a codified version. Skills require the development of psychomotor competencies and is based on regular practice. Attitude is the integration of knowledge and skills towards the care of patients, providing the matrix for the competent clinician. The theory of adult learning, centered actively on the learner, identifies several approaches. The behaviorist approach uses the classical technical drills to develop motor skills. The cognitive approach focuses on the mental processes, perception, reasoning and insight. The learner builds, analyses and organizes his knowledge towards appropriate medical decision making and execution. The individualized approach allows the shaping of the learning curve according to the individual scholar and his individual learning style.

The challenge of blending the socio-economic changes with this intricate process of knowledge creation and transfer will be the core challenge of the leaders of our profession. A reengineering of this process is proposed as a guide for the national and international organizations.

Conclusions: The changing socio-economic, juridical and medical environment offers great opportunities to redesign an improved and evidence based surgical residency for the next century.

THE LOGIC AND IMPERATIVE OF BIOLOGICAL SIMULATORS IN THE TRAINING OF CARDIAC SURGEONS

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USA

The apprenticeship model has been the principal method of information-transfer and skill-set development throughout human history and during the relatively short history of cardiac surgery. The traditional intermediary in this process in cardiac surgery has

been the patient. However, the continuing explosion of specific surgical technologies and techniques, a relative and absolute decline in the number of patients available to surgical trainees, and the gradual realization of the amount of time necessary to acquire and maintain true expertise, have prompted the need for a paradigm shift in the training of cardiac surgeons. Although the apprenticeship model is still valid today, certain disadvantages are obvious with the operating room as the sole forum for this knowledge-transfer and skill-set development, including patient risk, unfocused "down-time," and the inability to make mistakes and practice technical maneuvers. On the other hand, the use of biological "simulators" has the potential to compliment the operating room experience and to off-set these disadvantages by allowing for the opportunity to narrow one's focus to a specific technique or sequence of techniques, repetitively practice, make mistakes without risk, and probably eliminate "learning curves." A key component in the employment of these biological "simulators" is the necessity of competent mentors. Given the time constraints of the typical academic cardiac surgeon and the current lack of reimbursement for simulation training, it remains to seen where they will be found and how they will be utilized. However, it is clear that the evolving mandate for this *Mentored Simulation Imperative* clearly requires true mentors in the equation. The implications of this technology explosion and the "expertise requirement" strongly suggest that cardiac surgeons will need to subspecialize, with a much narrower individual focus, and that simulators of various kinds will become a routine part of the life of cardiac surgeons during their training and beyond.

Heart Disease in Developing Countries

Global Forum 21
October 2010

COULD RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE BE ELIMINATED?

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Rheumatic fever (RF) and rheumatic heart disease (RHD) were probably rare or non-existing in Taiwan before 1920s (Maxwell JL, J Trop Med Hyg, 1931). Based on an extensive review of the hospital records and the literature, we found that the two children admitted and treated for RF in 1946 at the National Taiwan University Hospital (NTUH) could be the earliest RF patients documented in Taiwan. A few RF/RHD patients continued to appear since then, reaching a highest level of 3-4 cases per 1,000 yearly pediatric admissions, during 1960s to early 1980s. The prevalence of RHD in Taiwanese school children surveyed in 1970 was 1.42 per thousand. The clinical manifestations of RF/RHD in Taiwan were generally similar to what described in the literature, except that the percent frequency of carditis was higher, 67% to 93%, and that of polyarthritis lower, 27% to 53%.

We launched in 1979, a prospective and controlled, long term, RF secondary prevention study, and a nation-wide RF control program under the auspices of the Taiwan Cardiac Children's Foundation. A RF special clinic was set up, and a national RF registry was established; RF/RHD brochures and booklets for patients and family.

Were designed, printed and distributed; Conferences and lectures for pediatricians and general practitioners were held; Large scale school children's cardiac surveys were carried out every year since 1982.

It was observed that, the number of NTUH pediatric RF/RHD patients decreased abruptly in 1983, gradually thereafter, reaching to a zero in 2004 and 2008, except in 1989 and 1990, when a world-wide RF resurgence occurred. The prevalence of RHD also decreased almost in parallel with the hospital statistics, Our experiences have proved that secondary RF prevention program is practical and cost effective. Could RF and RHD in Taiwan be, thus, eliminated?

THE CHALLENGES OF DEVELOPING OPEN HEART SURGERY PROGRAMME IN THE DEVELOPING WORLD, THE A CASE OF UGANDA HEART INSTITUTE

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Development of cardiac services in Uganda started in 1966 by Prof. Somers as a Cardiac clinic in the Department of Medicine at Makerere University Medical School.

By 1969, a rudimentary cardiac catheterization unit was functional and closure of atrial septal defects (ASD) was safely performed under core cooling under Dr. Boneli.

In 1970-72 a team of young professionals was picked after completing their Masters of Medicine training in the various specialities (Internal Medicine, Paediatrics, General surgery and Anaesthesia) was assembled and sent to Europe and the USA for training with the plan to return and sustain/develop the programme.

Unfortunately due to the Military take over by the famous General Idi Amin Dada in 1971, all the expatriates fled and left the country resulting in total collapse of the cardiac programme.

The team of talented professionals who were on training ended up getting employment abroad after their programmes, some have returned after retirement (>65 years of age).

Uganda Heart Institute initiated in 1988 by four founding bodies (Mulago Hospital, Makerere University, Ministry of Health and Uganda Heart Foundation), was registered by Government as Limited Company by Guarantee in 2001 and eventually accorded a full vote status in 2010, three year after open Heart Surgery was resumed in 2007.

The Institute has had to overcome major challenges of:

- Building a professional team,
- Acquiring the necessary equipment
- Generating the necessary funds
- Winning political and government support
- Winning public confident
- Getting patients to contribute financially
- Legal status
- Human resource structure
- Government beaurocracy

The Uganda Heart Institute is allocated funding in the Government budget and a human resource structure has also been provided to enable recruitment of appropriate staffing.

The first modern cardiac catheterization lab is being installed and plans to construct a modern 200 bed.

Heart Institute have been approved by the Government.

IMPLEMENTING CONTROL OF RHEUMATIC FEVER/RHEUMATIC HEART DISEASE IN THE INDUSTRIALIZING WORLD: OPPORTUNITY, OBLIGATION AND REALITY

Edward L. Kaplan, MD
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Recognized for centuries as a significant cause of cardiovascular disease in countries around the world, and as *the* major cause of acquired heart disease in children and young adults, rheumatic fever and its sequel, rheumatic valvular heart disease, continue - even into the 21st century - to represent resource-draining medical and public health problems. This medically, economically and socially disabling disease continues essentially unabated in many countries, even though proven cost effective control measures have been available for more than half century.

At least sixty years ago it was unequivocally demonstrated by controlled studies that primary prophylaxis (treatment of streptococcal pharyngitis) prevents rheumatic fever. Penicillin is inexpensive, effective and available in most countries. Why has primary prophylaxis been ineffective in much of the industrializing world?

International studies in the 1960s and early 1970s by the World Health Organization and others also have documented that secondary prophylaxis (antibiotic prevention of recurrent streptococcal pharyngitis) is both feasible and effective, and reduces morbidity and mortality among affected patients. Why then do RF/RHD recurrences continue to occur so frequently, resulting in a drain on already scarce resources? How much is related to a lack of basic scientific understanding of the epidemiology and pathogenesis?

On the horizon there are potential group A streptococcal vaccine candidates that should offer more effective control of this cardiovascular sequel to streptococcal infection. However, realistically it is quite likely that another decade will pass before this approach can be made available to many populations. Until then, there is a realistic opportunity and as well as a demanding obligation for the medical, public health communities and governmental authorities to implement known effective ways of addressing this crippling disease process among children and young adults during their most productive years. New approaches (eg, school based programs) are required, and are realistic.

CHALLENGES OF SETTING UP CARDIAC SURGERY IN BANGLADESH

Jahangir Kabir
Bangladesh

Bangladesh has many socio-economic, cultural relations with West Bengal including seven sisters of India as her neighbours. We probably have similar type of cardiac diseases including rheumatic heart diseases. Bangladesh has a population of 160 millions people and a substantial amount lives below extreme poverty line. We do not have any data registry for cardiac disease profile similar to the neighbouring states of India. But coronary artery diseases are much more common in eastern part of Bangladesh than to west. But, nevertheless, congenital heart disease in Bangladesh may not have any geographical variation and similar to this particular region of the subcontinent.

National Institute of Cardiothoracic & Vascular diseases (NICVD) established in 1980 is the first & only dedicated Government cardiac hospital in Bangladesh and still standing as mother institute. However, from its inception the institute demanded transfer of technology for the surgical treatment of coronary artery diseases & complex congenital heart disease. The institute also understood a long term apprenticeship is required as opposed to short term training in coronary and complex congenital heart diseases. Out of few hospitals that provided this training like Madras Medical Mission and Frontier Life Line hospital under the leadership of Dr. K M Cherian was praised to be noted. Because they did not only trained surgeon and cardiologist but also trained nurses including paramedics.

After my long training (three years) with DR. K M Cherian challenges for setting up of cardiac surgeries in Bangladesh was many fold. Among these I believe man power development, psychological limitations and political instability are important. However, Technical collaboration between the hospitals in terms of transfer of technology, financial support in both government and private centres enabled us for doing more than twelve thousand cases in less than 11 years (1999-2010).Now that almost all cases of coronary artery disease are done in beating heart, Heart failure surgery like SAVE procedure done

regularly. Similarly, in complex congenital heart disease arterial switch operation done in good numbers with encouraging results.

CLOSED MITRAL VALVOTOMY A LIFE SAVING PROCEDURE IN FACILITY DEPRIVED COUNTRIES: EXPERIENCE AT MUHIMBILI NATIONAL HOSPITAL,TANZANIA

E.V. Ussiri, E.T.M. Nyawawa
Ussiri Muhimbili, National Hospital, Tanzania

Background: Rheumatic heart disease remains a major health cardiac problem in developing countries as the culprit of rheumatic fever. Mitral valve stenosis is the most common complication valvular heart disease and it consequences of increase in pulmonary hypertension , heart failure pulmonary vascular disease and if untreated death ensues. The management of this condition varies depending on availability of expertise and resource; however in a facility deprived country with low economic status: closed mitral valvotomy remain the standard palliative treatment! The *aim of this study* was to evaluate the clinical status of patients with mitral stenosis following closed mitral valvotomy.

Settings: Muhimbili National Hospital, cardiothoracic unit

Interventions: all patients presenting with severe mitral stenosis in absence of calcification in its leaflets and regurgitation were enrolled between May 2008 to November 2009. Excluded were those who failure consents. A total of fourteen patients were included in the study of which 10 (71.4%) were females and 4 (28.6%) were male. They have mean age of 21.5 ± 8.8 (range11-44). The diagnosis was based on clinical evaluation using NYHA class and 2D-Echocardiography findings. All patients' demographic data, preoperative and post operative findings were taken and data analysis was done using an SPSS 11.5 program. Categorical data were compared and analysed using two Tailed-χ^2 and values were taken 5% significance level.

Conclusion: There was an overall highly significant improvement in clinical stage of the disease, reduction in mean pressure gradient across the mitral valve, reduction in pulmonary hypertension and mean left atrial size. Similary there was improvement in ventricular function in terms of ejection fraction and increase in mean mitral valve area. Closed mitral valvotomy remain the standard palliative treatment in patient with severe mitral stenosis in economically deprived countries.

Keywords: mitral stenosis, rheumatic heart disease, mean pressure gradient, mitral valve area.

CARDIAC SURGERY: ONE YEAR EXPERIENCE OF CARDIAC SURGERY AT MUHIMBILI NATIONAL HOSPITAL-DAR ES SALAAM, TANZANIA

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Part I One year experience of cardiac surgery at MNH 2008/2009 (Dr. Nyawawa ETM)

Part II Overview of cardiac surgery in developing countries of Africa (Dr. Ussiri EV)

Background: Establishing a Cardiac Unit in developing countries is usually difficult as it is associated with many obstacles both expertise and financial constraints and more alarming is mortality rate which may be high.

Even after success in the initial stage sustainability of such program is dilemma. The aim of this study was to determine pattern of disease profile, type of cardiac surgery done and overall outcome.

Patients and Method: All patients who underwent cardiac surgery at the centre were prospectively recruited

Patients' demography and disease characteristic as demonstrated at the echocardiography and confirmed at the operation were recorded. Peri-operative factors were the measurable statistics that determine the overall patients' outcome. All data were entered and analyzed using SPSS 11.5 window Program.

Result: A total of 105 cases of cardiac surgery were done, 21% males and 79% females. Mean age was 19.4 ± 12.3.The majority of cases were due to Rheumatic Heart Diseases (47.6%), Congenital heart diseases (35.2%), Myxomatous valvular degeneration (16.2%) and pericardial disease (1%). Mitral valve disease was the commonest cause of heart disease (58.1%). Prolonged duration of aortic cross-clump and total operation time were associated with prolonged intensive care and poor patients' outcome respectively ($P < .05$). While, ventricular dysfunction and total cardiopulmonary time were not. The overall mortality was 13.3%. Majority of all death (64.5%) followed mitral valve repair.

Conclusion: The majority of patients (86.7%) who underwent cardiac surgery had full recovery. The mortality of 13.3% is probably comparable with other settings. The diversity of spectrum of cardiac disease found else where is also found in our community and therefore need to increase community awareness. Mitral valve repair deserve special entity that requires skills and expertise. The mere presence of suboptimal ventricular dysfunction is probably not a contraindication to cardiac operation. The duration of aortic cross-clump and total operation time were determinants of postoperative outcome.

AUDIT OF TANZANIA OPEN HEART SURGERY: TOO MUCH VALVE REPLACEMENTS INSTEAD OF REPAIRS?

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Objective: To document type of cardiac valve surgery in newly established open-heart unit in a developing world were rheumatic heart disease is prevalent.

Methods: Age, sex, valve type and pathology, outcome of patients undergoing open-heart surgery between May 2008 to May 2010 at Muhimbili National Hospital were recorded and analysis done in SPSS.

Results: One hundred twenty nine patients, 97 females (75.2%) and 32 males (24.2%) with mean age of 19.6 ± 11.8 (min. 2 max. 52) years had surgery. Rheumatic Heart Disease (RHD), ninety patients (69.8%), 67 female and 23 male; and congenitally abnormal valves in four patients. Eighty procedures (94.4%) were on mitral: 31 replacements and 31 ring anuloplasties; closed and open mitral commissurotomy in 11 and

3 respectively. Ten patients had isolated aortic valve replacement, and four hearts had aortic and mitral valve replaced. Mechanical prosthesis was used in all patients, 16.0% implanted in patients aged less than fifteen years. Tricuspid valve repair was the main associated surgery in 17 hearts (13.2%). There were 14 deaths (10%).

Conclusion: Mitral valve was commonest with valve replacement frequency equaling repair. Prosthetic valve replacement in younger patients from developing country will need close follow up to evaluate long term outcome.

Humanitaian Missions

GLOBAL ASPECTS OF CT SURGERY WITH FOCUS ON ASIA

Angelo Thomas Pezzella
USA

The incidence and prevalence of cardiothoracic disease continues to increase globally, especially in emerging economies and developing countries. This is apparent in Asia, where the socioeconomic conditions have dominated international progress. Cardiothoracic surgery is also growing, despite decreased access, availability of surgical centers, political, and cost issues. The increase in atherosclerotic coronary artery disease, rheumatic heart disease, congenital heart disease, trauma, and thoracic malignancies is a more urgent problem or challenge than realized in these emerging economies and developing countries, or low middle income countries. A determined focus and cooperation between the preventive and curative elements of care is warranted. This represents a paradigm shift to develop a consensus that fosters a multi-integrated disease specific approach that includes prevention, promotion, diagnosis, treatment, and rehabilitation. In addition, the concept or acceptance of surgery as a necessary component of public health policy is critical to improving overall global healthcare.

25 YEARS EXPERIENCE IN HUMANITARIAN MEDICAL CARE

Russell Lee

This program coordinated by Sydney Adventist Hospital, is a program whereby surgery is performed by a volunteer team to bring relief to people suffering from disease which cannot be treated by local means. Sponsorship in the South Pacific countries is also provided by the Royal Australasian College of Surgeons under the Pacific Island Project funded by AusAID. Support is also provided by various service organisations, medical companies and personal donors.

Countries visited by these volunteer teams include: Tonga, Fiji, Vanuatu, Solomon Islands, Papua New Guinea, China, Mongolia, Nepal, Vietnam, Myanmar, Cambodia and Rwanda. Inquiries are constantly being received from other countries and these require individual evaluation by the Health Care Outreach Management Committee.

The aims of the program are to:

- Assist the local doctors with diagnosis and treatment of heart disease patients
- Provide urgently needed surgical procedures for patients with heart disease and reconstructive surgery like cleft lip and palate deformity, virginal fistula repair, Burns Reconstruction and Orthopaedic Reconstruction.
- Provide in-service training for local medical and nursing staff and to stimulate interest in improving levels of health care within the country
- Assist with equipment needs at the local hospital
- Contribute to a preventative programs in the country being visited

Background to Operation Open Heart

The concept of taking a complete fully equipped cardiac surgical team to developing countries began after a visit to Tonga by an intensive care nurse, Russell Lee, who at the time had just completed his post-graduate training in cardio-thoracic nursing. He observed the urgent need in Tonga for surgery for relatively young people with rheumatic heart disease. On returning to Australia he relayed this urgent medical need to colleagues at Sydney Adventist Hospital.

Interest from medical and nursing staff and from medical supply companies in supporting the project was such, that a formal proposal to take a cardiac surgical team to Tonga was accepted by the Sydney Adventist Hospital Board of Management in 1985. The program became known as Operation Open Heart for Tonga. When other countries were visited the 'for Tonga' was dropped and the program is known as Operation Open Heart.

Reconstructive Surgery

The concept of taking a surgical team to Nepal to undertake repair of cleft lip and palate deformity arose during a visit to Nepal by Dr Charles Sharpe in 1992. An annual visit to Banepa ADRA Clinic has been made by a volunteer team since 1994 and although they have experienced many challenges transporting their equipment and getting it through Customs at Kathmandu Airport and a bomb explosion outside the clinic in Banepa, this team of dedicated volunteers return each year to undertake this humanitarian work. This program has grown to include a burns reconstructive program, a vaginal fistula repair program in Nepal, as well as an Orthopaedic reconstructive program in Cambodia.

BASIS OF OPERATION

Personnel

Each team consists of volunteers who contribute financially toward the specific project in addition to their time. The contributed time varies from approximately four days to two weeks.

To date over 1750 volunteers have been involved with the program since it began in 1985/86. Some individuals may only volunteer for one project and others have been on numerous projects. For example one surgeon has been involved in approximately 30 projects.

The volunteers come from many different hospitals around Australia and New Zealand. On two occasions nurses have travelled from the United Kingdom to join with a Team in the South Pacific and

work with their Southern Hemisphere colleagues. On most occasions the complete Team will not have met until they reach the project location. This has potential for dysfunctional teamwork; however, this has not been our experience. On all occasions the Team have worked together very cohesively and it is with their recommendations that many of their colleagues back home join a future Team.

Preparation

Before a surgical team visit is made to developing countries, appropriate personnel undertake an assessment of the local facilities and resources. Personnel involved in the preliminary visit may include a cardiologist or cardiac surgeon, hospital engineer and registered nurse/ coordinator. This feasibility visit is vital for the planning phase so that appropriate resources are obtained. In many instances an engineering volunteer team precede the surgical team to install or upgrade electrical or medical gas facilities at the hospital. This planning is undertaken with the administration and medical personnel locally to ensure that the upgraded facilities will be of permanent benefit to the hospital and will enhance patient care.

Equipment

Specialised equipment and medical consumables for the project is transported prior to the team's arrival. This varies according to the complexity of the program and in round figures is between 800kgs to 4000kgs. The equipment includes: Operating theatre instruments, monitors, ventilators, heart-lung machine, heart valves, pacemakers, ECG machine, Cardiac Ultrasound machine, voltage stabilisers, disposables and drugs for use in Theatre, Anaesthetics, Intensive Care and Ward.

The Team has been most grateful for the generous support of many medical companies in providing many of the products used during these projects. However, in more recent times more and more of this equipment has to be purchased.

Local contribution

Each project is planned in liaison with the Ministry of Health and Hospital Administration in each location.

Accommodation and food are generally supplied for the team by the host country; however, this is sometimes provided by AusAid within the Pacific Island Project, service organisations such as Rotary, and sometimes contributed to by the volunteers themselves.

Health Care Outreach Projects

A summary of the projects undertaken to date include:

Country	Visits	Procedures
Tonga	4 Cardiac Surgical visits	85
Vanuatu	7 Cardiac Surgical visits	126
Fiji Islands	19 Cardiac Surgical visits	606
Solomon Islands	2 Cardiac Surgical visit	50
Papua New Guinea	17 Cardiac Surgical visits	723
China	3 Cardiac Surgical visits	42
Mongolia	3 Cardiac Surgical visits	25
Myanmar	8 Cardiac Surgical visits	174
Nepal	6 Cardiac Surgical visits	62
Nepal	16 Reconstructive Surgical visits	843
Vietnam	6 Cardiac Surgical visits	52
Cambodia	2 General Surgical visits	30
Cambodia	4 Reconstructive Surgical visit	162
Rwanda	4 Cardiac Surgical visits	92
	101	**3072**

Patients

Patients are initially screened by local doctors and referred to the Australian Physician associated with the Team for final diagnosis and selection. Mostly a Physician (Cardiologist or Surgeon, depending on the team) will precede the surgical team so that on their arrival cases will be discussed at a case conference and selected for surgery. Surgery will be undertaken on 3 – 10 patients per day according to the complexity of diagnosis and local infrastructure. The procedures undertaken will include a wide range of procedures and the age ranges from the very young at only a few months of age through to some elderly patients in their 70's.

Education

Education is an important component of each project that is focussed on identified local needs. The education may be presented formally in lectures, workshops & or courses. On other occasions it is 'hands on' type education at the bedside.

In addition as required both informal and form training positions have been found in suitable institutions outside of the recipient country to progress the training for key positions, to assist in the overall goal of establishing a sustainable residual program in country. So far positions have been found, for Surgeons, Anaesthetists, Nurses and Perfusionists in both Australia and India to help these countries realise their goals.

Often we here the question "*why do such high cost, highly technical work when most of these countries can't provide for themselves basic primary health care*", and we would have to agree, however these are the skills we can offer and it has been interesting how far reaching the impact of these projects have been outside of the fortunate recipients of this surgical intervention.

- Reduced mortality in snakebite patients Neurological Injury due to the skills gained and infrastructure improvements with each of the team's visits.
- Decreased mortality due to improved provision of Medical Gases.
- Improved Infection Control
- Improved Staff Moral & reduced "Brain Drain" from the host countries with the long term commitment and support of the visiting volunteers.

Where to From Here

The challenge for the future is to effectively review each request from new countries and where we feel we can make a positive contribution do so with the resources that are at hand.

- Collaborate with other teams/groups
- Investigate additional sources for:
  - Funding
  - Acquiring equipment and consumables
- Constantly review outcomes & directions

HealthCare Outreach Mission Statement:

Interventional, Developmental, Sustainable

We will improve the global quality of life through service delivery, training and capacity building in developing countries.

HealthCare Outreach's Objectives Are:

- To empower health professionals to deliver enhanced health care skills in the following areas:

  - Cardiac Surgery
  - Cardiology
  - Reconstructive Surgery
  - General Surgery
- To empower healthcare support staff in enhanced medical support in the following areas:
  - Infection Control
  - Diagnostic Services
  - Engineering and preventative maintenance
  - Procurement, storage and delivery
- To create awareness and support the development of prevention and rehabilitation services locally.
- To facilitate Australian professionals to engage in the health care development processes in developing countries.
- To develop specialised infrastructure to support enhanced health care services.

Our Charter is To:

- Provide medical treatment for patients in developing countries who do not have access to such treatment owing to a lack of the necessary technical or financial means in their own country.
- Provide medical treatment for patients in developing countries irrespective of the nationality, race or religion.
- Provide training for local medical, nursing and allied health staff in the specialists fields associated with different diseases.
- Support the procurement of medical technology and equipment to enhance the health care delivery as identified by the developing country.
- Promote the development of hospital facilities designed appropriately for the needs of the developing country.
- Provide support for all skilled personnel essential to our work, in particular the volunteer specialists necessary to achieving our goals.
- Call upon partners and donors for the financial and technical assistance necessary to fulfill our objectives.
- Collect funds for the purposes of fulfilling our objectives.
- Undertake to behave with complete transparency towards our donors and partners.
- Coordinate all outreach activities advertised under the banner of HealthCare Outreach and Sydney Adventist Hospital Limited.

HOW TO MAINTAIN STANDARDS IN HUMANITARIAN PEDIATRIC CARDIAC SURGICAL MISSIONS.

William M. Novick, Frank J. Molloy, Christian L. Gilbert, Kathleen N. Fenton, Igor Polivenok, Gopichand Mannam, Amna Butt, Eugene V. Suslin

University of Tennessee Health Sciences Center, Memphis, TN, USA; Institute of General and Urgent Surgery, Kharkiv, Ukraine; Star Hospital, Hyderabad, India; Armed Forces Institute of Cardiology, Rawalpindi, Pakistan; National Children's Cardiac Surgical Center, Minsk, Belarus and the International Children's Heart Foundation, Memphis, TN, USA

Humanitarian assistance for pediatric cardiac services has expanded significantly over the past 20 years. Programs vary from single physician providing operative assistance for days to entire pediatric cardiac service teams visiting for 2 to 4 weeks and providing all aspects of pediatric cardiac care and education. Sites for assistance vary significantly from start-up programs with little equipment, experience or personnel to high volume institutions with new equipment and adequate personnel asking for assistance with neonatal cardiac care. Maintenance of standards under such diverse conditions requires adherence to principles established by the visiting team which ensure patient safety and satisfactory outcomes.

Factors which can positively affect outcomes during a pediatric cardiac surgical mission and are under the direct control of the visiting team are; visiting team composition, adequate supplies and medicines, appropriate hardware, and surgical case mix. Factors which are important, but not necessarily under the direct control of the visiting team are; infection control, sterilization, adequacy and reliability of power, local team level of experience, motivation and number of personnel participating.

To maintain standards the team leader in consultation with the visiting and local team must reserve judgment on which types of cases can be performed with safety and acceptable outcomes. The trips of the International Children's Heart Foundation for the calendar year to date will be used to demonstrate what can be achieved under diverse situations.

INTERNATIONAL QUALITY IMPROVEMENT COLLABORATIVE (IQIC) FOR CONGENITAL HEART SURGERY IN DEVELOPING COUNTRIES: CLOSING THE QUALITY & SAFETY GAP FOR PEDIATRIC CARDIOVASCULAR PROGRAMS IN DEVELOPING COUNTRIES

Kathy Jenkins, MD, MPH

The International Quality Improvement Collaborative (IQIC) collects benchmark data for congenital heart surgery to guide quality improvement efforts and reduce mortality. The Collaborative was conceived at the Global Forum for Humanitarian Medicine in Cardiology and Cardiac Surgery in Geneva in 2007, and officially launched in Boston in 2008. To date, there are fourteen participating sites in developing countries from around the globe that enter data for all of their congenital heart surgical procedures. Major infection rates and risk-adjusted mortality, using the RACHS-1 methodology, are used as benchmarks for comparison with other participating sites. Outcome variables that are examined are patient and procedural characteristics, major surgical site infections and sepsis, as well as in-hospital and 30 day post-operative mortality. As part of the IQIC, sites also participate in monthly webinars which focus on three change strategies on a rotating basis, ranging from beginner-, intermediate-, and advanced-level content. These include educational videos and web-content related to conducting safe perioperative practices, building effective team-based practices through empowering nurses, and applying methods in reducing surgical infections. The IQIC's next steps are to recruit additional sites, publicize results, and expand quality improvement content for the webinars.

EACTS POSITION ON THE INTERNATIONAL ASSISTANCE IN THE FIELD OF CARDIO-THORACIC SURGERY

Marko Turina
Chairman, International Cooperation Committee of the EACTS, Switzerland

Cardio-thoracic surgeons in the Western world, especially when well established in their practice, or when reaching retirement age, often perceive themselves under social pressure to develop some charitable actions, preferably in the Third World countries. This is a laudable activity, from which a small group of selected patients might profit; on the larger scale, such periodic visits rarely result in a major improvement in the local facility. EACTS is sometimes approached for a bigger help in supporting some local institution; there is also a disappointment and even reproach when large-scale financial and personal aid is not forthcoming.

EACTS Council wishes to clarify our position in this matter:

- Activities of individuals in the Third World or in the developing nations are strictly personal matters, and are performed without EACTS funding, organization or oversight.
- EACTS cannot (and is financially unable to) accept the responsibility for the running of a cardio-thoracic centre in a Third World or in a developing nation. This remains the domain of professional charitable organizations, some of which are remarkably successful in their activities.
- EACTS primary role is educational. In the field of international assistance, it is presently represented by the Bergamo School, by the Visiting Scholarships, and by the EACTS Teaching Courses in Advanced Techniques in cardiac and thoracic surgery, and in the Applied Science Course.
- Transfer of knowledge remains one of the primary goals of the EACTS: recruitment of high-level scholars for surgical and scientific teaching, and the assistance in science projects, remain our main activity.

CARDIAC SURGERY IN EMERGING COUNTRIES: OUR EXPERIENCE AND THE FUTURE: CURING CHILDREN TOGETHER

Alain Deloche
France

Cardio-vascular diseases have become a significant growing cause of mortality in developing countries. Over the last 20 years, La Chaîne de l'Espoir has developed a significant experience in designing and implementing various programs of action for facilitating access to quality paediatric cardiac health care for disadvantaged children and young adults of emerging countries. For instance: Transfer of children abroad for complex surgical operations not possible locally; Caring and training missions to emerging countries involving local clinicians; Transfer of medical, technical and administrative know-how; Creation, refitting and equipment of hospital structures (The Heart Institute).

The future of our missions on cardiac surgery will have a new approach; to expand and reach out an even more considerable number of children all over the world, a scheme of cooperation with the European project of the ESC "European Heart for Children" has been established to empower the missions and share knowledge of congenital heart disease between the countries.

In order to expand the scope and contribution of those programs, La Chaîne de l'Espoir is currently launching the idea of a world-wide consortium of Organisations willing to share resources for coming up with joint international programs of action. This initiative called, the International medical Network (IMN), will provide a dedicated environment for coordination and exchanges between the IMN network members, through a collaborative Web site: the InterMedicalNet.

IMN - INTERNATIONAL MEDICAL NETWORK; TOGETHER WE WILL MAKE IT!

Bernard Clot
IMN – International Medical Network; Curing children together!

The International Medical Network (IMN) is a recent initiative of the French medical association, La Chaîne de l'Espoir, aiming at the short term launching of a world-wide single source of collaboration between medical Non Profit Organisations (NPOs), from all over the world, working in the field of pediatric care in developing countries. The objective is to improve their overall efficiency by joining and sharing resources and expertise.

This new entity, the IMN, will be independent from existing NPOs and act as a consortium of affiliated NPOs and of medical and non-medical professionals involved or interested in these types of humanitarian medical programs. To give life to this idea, a new and independent organization will be established soon. A core network of 3 European medical associations (Chain of Hope, in the UK, La Chaîne de l'Espoir, in France, and Bambini Cardiopatici Nel Mondo, in Italy) is already working to set up a pluri-annual joint action plan of pediatric cardiac surgery projects. In addition, a state of the art informational and collaborative Web site (domain name: intermedicalnet) and various related services are currently being developed. They will provide, by the first quarter of 2011, a comprehensive set of easy to use on-line facilities open to affiliated NPOs and professionals. By giving a world-wide visibility about "who we are" and "what we are doing", we expect to facilitate the funding and the staffing of the new joint programs of action proposed by the network affiliates. Other services will be added in the future in response to the up-coming needs of the network affiliates; for instance: on-line know-how transfers and training services, medical and non-medical guidelines, humanitarian project's guidelines etc..

By promoting and facilitating international cooperation and collaboration, we expect to bring a significant and useful contribution to the sustainable development of pediatric health care in the developing countries. All those interested in learning more about and/or participating in this exiting humanitarian venture, are invited to contact us, as of today at: bc.imn@chainedlespoir.org.

Global Forum 22
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Pediatric Cardiac Care Around the World

PEDIATRIC CARDIAC CARE IN SOUTH AMERICA WITH EMPHASIS ON BRAZIL FOR THE GLOBAL FORUM

Noedir A.G. Stolf, MD, PhD

Since the [years] fifties, pediatric surgery for correction of congenital heart defects was done in Brazil by general cardiac surgeons. The Brazilian cardiac specialty has evolved from one group of pioneers, historically including both adult and pediatric surgeries.

The Pediatric Department of the Brazilian Society of Cardiovascular Surgeons, SBCV, was created 7 years ago aiming to aggregate, further increment education and encourage cardiac specialists for pediatric surgery. The current and future generations of congenital heart defects surgeons are being formed within the international network, are capable to perform highly complex procedures and are obtaining results, numbers and quality quite comparable to the international benchmarks.

However, many challenges remain to overcome. The Unified Public Healthcare system, SUS, is responsible for over 80% of the Brazilian population and still presents uneven regional services distribution and access; North and North East regions services are very restricted by their continental distances. Only five dedicated pediatric centers exist, the remainder being general Heart Institutes. There is a limited proportion of wealthy babies who succeed prompt access to diagnostic and surgery. The study to subsidize for the SUS planning is one frontline work of the SBCV Pediatric Department.

Despite equity and access barriers and challenges, the Brazilian pediatric heart surgery has been growing steadily in Brazil and has succeeded to present technical innovations for corrections of congenital heart defects.

PEDIATRIC CARDIAC SERVICES IN THE MIDDLE EAST

Zohair Al Halees, MD
King Faisal Heart Institute of the King Faisal Specialist Hospital and Research Center, Riyadh, Kingdom of Saudi Arabia

The number of children born with congenital heart disease (CHD) is likely several times that of the developed world simply because of the high birth rate. Unfortunately the vast majority of these children receive no attention. Reasons for that include: lack of awareness, pediatricians receive little training in cardiology and pediatric cardiac services are not recognized as a health priority by the governments.

Saudi Arabia and United Arab Emirates have the highest GDP among Arab league countries. Gulf countries in general are among the highest by GDP per capita. Because of this, Gulf countries spend more on health care than other Middle East countries; Saudi Arabia in particular invested a lot in that regarded.

Cardiac services improved significantly and though pediatric cardiac care lagged behind it is catching up quickly. Institutions within

Saudi Arabia are offering state of the art therapy options for adults and children with cardiac disease. The infrastructure is in place but unfortunately all the emphasis currently is on therapy and not prevention. This deficiency is now recognized and hopefully will be circumvented. Those state of the art options are not available in other Middle East countries; Gulf States treat their own citizens. Jordan invested in "medical tourism" and is considered a destination for patients seeking cardiac help. Nevertheless, the capability to handle all congenital cardiac problems is very limited.

Therefore, many children still do not have access to cardiac care in many Middle Eastern countries. They may never get a diagnosis or they may get a diagnosis but no definitive therapy. Charity organizations are trying to help to improve that situation but this can only cover a very small proportion of the problem. Without radical change in the local governments' attitude in restructuring health care expenditures, the problem will linger on.

PEDIATRIC CARDIAC CARE IN TAIWAN

Mei-Hwan Wu, MD, PhD, FACC
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The Pediatric Cardiology program started quite early in Taiwan. In 1952, the Pediatric Cardiology subspecialty and services had already been established in Taiwan. Taiwan is an island country with an area of 36,188 km^2 and the population is around 22.6 million. There are 23 academic medical centers, 80 regional hospitals, and 435 district hospitals. A nationwide National Health Insurance (NHI) program was implemented in Taiwan in 1995, and covered over 97% of Taiwan population. During the six decades, the advances in pediatric cardiac patient care, transcatheter cardiac interventions for structural heart disease, Transcatheter ablation of the tachycardias, cardiac surgery, pediatric intensive care, fetal cardiology, preventive cardiology and genomic medicines have been prompt, particularly in the latest 15 years. The disease spectrum of cardiac children population, meanwhile, is changed and the age group of congenital heart disease becomes wide. From the School Survey (Cardiac Children Foundation, ROC) Database in the population aged 6-7 years of Taipei city 2003-2007, the prevalence (per 1,000 children) of congenital heart disease, EKG abnormalities, Kawasaki disease, rheumatic heart disease, and other acquired heart disease was 7.22 (male 6.74, female 7.73), 4.66 (male 5.4, female 3.85), 1.93 (male 2.24, female 1.60), 0.03 (male 0.03 and female 0.03), and 0.15 (male 0.19, female 0.09), respectively. The total potential patient load which is an extension of cardiac disease in children will be 13.99/1,000 (male 14.29, female 13.3).

With an ever low birth rate in Taiwan in this millennium, the child health policy and the relevant programs for each illness will be the most important for the government. The international child health index in Taiwan, including neonate mortality, post-neonatal infant mortality, under-5 mortality and mortality in population aged 1-18 years are all comparable to those in the United States. With such sound base, we foster a hope that the medical care of the cardiac children can be further optimized in the short-term as well as in the long-term outcomes. The root of adult cardiac problems, such as the coronary arterial disease originated from Kawasaki disease, can be ameliorated. These can only be achieved by team work from bench to bedside as well as from country to countries.

CHILDREN WITH HEART DISEASE IN MYANMAR – THEIR PLIGHT

Christopher Moysey Whight

My presentation will summarize the plight of the children in Myanmar with heart disease

With a population estimated between 48 and 55 million and a birth rate of 17/1000, around 850,000 babies are born annually in Myanmar. Assuming an incidence of congenital heart disease (CHD) of 1% of births, around 8500 babies are born each year in Myanmar with CHD.

Infants with complex lesions, around 15% of births with CHD, have very high early mortality.

Perhaps 50% of presentations will have anatomically simple lesions such as ASD, VSD, PDA, or mildly complex lesions such as Tetralogy of Fallot. This correctable group of patients will usually survive long-term without early surgery, but with increasing personal and social disability.

Added to this group of thousands, are large numbers of children who suffer from a wide variety of other acquired cardiac abnormalities, most notably Rheumatic Heart Disease (estimated at 1.5 to 3/1000 children).

Currently, in Myanmar, there are minimal facilities dedicated to the management of children with heart disease.

Programmes addressing these issues are developing, and I shall outline the history and success of one such programme, with which I have been involved for six years.

The Operation Open Heart programme, co-ordinated by The Sydney Adventist Hospital in Australia, with financial support from Rotary International, corporate donors and self funded volunteers has been supporting the development of paediatric cardiac medical and surgical services in Yangon since 2003.

Specialist volunteer teams of cardiologists, cardiac surgeons, anaesthetists, intensivists, specialist cardiac nurses, cardiac and bio-medical technicians, have made regular charitable visits, usually twice per year developing skills transfer and donating much needed equipment.

Cardiac units in Yangon are now performing diagnostic as well as palliative and corrective surgery at a very high level.

These facilities will hopefully lead the training and development of other facilities in Myanmar, but require continued support from established institutions around the world.

ABOUT 20 YEARS OF EXPERIENCE IN CARDIAC PEDIATRIC DEVELOPMENT PROGRAMS IN SUB SAHARIAN AFRICA

Alessandro Frigiola, MD
IRCCS Policlinico San Donato, San Donato Milanese, MI, Italy

The Association "Bambini Cardiopatici nel Mondo" was founded in 1993 in Milan by Prof. Alessandro Frigiola, MD, Head of Cardiac Surgery of the Center "E. Malan" of Policlinico San Donato, San Donato Milanese, and Prof. Silvia Cirri, MD, Head of Intensive Care Unit of the Sant'Ambrogio Hospital, Milan.

The activity of the Association is carried out both in Italy and abroad, above all in developing countries that do not have hospital structures able to provide the needed care.

The Association is a non profit organization.

The main objectives reached by the Association:

- 3.500 cases of congenital heart disease studied
- 1.393 cardiac surgery operations carried out
- 250 study grants for foreign physicians (109 cardiac surgeons, 49 cardiologists, 23 anesthetists and intensive care specialists, 14 haemodynamic specialists, 6 vascular surgeons, 28 perfusion technicians)
- 204 missions
- 61 specialist training courses in Italy and worldwide
- Donations:
    - 5 eco-color doppler machines
    - 8 complete hospital beds for Intensive Care Unit
    - 2 extra-corporeal circulation machines
    - various surgical materials (thread for stitches, cannules, valves etc)
- Construction of Cardiac Surgery Centers
    - Shisong (Cameroon): officially inaugurated on 19th November 2009
    - Damascus (Syria)
    - Pristina (Kossovo)
- Donation of 2 Paediatric Intensive Care Units to the Centers of Lima (Peru) and Cairo (Egypt)

"Children's Heart Project for Africa" goal is to realize a Pediatric Heart Center that can be modulated in different types (Minimal, Intermediate and Full Solution), in 7/10 African countries.

In the last ten years we have been involved in the following projects:

Camerun – construction of a Cardiac Center in Shisong, Kumbo, inaugurated on November 19, 2009 (Full solution)

Senegal – Cardiac Center in construction in Fann, Dakar (Full Solution)

We are cooperating with Chaine de L'Espoir for the development of paediatric cardiac surgery in two already existing Cardiac Centers in Mozambique and Ivory Coast .

Furthermore we are setting the basis for Minimal Solutions in Congo, Guinea Bissau and Gambia while an Intermediate Solution has been thought for Mali.

Science and Economy

GLOBAL ENERGY CHALLENGES: OPPORTUNITIES FOR NANOTECHNOLOGISTS

Seeram Ramakrishna
National University of Singapore, Singapore

More than half the world population now lives in urban areas, which account for more than sixty percent of the world's water, energy and food use. They also account for eighty percent of the world's green house gas emissions. The urban areas demand better solutions for delivering higher standards of living, as they grow bigger, more complex, and confronted with noise pollution, air pollution, water pollution, intense urban heat envelopes, and crowding. The world's average food consumption per person per day was 2300 kilo calories in 1965. It has grown to 2800 kilo calories in 2000 and is expected to reach 3000 kilo calories by 2030. The World average per capita water consumption is about 1200 cubic meters per year. 2500 and 700 are the numbers for USA and China. The world average electricity consumption, measured in annual kilowatt-hours per person, had grown to 2600 in year 2005, as compared to 2000 in year 1990. The USA's average electricity consumption is about 13,000 and it is around 8000 for Japan, Singapore and South Korea. 2000 and 500 are the average electricity consumptions in China and India respectively.

Energy is critical to the production of food and clean water. It is logical to expect that energy demand is likely to grow as the heretofore underprivileged aspire to higher standards of living. ADB forecasts significant growth of Asia's middle class, defined as those people consuming between $2 to $20 a day, which is expected to cross two billion by 2030. Asians are forecast to seek higher standards of living and more material comforts such as cars, and personal and household electronics as well as better public infrastructure and services. Such an explosion of demand for higher standards of living conditions would put pressures on energy, water, food, land resources, public health and environment, because the experience of developed nations indicates that the standard of living is roughly proportional to the amount of resources and services accessed by a person. This correlation is indirect but a strong trend. Hence it is highly desirable that the research community and businesses focus on generating new knowledge and innovations that would potentially deliver higher standards of living with lower amount of resources at affordable costs.

Two broad strategies are being followed to tackle the challenge. One of these strategies requires optimizing the energy conversion processes employing nonrenewable energy resources. Other requires the abundant use of the renewable energy resources. Both strategies can greatly be influenced by the advances in nanotechnology. Using nanotechnology, the process and performance optimization of the energy conversion processes employing nonrenewable resource includes LEDs, wireless controls, lubricants, highly efficient superconductors and zero loss transmission lines, flexible electronics, cleaner coal fired power plants and efficient fuel cells can be modified. The use of nanotechnology in harnessing renewable energy resources has become critical over recent ten years. Nanostructures such as quantum dots, nanorods, nanofibers and anti-reflective coatings using non-metallic nano-layer are some of the technologies being employed to improve the efficiency of solar based devices.

Nanotechnologies led innovations in energy technologies have an important role to play in realizing sustainable development and higher standards of living for larger proportion of populations.

THE SALAM CENTRE PROJECT: STATE OF THE ART, FREE OF CHARGE CARDIAC SURGERY IN AFRICA

Gino Strada
Emergency NGO, Italy

EMERGENCY is an Italian NGO founded in 1994 to provide free high quality medical and surgical assistance to the victims of war,

landmines and poverty. Until now, over 4,2 million people have been treated within the hospitals and medical facilities built and run by EMERGENCY in countries like Iraq, Afghanistan, Cambodia, Sierra Leone, Sudan, the Central African Republic, etc.

In April 2007 EMERGENCY opened the Salam Centre for Cardiac Surgery in Khartoum, Sudan. This is the first and only centre of excellence in Cardiac Surgery completely free of charge in the whole African continent.The Salam Centre was built to receive patients from Sudan and its 9 neighbouring Countries. However, during its first three years of activities, the Centre has already treated patients from 20 different countries.

Up to 30th June 2010, 51.6% out of 3,067 admitted patients was younger than 25 years old. The main pathologies are valvular heart diseases associated with rheumatic fever (64%), congenital heart diseases (22%) and ischemic heart diseases (13%).

In three years, 2,436 surgical operations and 818 Cath Lab procedures have been performed at the Salam Centre, with a 30-days surgical mortality rate of 3.15%.

An international team of about 60 highly qualified staff members ensures the regular course of clinical activities and the training of over 300 Sudanese staff members employed at the Centre.

COST CONTAINMENT IN DEVELOPING NATIONS

D. Janardhana Reddy
Vijaya Heart Foundation, Chennai

Cardiovascular surgical procedures are being performed in India at a nominal cost compared to developed nations. Hospital and Healthcare management models are many, it may be corporate sector hospitals, charitable institutions – Religious and Non Religious trusts, Public sector hospitals and Central Government Institutions and State Government run hospitals.

There is no sensitive data to talk about costing and efforts towards the cost containment and quality assurance. Every one talk about man power management and restrict and reduce the technical people not respecting technical qualification with the years of experience in their field of cardiovascular surgical technology.

We have a data generated from our institute to monitor cost of cardiac surgery. Cardiac surgery in private sector got organized 25 years ago, a heart surgery costing around $3000 US dollars. Today it still is being done around $3000 to 3500 US dollars.

Credit for cost containment goes to senior cardiac surgeons who started the new cardiac surgical programs as an institution of training and practice.

Medical industries encouraged the cardiac surgeons by supplying expensive materials and drugs at a subsidized price. Their active participation in academic activities like training the doctors and cardiovascular technicians. Hospitals helped cardiovascular surgical units by giving special privileges and subsidized the cost wherever its possible.

Well functioning Department of Cardiovascular surgery is likely to enhance the image of the institutions, and moral of the personnel working for the institute.

75% of the cardiovascular surgeries are being done in 25% of the hospitals. It is the trained man power and real money that is required to give good health care in this part of India.

HEALTH INSURANCE - PAN INDIAN SCENARIO

S.Prakash, MS, FRCS(Glasg), FAIS
Medical Director, Star Health and Allied Insurance Co. Ltd., Chennai, India

Implementation of Mass Health Insurance Schemes in India. The state of Andhra Pradhesh has a community Health Insurance Scheme (AAROGYASRI) which covers over 66 million population. Doctors who are trained to process pre-authorization and claims on-line are a vital part of implementation of any health insurance scheme.

Tamil Nadu Chief Minister Insurance Scheme for life saving treatment (Kalaignar Kappeetu Thittam) is a similar effort by the Tamil Nadu Govt in the lines of Aarogyasri. All these schemes work with the noble objective of providing quality and cost effective health care to the economically underprivileged. Around 1200 Hospitals are empanelled to execute these schemes across the two states - Tamil Nadu and Andhra Pradesh. A technology has been devised which can monitor all hospitals and ensure that appropriate surgery/procedure is being done only for the deserving patients. Implementation of this schemes has created a health care revolution in the two states by improving the infrastructure and manpower facilities not only in urban but importantly, also in rural areas.

HEALTH FOR ALL, WHAT ARE THE MEANS NECESSARY

B.S. Murthy
Hyderabad

WHO defines health as a state of complete physical and mental wellbeing. "Health for all" implies this state in the whole population of a country or populations of the world. I would confine myself to India. How do we achieve this for a population of 1.2 billion, 75% of which is rural areas living in 660,000 villages. The health care delivery is a 3 tier system with government, private, corporate and charity sectors participating. In spite of the state governments spreading the health care to all nooks and corners, lack of infrastructure, equipment and qualified personnel the desired effects are not achieved. The corporate and private sector is mostly concentrated in metropolitan and urban areas. A plan to make the health care delivery to spread is to have smaller multi-speciality hospitals of 300 to 500 bed strength situated in various localities of the cities instead of huge 1000 to 1500 bedded hospitals access to which may be difficult. The corporate and private sector health providers should be compelled to have a part of the bed strength in rural and semi urban areas if they are to be given license to establish big hospitals in metropolitan and urban areas.

Health education is in turmoil. There is a sudden spurt of medical colleges especially in private sector. Though this phenomenon is good there is a lack of qualified and experienced teachers. Recent government initiative to have a short and three year version of bachelor course in rural medicine is welcomed and condemned equally. Illness is not different in urban and rural areas. In our wisdom we have abolished earlier Licentiate courses and preferred uniform 4½ year undergraduate course. That should not be diluted. Ways and means of attracting and keeping the medical graduates in rural areas are to be explored

than creating a cadre of under trained and qualified quacks. Post graduate medical training along with under graduate training should have uniform curriculum, syllabus, assessment and examination system through out the country under one regulating body to improve and maintain uniform standards. Nursing and paramedical training and education should be revamped to attain uniform standards.

Preventive health care is non existent or poorly managed. National disease control programmes though look after control preventive health care needs a fillip.

70% of population pays out of pocket for health care. Health insurance has to spread. Universal health care insurance should become a reality. Schemes like Arogyasri for below poverty line population and like payment of certain daily allowance if the earning head of the family member is hospitalized are sum of the schemes in the right direction. Some form of collecting daily premium from family universally with statutory sanction will go a long way in pooling a large reserve fund for health insurance. This should compliment other present health insurance schemes.

IMPACT OF GOVT. HEALTH INSURANCE ON PRACTICE OF CHD

I.M. Rao
Innova Children's Heart Hospital, Hyderabad, Andhra Pradesh

Aarogyasri is a unique health insurance scheme being implemented by Government of Andhra Pradesh through Aarogyasri Health Care Trust. It involves provision of health care by a unique private- public partnership, with the insurance providing the financial cover and health care delivered by a large number of participating private hospitals. The scheme provides financial assistance to BPL families to meet the catastrophic health needs. The treatment of children with congenital heart diseases is included in the coverage of the scheme. The scheme named after the late Prime minister Rajiv Gandhi was introduced in the state f Andhra Pradesh in April 2007. The scheme was a boon to these needy children. A large number of children with heart defects underwent surgery. The impact of the Rajiv Aarogyashri program on the Pediatric Surgical practice in Andhra State will be presented.

A TELECONFERENCE TRAINING SERIES FOR CARDIAC SURGEONS, CARDIOLOGISTS WHICH IS A COLLABORATION BETWEEN: WORLD HEART FOUNDATION (WHF), WORLD BANK GLOBAL DEVELOPMENT LEARNING NETWORK (GDLN), AND VINACAPITAL FOUNDATION (VCF)

Robin King Austin
The Vinacapital Foundation, Vietnam

The World Heart Foundation International Symposium for Cardiac Care, is a series of training conferences to improve capacity for cardiac care and cardiac surgery in Vietnam and other Asian countries. The series is broadcast in live interactive format to nine sites, and worldwide through a simultaneous webcast. In December 2008 the program was accepted as a "Clinton Global Initiative" and praised by former President Clinton during a Clinton Global Initiative meeting in Hong Kong as a model health program "which should be replicated" across the world.

The International Symposium for Cardiac Care is a regional program that links surgeons and doctors involved in cardiac care in developing countries with the world's best in cardio-thoracic surgery, cardiology, ICU nursing and pediatric cardiac care during three concurrent series of symposia. It allows doctors from all over Vietnam to congregate in teleconferencing centers in Ho Chi Minh City, Hanoi, Danang, and Hue for a series of lectures by exemplary leaders in the field of cardio-thoracic surgery.

The lectures are interactive, enabling participants to ask questions after the presentation. Learning centers in Indonesia, Cambodia, China, and Bangladesh are also connected interactively. The series is also broadcast simultaneously via webcast and is available to groups and individuals anywhere where there is a good DSL connection. The sessions are also recorded and are being compiled into a DVD learning series and to be distributed to surgical programs and medical libraries in developing countries around the world.

Our hope is that exposure at the World Congress and Global Forum will enable many more sights to join into the current webcast and forge connections that would help us replicate the interactive series in other areas of the world.

CLINICAL AND ECONOMIC EVALUATION OF FAST TRACK RECOVERY AFTER CARDIAC SURGERY THROUGH RECOVERY UNIT

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Objective: To evaluate the clinical effectiveness and safety of our fast track model through Theatre Recovery Unit and perform an economic evaluation.

Methodology: A prospective controlled observational study over a period of 6 months. A total of 136 patients were included into two groups; the fast track group n = 84, and conventional group n = 52 patients. Fast track patients went through Theatre Recovery Unit (TRU) which is an independent unit of the Cardiac Intensive Care Unit (CICU), and were discharged on the same day to an intermediate progressive care unit and then to the ward. The control group patients went to the intensive care where they stayed for at least one day, and then went to the ward.

Economic evaluation was done using a top down costing for the different units of the model. One-way and multi-way sensitivity analysis was done to account for any uncertainties in costing.

Results: The fast track pathway reduced the intensive care length of stay (LOS) compared to the conventional one (5.92 hours compared to 22.71 hours, $P < .001$). The total duration of intubation was also reduced from 4.08 hours to 2.75 hours, $P < .001$. There was no statistically significant difference in total hospital LOS, complication rate, reintubation or readmission. Fast track is £ 371 cheaper on average with cost savings range from £166 to £1324.

Conclusion: Fast recovery through Theatre Recovery Unit is safe and more cost effective when compared to the conventional recovery through the Cardiac Intensive Care Unit.

ORAL PRESENTATIONS

21st October 2010 Hall 1 Session 2 Adult Onpump and Sternal Closure

21 October 2010

FORTY-YEAR OUTCOMES AFTER CORONARY ARTERY BYPASS GRAFTING WITH INTERMITTENT FIBRILLATION TECHNIQUE WITHOUT USE OF CARDIOPLEGIA

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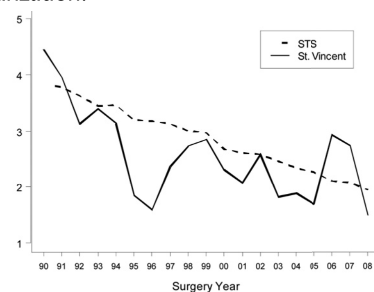
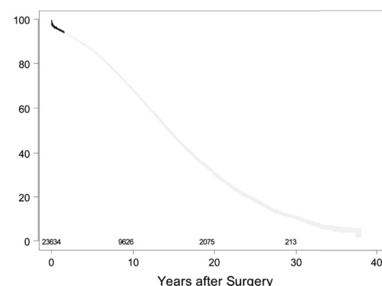
Background: Coronary artery bypass grafting (CABG) has long been the "gold standard" for treatment of multi-vessel coronary artery disease. We sought to establish the baseline of long-term outcomes after isolated CABG.

Methods: From 1968 through 2008, 23,634 patients underwent 25,351 isolated CABG procedures by a single surgical team. The intermittent fibrillation technique without use of cardioplegia was consistently utilized as a method of myocardial protection, using cardiopulmonary bypass for 99% of all the patients. Patients were prospectively followed with direct contact at annual intervals. Mean, maximum and total follow-up years are 9, 40 and 216,217 years.

Results: Operative mortality decreased over time, despite increasing patient age, and tracked The Society of Thoracic Surgeons (STS) national CABG mortality trend. Survival at 5, 10, 20, 30 and 40-year survival was 86.0(85.6, 86.5)%, 68.1(67.4, 68.8)%, 30.4(29.5, 31.3)%, 10.5(9.7,11.5)%, 3.6(2.1, 6.1)%.

Conclusion: This study confirms that intermittent fibrillation is an equally safe and effective method of myocardial protection during the ages of cardioplegia and off-pump CABG. It further establishes a baseline of long-term CABG survival that could be used for comparative outcomes research in interventional coronary revascularization.





EARLY AND MID TERM SURVIVAL FOLLOWING ISOLATED CORONARY ARTERY BYPASS SURGERY IN PATIENTS WITH CHRONIC DIALYSIS DEPENDENT RENAL FAILURE

Uday Dandekar, Anand Sachithanandan, Neil Howell
Domenico

Objectives: Coronary disease is major cause of morbidity and mortality in patients with dialysis dependent renal failure (DDRF). Our aim was to assess the impact of DDRF on early and mid term survival following isolated coronary artery bypass grafting (CABG).

Methods: Prospectively collected data on 5601 consecutive patients who underwent isolated CABG between 1/4/1997 to 31/12/2005 was analysed. From this, 40 DDRF patients were identified. DDRF patients were compared with 2989 matched population. 27 patient-related and peri-operative variables were analysed. Logistic regression analysis was used to calculate a propensity score for each patient. Late survival data was obtained from UK Central Cardiac Audit Database (CCAD). Mean follow-up was 4.62 ± 2.8 years.

Results: 30 day mortality was 5% in DDRF patients and 2.6% in control group (*P* = .28 Fisher's Exact test). Cox-Regression survival analysis with mean propensity score (co-variate) showed freedom from all-cause mortality in DDRF group at 1,3 and 5 years was 89%,82% and 74% respectively compared with 96%,94%, and 90% in the control group [(*P* = .001) HR = 2.95 95%CI (1.54-5.64)].

Using actuarial survival, patients with Euroscore <5 have a better long term survival compared to patients with Euroscore >5, in whom the survival drops significantly (*P* = .0001) (Figure 1). Older age, increasing severity of LV dysfunction and instability of symptoms were predictors of poor long term survival.

Conclusions: Early 30 day mortality in DDRF group compared to control group was acceptable (*P* = .28). However patients with DDRF have a reduced long term survival following CABG giving limited prognostic benefit. CABG in this select group requires careful consideration.

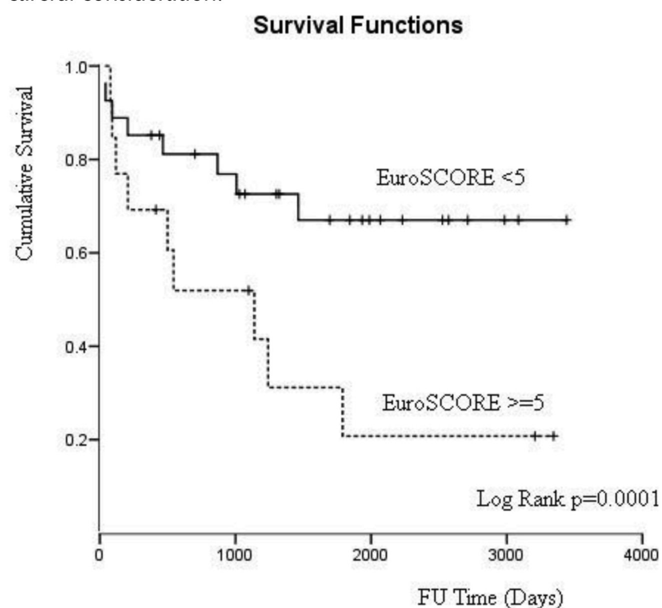


Figure 1

OUTCOMES OF CORONARY ARTERY BYPASS GRAFTS VS PERCUTANEOUS CORONARY INTERVENTION IN MULTIVESSEL CORONARY ARTERY DISEASE. AN OBSERVATIONAL STUDY

Contini, Giovanni Andrea, MD,[1] Fortuna, Daniela, MSc,[2] Guastaroba, Paolo, MSc,[2] Vignali, Luigi, MD,[1] Varani, Elisabetta, MD,[3] Manari, Antonio, MD,[4] Marzocchi, Antonio, MD,[5] Biagi, Bruno, MD,[6] Ghidoni, Italo, MD,[7] Gherli, Tiziano, MD,[1] Grilli, Roberto, MD[2]
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Background: Availability of drug eluting stents (DES) made percutaneous coronary interventions (PCI) relatively more attractive as an alternative to coronary artery bypass graft (CABG) in patients with multivessel coronary disease. We compared clinical outcomes of CABG vs PCI, (DES only and PCI with bare metal stents (alone or in combination with DES) in patients with multivessel coronary disease.

Methods: Observational study, based on two cohorts of patients with multivessel coronary disease undergoing a revascularization procedure (2860 CABG, 2110 PCI) between July 2002 and December 2004 at 13 public and private hospitals of Emilia-Romagna Region, Italy. Information relevant to the study was retrieved through two clinical registries, prospectively collected by clinicians at each centre, and through record linkage procedures with administrative databases: the regional database of hospital admissions (SDO), the regional mortality registry (REM). Main outcome measures were four-year mortality (all cause and cardiac cause), incidence of acute myocardial infarction (AMI), stroke, and repeat revascularization.

Results: After adjustment for baseline patient characteristics, PCI had higher mortality for all causes (HR:1.28 CI 95% 1.09-1.5), cardiac death (HR: 1.49 CI 95% 1.15-1.93), AMI (HR: 2.26 CI 95% 1.84-2.77) and TVR (HR: 2.82 CI 95% 2.35-3.38). No statistically significant differences emerged for stroke (HR: 0.95 CI 95% 0.70-1.29). When CABG was compared with patients receiving PCI with DES only, results did not change.

Conclusions: In this observational study patients undergoing CABG for multivessel coronary disease had better outcomes than those treated with PCI, regardless the type of stents used.

PERIOPERATIVE RISK FACTORS OF SURGERY AND TRANSCATHETER CLOSURE OF POST-INFARCTION VSD

N. Qedra, B. Tutkun, S. Buz, P. Ewert, E. Wellnhofer, C. Knosalla, M. Hübler, R. Hetzer

Objectives: Post-infarction ventricular septal defect (infarct-VSD) is a serious complication of myocardial infarction with a high risk of mortality. We retrospectively evaluated perioperative risk parameters of surgical and transcatheter closure (TCC) of infarct-VSD for postoperative 30-day mortality.

Method: We analyzed data of 57 patients (age: median 66; range 47 – 85 years) who underwent surgical closure of infarct-VSD between 1988 and 2007 and five other patients who underwent TCC at our hospital. In addition we reviewed 159 patients reported on in 25 publications (age: 51–88 years) with attempted TCC of infarctVSD.

Results: In the surgical group 21 patients (37.5%) died within the first 30 postoperative days. Median time from myocardial infarction (MI) (37 posterior MI, 20 anterior MI) to surgery was 22 (range 0–176) days. Twenty-three patients (41%) were in cardiogenic shock at the time of operation. In the multivariate logistic regression only left ventricular ejection fraction ($P = .02$) and troponin ($P = .49$) were significant predictive variables for postoperative mortality (73% accuracy). In the reviewed TCC group, the mortality in patients in the acute phase and/or in cardiogenic shock (n = 50) was 86%

Conclusions: In our surgical cohort, pre-operative left ventricular function and troponin level were found to be the best predictors to identify patients at high risk for mortality.

Primary TCC of infarctVSD in patients in cardiogenic shock does not improve survival. Transcatheter closure seems to be a suitable option in stable patients both later than 3 weeks post infarction and as treatment of residual VSD after primary surgical closure.

RESULTS OF THE CORONARY ARTERY BYPASS GRAFTING ALONE AND COMBINED WITH SURGICAL VENTRICULAR RECONSTRUCTION FOR ISCHEMIC HEART FAILURE

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Research Institute of Circulation Pathology, Novosibirsk, Russia

Objective: To compare the results of the coronary artery bypass grafting (CABG) alone and combined with surgical ventricular reconstruction (SVR) in pa-tients with ischemic heart failure.

Methods: In this study we included 236 patients with ischemic heart failure who underwent surgical treatment. There were 217 men and 19 women, with a mean age 56 ± 8, whom had prior one or more myocardium infarction, with 3-4 NYHA functional class, and EF less then 35%.

Patients were blindly randomized in two groups. There were 116 patients who un-derwent CABG with SVR and in 120 patients was performed CABG alone. With echocardiography study we estimated left ventricular and mitral valve dysfunction before and after surgery. There was no difference in preoperative status in patients of both groups.

Results: The hospital mortality rate was 5.8% after isolated CABG and 3.5% after CABG combined with SVR. All surviving patients had postoperative study from 1 month to 3 year. The mean NYHA functional class decreased from 3.1 ± 0.7 to 2.1 ± 0.6 one year after CABG and from 3.2 ± 0.5 to 2.0 ± 0.4 one year after CABG with SVR. We revealed that left ventricular reconstruction significantly decreased EDV from 241 ± 64 to 166 ± 36 and increased EF from 30 ± 6 to 38 ± 4 accordantly. However after isolated CABG EF did not increase significantly (31 ± 5 and 33 ± 7 respectively). One and three-year survival rate was 95% and 78% after CABG with SVR and 83% and 78% after CABG alone.

Conclusions: Despite on the more aggressive surgical strategy left ventricular reconstruction did not increase operative mortality and early results were significantly effective compare with coronary artery bypass grafting alone.

IMPACT OF LOW BODY MASS ON OUTCOMES FOLLOWING CABG SURGERY IN THE ELDERLY

Gintaras Kalinauskas

Introduction: Extremely low or extremely body mass index have been identified as risk for cardiac surgery. The aim of our study was to evaluate impact of BMI on CABG outcomes in the elderly.

Methods: Retrospective review of consecutive 6099 CABG patients operated on in our institution from January 2000 to May 2010. Six hundred eighty six patients older than 75 years were included in the study. One hundred fifty eight patients (23%) were obese, 27 (4%) very lean and 501 (73%) had normal body weight. Preoperative risk factors, intraoperative variables, mortality and postoperative morbidity rate were compared between the groups.

Results: Almost half of the elderly patients were female. In normal body weight group 34%, in obese group 47%, in very lean 49%. The preoperative EuroScore index was highest in a very lean patient group 8 ± 7.4 compared with 6.2 ± 2.1 and 6.4 ± 2.3 in obese and normal weight patients respectively. The mean duration of surgery, cardiopulmonary bypass time, aortic cross clamp time, number of grafts performed were comparable between the groups. Mortality rate in obese patient group was 4.4%, in normal body weight group patients - 12%, and in very lean patients group - 22%. Mortality rate was higher in the lean patient group comparing with obese patients ($P < .05$). Mean duration of postoperative ICU stay was 3 ± 1.6 days for low BMI, 3.6 ± 5.6 for normal weight and 3 ± 2.7 for obese

Conclusion: Patients with low BMI are at higher risk during CABG than obese patients. Reversing cachexia might be of benefit in the elderly population.

EFFECT OF PRE-OP CLOPIDOGREL EXPOSURE ON POSTOPERATIVE BLEEDING IN PATIENTS UNDERGOING ELECTIVE CORONARY ARTERY BYPASS SURGERY

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Frontier Lifeline & Dr K M Cherian's Heart Foundation, Chennai, India

Background: Antiplatelet therapy have been demonstrated to reduce the risk of cardiac events in patients presenting with acute coronary syndrome, yet all effective therapies also increase the risk of bleeding. This study aimed to test the hypothesis that patients undergoingcoronary artery bypass grafting(CABG) who received clopidogrel, versus those who did not, have worse bleeding outcomes and blood transfusion requirements.

Patients and Methods: A study population of 342 patients, who underwent on pump elective CABG, were recruited Between January 2004 to December 2008, of these 191 stopped clopidogrel more than 5days, prior to surgery (group I) and 151 stopped clopidogrel Less than 5 days (group II).Primary outcome was the analysis of

post operative bleeding and Secondary outcome was the analysis of number of blood products used and the need for re-exploration.

Results: In patients who have undergone elective Coronary Artery Bypass Grafting(CABG), drains after 8 hours (Group I- 214.9 mL, and Group II – 222.7mL, *P* = .3) , 12 hours (Group I- 288.3 mL, and Group II –275.6mL, *P* = .2) and total drain (Group I- 405.3mL, and Group II – 389 mL, *P* = .3) was statistically insignificant (*P* > .05). However the duration of drain found to be increased in Group II patients by showing negative correlation in between number of days for which clopidogrel withheld. Post operative Elective Coronary Artery Bypass Grafting (CABG) patients with diabetes mellitus, Sex, no of grafts, and Cardiopulmonary Bypass Time (CPB) shows significant relationship (*P* < .05) with post operative bleeding. Age, Left Ventricular Ejection Fraction (LVEF), Number of blood products used, Re exploration, Hemoglobin, Associated diseases and other risk factors shows statistically insignificant with post operative bleeding. Conclusion: Pre-operative clopidogrel exposure does not increase the risk of haemostatic re-operation and the requirements for blood and blood product transfusion during, and after, CABG surgery.

GRADING OF ATHEROMA IN THE ASCENDING AORTA USING EPIAORTIC ULTRASONOGRAPHY DURING CORONARY ARTERY BYPASS SURGERY

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Objective: Atheroma of the aorta has been graded in several ways using ultrasonography of the intimal thickening. The incidence of any cerebral injury is known to increase depending upon the severity of the atheroma grade. We review our intaroperative experience using the Epiaortic Ultrasound (EAU) imaging technique to grade the ascending aorta.

Methods: We retrospectively analysed the EAU findings of 154 patients during coronary surgery between February 2001 to December 2004.The atheroma in the ascending aorta was graded as mild (1-2mm), moderate (2-3mm), severe (>3mm) in three segments:- Proximal,Middle and Distal,starting from the annulus to the base of the innominate artery.

Results: Atheroma grading in the three segments of the ascending aorta was as follows:

	Proximal	Middle	Distal	Total
Mild	37	42	34	113
Moderate	8	20	16	44
Severe	2	5	3	10
Total	47	67	53	167

EAU identified 81 out of 154 to have atheroma in the ascending aorta (proximal-30%, middle- 43% and distal segment-34%)

Conclusion: This review showed that the middle and distal segments of the ascending aorta had comparatively more number of intimal thickenings due to progression of atheromatous disease. These findings are useful for minimizing unwanted cerebral injuries during surgery since majority of the aortic manipulations take place in these segments.

STERNAL CLOSURE TECHNIQUE TO REDUCE INFECTION RATES IN PATIENTS WITH CORONARY ARTERY BYPASS GRAFTING USING BILATERAL INTERNAL THORACIC ARTERIES

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Objective: Arterial grafts, especially internal thoracic arteries (ITA), are showing superior long-term patency rates in coronary artery bypass grafting (CABG). We demonstrate our success in preventing perioperative sternal wound infections in CABG patients using bilateral internal thoracic arteries (LITA, RITA).

Methods: From January 2007 to February 2010, 106 patients (4 female, 101 male, mean age 48.6 years (range 35 to 68 years)) were operated on using both mammary arteries in CABG procedures performed by two surgeons. Patient selection for bilateral IMA grafting was based solely on coronary anatomy. 54 patients (50.9%) were diabetics, of these 39 (72.2%) received postoperative insulin therapy. Three patients underwent OPCAB surgery (one emergency case). Two mitral and one tricuspid valve repair as well as one Dor procedure were performed concomitantly. LITA and RITA were harvested as pedicles, and additionally 1 to 3 saphenous vein grafts (mean 3.8 grafts) per patient were performed. All patients received a modified Robiçsek sternal closure (video slides). Antibiotic coverage consisted of Rifampicin (local application) and Cefuroxime (i.v.).

Results: We had no rethoracotomy, no deep sternal infection or mediastinitis, no superficial sternal wound infection and no sternum instability. One patient (0.9%) died due to perioperative infarction and heart failure 3 weeks postoperatively. The postoperative course was uneventful in all other patients (some minor complications (atrial fibrillation, pleural effusion)).

Conclusions: Bilateral ITA bypass grafting can be performed with excellent postoperative wound healing, even in diabetic patients, based on a minimal adjustment of surgical procedure. This allows expanding the patient group suitable to undergo bilateral ITA grafting.

TWENTY YEARS' EXPERIENCE WITH POSTSTERNOTOMY MEDIASTINITIS AFTER CORONARY ARTERY BYPASS GRAFTING: RISK FACTORS FOR MORTALITY AND OUTCOMES AFTER NEGATIVE PRESSURE WOUND THERAPY AND CONVENTIONAL TREATMENT

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Background: We evaluated risk factors for mortality in patients with mediastinitis after coronary artery bypass grafting (CABG) and compared outcome after negative pressure wound therapy (NPWT) and conventional treatment.

Methods: All consecutive patients (n = 557, 1.8%) who underwent treatment for mediastinitis after isolated CABG (n = 30,738) in 01/1990-12/2009 were retrospectively analyzed. Group I (n = 496)

patients underwent conventional treatment (debridement, drainage, irrigation, rewiring of sternum with/without transposition of the greater omentum) and Group II (n = 61) patients NPWT. The annual rate of 90-day mortality was calculated for both groups. Six clinical und operative parameters were evaluated.

Results: The median 90-day mortality was 19.4% in group I and 11.5 % in group II (annual range 7-43% versus 0-20%, respectively). The following risk factors for mortality were statistically significant: age, female gender and emergency/urgent surgery ($P < .01$). Body-mass index, diabetes mellitus and type of mediastinitis (Robicsek classification) were not significant. Age and rate of emergency/urgent surgery were significantly higher in group II (69.7 ± 8.2 versus 66.3 ± 8.8 and 26.2% versus 16.1%, respectively). Proportion of female patients did not differ significantly between the groups. There was no correlation between annual mortality rate and risk factors for either type of treatment. In contrast to conventional treatment, NPWT showed a decrease in mortality rate (learning curve) over the years, reaching zero.

Conclusion: We recommend NPWT for treatment of poststernotomy mediastinitis after isolated CABG as it reduces mortality in this setting, even in high risk patients. In relation to conventional treatment, a significant improvement in outcome can also be achieved with increasing experience.

21 October 2010 Hall 1 Session 1-Adult Off Pump

TOTALLY ENDOSCOPIC CORONARY ARTERY BYPASS GRAFTING ON BEATING HEART

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Objective: Despite early introduction of beating heart totally endoscopic coronary artery bypass (TECAB) procedure, only a limited number of TECAB operations have been carried out worldwide. The main concerning is safety and patency of the anastomosis. This report describes our experience of TECAB on beating heart with robotic assistance and its early results.

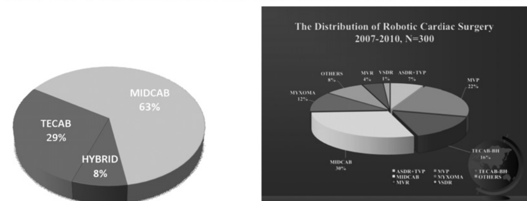
Material and Methods: From April 2007 through May 2010, a hundred and ten patients underwent robotically assisted coronary artery bypass grafting on beating heart, in which forty patients underwent totally endoscopic coronary artery bypass grafting (TECAB) on beating heart. Mean age was 56.97 ± 9.7 years olds (40 years to 77 years), including 36 male and 4 female. Mean weight was 73.56 ± 13.87 (54 to 106) Kg. Mean diameter of left ventricle was 46.10 ± 4.12 mm (40 mm to 56 mm), and average ejection fraction (EF) of left ventricle was 65.5 ± 5.86% (53% to 72%). All the patients had history of angina. Coronary arteriongraphy showed total occlusion or significant stenosis in the left anterior descending artery (LAD). 18 patients had hypertension, 7 patients had diabetes, 8 patients had old myocardial infarction. No patient had medical record of pleuritis. The pre-operative examination included physical examination, 12-lead ECG, chest X-ray, coronary arteriongraphy, CT scan of internal thoracic artery (ITA) and echocardiogram.

After general anaesthesia, the patient was intubated with a double lumen tube for single lung ventilation. Three ports were made on the anterior axillary line to place the 3D endoscope and the two arms of the da Vincie S surgical system. The surgeon controlled the instrument to dissociation the left internal thoracic artery from the first rib to its bifurcation. The ITA to the target vessels grafting was done on beating heart with a paraxyphoidal 4th port for endostabilizer. The TECAB procedures and clinical parameters were recorded and analyzed. The angiographic and/or CT follow-up for graft patency were performed in all patients.

Result: 39 the TECAB procedures were successfully completed, in which 7 patients received stent in RCA or 4 or 5 days after operation Cx in a hybrid procedure. One was converted to MIDCAB. The average ITA harvesting and anastomosis time was 38.6 ± 12.9 (22~60) min and 18.7 ± 10.6 (5~22) min. The average bridge flow were 31.3 ± 17.6 (7~101) mL/min. The average time of postorperative mechanical ventilation time was 8.29 ± 4.17 (6.5~12.6) h. The average chest drainage was 164.9 ± 83.2 (70~ 450) mL. ICU stay was 2.1 ± 0.9 (1~3) d. There was no postoperative angina pectoris. Troponin-T and creatine kinase/creatine kinase-myoglobin (CK/CK-MB) fractions were always within normal level. The postoperativer echo showed the average diameter and EF of left ventricle was 43.24 ± 4.22 (35~51) mm and 62.61 ± 4.85 (52~70) % respectively. Thirty-three patients underwent coronary angiography and 7 patients underwent CT scan for assessment of graft patency before discharged. The graft patency rate was 100% but one patient's LIMA in the middle had a bigger collateral. Angina was disappeared. There were no postoperative complications.

Conclusions: TECAB on beating heart was a really less invasive method for revascularization for selected patients and it offers precise, stable operative manipulations and its early results were excellent.

THE DISTRIBUTION OF ROBOTIC CORONAYR SURGERY



TOTAL ARTERIAL NO-TOUCH OFF-PUMP CORONARY ARTERY BYPASS: FEASIBILITY & INITIAL RESULTS

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Objectives: Total arterial no-touch off-pump coronary artery bypass technique, could potentially be the best surgical treatment for patients with coronary multi- vessel disease. It combines benefits

of OPCAB and exclusive internal thoracic artery graft approaches. However technical difficulties and learning curve could be challenging for cardiac teams. This study aimed at evaluating the feasibility, safety and analyzing short-term results of this technique.

Methods: This is a prospective single center clinical trial, from March 2008 to August 2009. Thirty patients with multi-vessels disease were included, in which half of them having unstable angina preoperatively. All the patients underwent total coronary revascularization using bilateral internal mammary arteries in T-graft fashion.

Results: Eighty-three exclusive ITA grafts were performed with no-touch beating heart technique. The average number of distal anastomosis per patient was 3.4. Total revascularization was achieved in all patients. There was no conversion to on-pump technique. Mortality rate was 3.3%.One patient had sternal infection. Neither stroke nor acute renal failure was observed. Follow-up after 6 & 12 months showed improved CCS grades in all patients.

Conclusions: Total arterial no-touch off-pump coronary artery bypass was feasible and safe with satisfactory short-term results. Larger studies are required to confirm the potential benefits of this technique, namely superior long term graft patency, reduced cardiac-related events, and enhanced survival rate.

OFF-PUMP CORONARY ARTERY BYPASS GRAFTING IN EMERGENCY PROCEDURES IS EFFECTIVE AND SAFE

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Purpose: Indication for emergent surgical treatment for coronary-artery disease (CAD) is rare, and occurs in life threatening situations. Coronary-artery bypass grafting (CABG) with cardiopulmonary bypass (CPB) remains the method of choice, while Off-pump coronary-artery bypass surgery (OPCAB) in these patients remains controversial. We explore the efficacy and safety of OPCAB in patients who need emergent treatment.

Methods: From 2003-2008, a total of 4314 Patients underwent surgery for CAD at our institution. Among these, 214 patients required emergency myocardial-revascularization at our institution. Of these patients, 62% (n = 133) underwent an OPCAB approach, whereas 38% (n = 81) had conventional CABG. Data analysis was performed prospectively and a propensity-score (PS), with preoperative characteristics and risk-factors was created, furthermore, logistic-regression analysis was performed. In addition, a composite endpoint of major non-cardiac complications such as respiratory failure, renal failure, re-exploration for bleeding was constructed.

Results: Outcomes were comparable in regard to mortality (5.3% versus 9.9%; PS-adjusted Odds-Ratio (PS-OR) = 0.48; *P* = .35) and major adverse cardiac-events (MACE) (9.0% versus 22.2%; PS-OR = 1.10; *P* = .78) such as stroke (1.5% versus 4.9%; PS-OR = 0.37; *P* = .40) and myocardial infarction (0% versus 1.2%; PS-OR = n/a; *P* =1.00). In contrast, the occurrence of the composite endpoint was significantly less frequent among OPCAB patients (5.3% versus 30.9%; PS-OR = 0.17; *P* = .003). In addition, quick extubation (≤12 h postoperative) indicating a straighter post-operative course was more frequently observed among OPCAB patients (56.2% versus 11.8%; PS-OR = 3.49; *P* = .02).

Conclusions: Emergency OPCAB is feasible and can be safely performed with comparable outcomes. In regard to non-cardiac complications, OPCAB appears to be the superior approach, further studies are necessary to validate these findings.

OFF-PUMP SURGERY IS NO CONTRAINDICATION FOR PATIENTS REQUIRING REDO CABG!

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Purpose: Redo coronary-artery bypass grafting (CABG) is associated with a higher risk for worse outcomes. Clinical acceptance and certain technical aspects with off-pump surgery (OPCAB) limit its application in the redo setting. We evaluate the safety and feasibility of OPCAB in patients requiring redo CABG.

Methods: From 2002-2008, 254 patients underwent redo myocardial-revascularization at our institution. Patients received either OPCAB (n = 82; 32.2%) or on-pump CABG (n = 172; 67.8%). All data were prospectively collected and a propensity-score (PS), including 50 preoperative risk-factors, balanced characteristics between OPCAB and on-pump groups. Univariate-, multivariate- and logistic-regression analysis was applied to assess outcome data. In addition, a composite endpoint including major non-cardiac adverse events (MNCAE) such as respiratory failure, renal failure, rethoracotomy and bleeding was created.

Results: Both groups were comparable in regard to preoperative demographics and mean EuroScore was 5.2 ± 1.2 versus 5.3 ± 1.0. Operative mortality-rate for OPCAB compared to on-pump CABG was 6.1 versus 5.2% respectively (PS-adjusted Odds-Ratio (PS-OR) = 1.1; *P* = .79) and OPCAB patients presented with a trend to less frequent major adverse cardiac-events (MACE) including postoperative myocardial-infarction (2.8% vs. 4.7%; PS-OR = 0.60; *P* = .55), low cardiac output (2.1% versus 6.8%; PS-OR = 0.33; *P* = .32) and stroke (0% versus 3.5%; PS-OR = n/a; *P* = .97). In addition, the occurrence of non-cardiac related complications (MNCAE) was significantly lower among these patients (11.0% versus 27.3%; PS-OR = 0.27; *P* < .01).

Conclusions: Redo off-pump CABG is safe and feasible and should not deter surgeons from performing the OPCAB approach. It comes with similar MACE and mortality and may even benefit the patients in regard to non-cardiac related complications.

MULTI-VESSEL RE-DO CABG ON A BEATING HEART

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Objective: With the onset of graft attrition and progress of native atherosclerosis more and more patients are coming for re-do CABG. Obviously this cohort is of an

older age group with various co-morbid age related problems. Such patients may not tolerate the deleterious effects of CPB and would benefit greately by an off pump procedure without compromising the completeness of the revascularization.

Methods: We will be presenting 72 cases from Jan 1999 to mid 2010 in the age group of 55-80yrs with male female ratio 3:1. All had angina Class II – IV with graft attrition in 70% and new lesions in 40%. 7 patients were unstable and required elective preoperative IABP support. In a few initial cases the femoral artery and vein were kept exposed for going on CPB if required. The average number of grafts were used 2.8 with single radial artery in 90%, LIMA in 50%, RIMA in 20%, bilateral radial in 20% and RGEA in 10% of the cases. IABP was used electively in the initial few cases.

Results: 90% paients could be extubated within 6 hrs and received only 1 to 2 units of whole blood. There was no neurologic deficit and all these patients required minimal inotropic support. 2 patients developed a peri op MI – one needed post op IABP support. 5 patients with preoperative renal failure underwent hemodialysis pre and post CABG in the ICU.

Conclusion: Multivessel off pump redo CABG can be carried out safely without a compromise on the completeness of revascularization and with minimal morbidity.

OFF-PUMP VERSUS ON-PUMP CORONARY ARTERY BYPASS GRAFT SURGERY: DIFFERENCES IN SHORT-TERM OUTCOMES AND IN LONG-TERM MORTALITY

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Background: Off-pump coronary artery bypass graft surgery (OPCAB) has been performed for many years, but its use is increasing in frequency, and it remains an open question whether OPCAB is associated with better outcomes than on-pump coronary artery bypass graft (CABG) surgery.

Methods and Results: patients who underwent either OPCAB with median sternotomy (468 patients) or on-pump CABG surgery (246 patients) between 2008 and 2010 were followed up. Short and long-term outcomes were compared after adjustment for patient risk factors and after patients were matched on the basis of significant predictors of type of CABG surgery. OPCAB had a significantly lower inpatient/30-day mortality rate (adjusted OR 0.71, 95% confidence interval [CI] 0.58 to 0.87), lower rates for 2 perioperative complications (stroke: adjusted OR 0.66, 95% CI 0.47 to 0.86; respiratory failure: adjusted OR 0.84, 95% CI 0.62 to 0.90), and a higher rate of unplanned operation in the same admission (adjusted OR 1.27, 95% CI 1.01 to 2.15). In the matched samples, no difference existed in 3-year mortality (hazard ratio 1.08, 95% CI 0.96 to 1.22), but OPCAB patients had higher rates of subsequent revascularization (hazard ratio 1.55, 95% CI 1.33 to 1.80).

Conclusions: OPCAB is associated with lower in-hospital mortality and complication rates than on-pump CABG.

EARLY OUTCOMES OF OFF-PUMP CORONARY ARTERY BYPASS GRAFTING IN 3028 PATIENTS

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Objective: Off-pump coronary artery bypass grafting (OPCAB) is currently used as an effective alternative to conventional on-pump surgery. This retrospective study was conducted to review our early results of OPCAB surgery.

Methods: Three thousand and twenty eight OPCAB surgical procedures were performed by a single team of surgeons between January 2001 through May 2010 comprising 49.9% of all coronary artery revascularization procedures. The early outcomes of OPCAB procedures were analyzed.

Results: Mean age of the patients was 59.32 ± 10.88 years. 638 patients (21%)were females, 394 patients (13.1%) had left main coronary artery stenosis, 341 patients (11.26%) had compromised left ventricular function (LVEF ≤ 39%), 609 patients (20.1%) had renal insufficiency (stage 3,4), 214 patients (7.06%) had chronic obstructive pulmonary disease, 605 patients (19.98%) had EURO Score of ≥6. The 30-day mortality was 0.33 % (n = 10). 36 patients (1.2%) needed intra aortic balloon pump support, 40 patients (1.3%) needed prolonged ventilatory support (≥ 48 hrs), 18 patients (0.6%) needed renal replacement therapy and 2 patients needed continuation of RRT post operatively and 60 patients (1.98%) were converted to on-pump CABG. LV dysfunction, chronic obstructive air way disease, renal insufficiency and left main stem coronary artery stenosis were not significant predictors of early adverse outcomes.

Conclusions: This study shows that OPCAB surgery is an acceptable alternative to conventional on-pump coronary artery bypass grafting for the treatment of coronary artery disease. Patients with co-morbidities like renal insufficiency, chronic obstructive pulmonary disease and compromised left ventricular function disproportionately benefited with OPCAB.

JOURNEY THROUGH MIDCAB (1997 TO 2009): TYRO TO VIRTUOSO (STUDY OF 159 MIDCAB)

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Background: MIDCAB CABG in triple vessel disease is remained dream to many Cardiac surgeons. Difficulties and short comes exist. How to overcome and accomplish a complete and satisfactory revascularization is the most important goal of a Bypass surgery. Technical difficulties and its solution are described.

Method: Since 1997, we started sternal sparing MIDCAB CABG. Till 2009 we have done 159 patients.70 patients were operated for SVD (58 CABG, 12 redo CADG), 32 cases for DVD (29 CABG, 3 redo CABG), 57 cases of TVD (55 CABG, 2 redo CABG). For initial two years it was limited to SVD, mostly CTO of LAD. 1st case of redo CABG was carried out in 1999. Gradually field was expanded to DVD and since last 4 yrs. TVD cases are also incorporated. It also includes 10 cases of endarterectomy. One case with CMV and CABG. Patients' age range between 32 – 92 yrs. LVEF = 25% (10 – 55%), 3 patients with EF of 10% were offered CABG with stem cells implantation. As much as 4 vessels were grafted.

Patients overweight have no contra indication. Additional plural adhesion is also not a contra indication. Among TVD 20% had varying degree of left main disease (50 – 96%). 1 patient weighing 114 kg was also operated.

Result: There was 1 mortality in a redo CABG group. The patient died on 6th POD due to VTVF. One case of TVD shows ST-elevation for 24 hrs, post operatively which subsided later on (peri operative MI). 1 patient required re-exploration due to bleeding from mammary bed. Average requirement of BT was 1.5 bottles per patient. Transfusion requirement usually depends upon pre operative HB level. Average hospital stay was 4 days (36 hrs to 6th POD). No major wound complication is seen. Average incision size is 3.5 inches (2.5- 4.2 in.). Conversion to mid sternotomy was required in 1 patient.

Conclusion: Sternal sparing MIDCAB can be carried out in all but cardiogenic shock group of patients. We found it is particularly advantageous to old debilitating patient more so with farer sex group of patient. It can b learnt only by self indulgence. This method is not described anywhere in known literature. It is little time consuming and requires great deal of skill and patience on part of operator.

MIDCAB–PROXIMAL ANASTOMOSIS (AN ENIGMA)–CORONARY WEB MASTERING A SOLUTION

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Background: Distal anastomosis to the coronary arteries may not cause that much problem due to relatively easy accessibility. Method of Exposing aorta and if due to anatomical and hemodynamic limitation aorta can not be expose what other alternatives site are available is explained.

Method: once coronary artery is exposed and stabilized distal anastomosis is a relatively easy task. When question of proximal anastomosis arises, through minithoracotomy (from 4th ICS), where is the aorta? Aorta is no where in the picture. Due to our traditional mind set we look forward to proximal ascending aorta for proximal anastomosis. Technique of exposing proximal ascending aorta is explained. What are the other alternative site and how to carry out proximal anastomosis with alternative site is also explained. A new concept called coronary web mastering along with arterial loop technique is also shown in detailed.

Result: with different technique explained above, we have complete and satisfactory proximal anastomosis. Because of not finding suitable site for proximal anastomosis we have never converted our MIDCAB procedure to conventional sternotomy procedure

Conclusion: In MIDCAB CABG proximal anastomosis are real challenging compare to distal anastomosis. Over the last 10 years we have gradually evolved various alternative site for proximal anastomosis . Though technically challenging these methods are effective for complete triple vessel revascularization through sternal sparing minimally invasive minithoracotomy approach.

LATE OUTCOMES OF ON-PUMP AND OFF- PUMP REDO CORONARY ARTERY BYPASS GRAFTING

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Objective: The aim of study was to evaluate late outcomes of on-pump vs off- pump redoes patients.

Material and Methods: Two groups of patients were compared. Group 1 consisted of 34 off- pump redo coronary artery bypass surgery patients, group 2 - 160 on pump redo coronary artery bypass surgery patients. Groups were not differed according age, gender, functional class, preoperative MI rate and LV function. Significantly more grafts were performed in the on-pump group. Survival, presence of angina, rate of postoperative MI, PTCA, and reoperations were calculated in late follow up period. The follow up time was 3.37 ± 2.15 years in off-pump group and 3.27 ± 2.36 years in on-pump group.

Results: Survival after 6 years in off-pump redo coronary artery bypass surgery group was 85.3%, in on-pump redo coronary artery bypass surgery-83.6 ($P = .758$). Five years after redo operation 54.9% of off-pump coronary artery bypass surgery patients had no angina and 69,3% on pump ($P = .174$). There were no major cardiac events (PTCA, death, MI and reoperations) after 6 years: 69.7% in off-pump group and 76.9% in on-pump group ($P = .343$). 79.4% in off-pump and 91.9% in on-pump group ($P < .02$) were free of PTCA five years after redo surgery.

Conclusions: There was no different in survival, despite that on-pump patients received more grafts than in the off-pump group. Recurrence of angina and incidents of major cardiac events were almost equal in on-pump and off-pump redoes coronary artery bypass surgery groups. PTCA was more often performed in the off-pump redo patients at late follow up.

IS OFF PUMP COMPLETE REVASCULARISATION FEASIBLE IN ALL REQUIRING CORONARY BYPASS SURGERY

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Background: Off Pump Revascularisation decreases morbidity associated with cardiopulmonary bypass and hypothermia especially in high risk patients. However, doubts are still raised on whether complete revascularization can actually be achieved in those with badly diseased vessels.

We have been performing Off Pump Revascularisation in almost all patients and present here an overview of the results.

Methods: From January 2005 to June 2010 we performed OPCAB in 5482 patients requiring only Coronary Revascularization while patients requiring closure of post MI VSD or Repair of significant mitral regurgitation along with revascularization were excluded. Among these 2493 were hypertensive, 1609 Diabetic, 882 had acute MI with raised Troponin I. Severe left ventricular dysfunction was seen in 804 while 575 had Renal dysfunction. Mechanical stabilization and intracoronary shunts were used to facilitate anastamosis with a target to achieve complete revascularization in all. IABP was required preoperatively in 124, peroperative in 242 and postoperative in 38. Conversion to ON PUMP

was required in 28(cardiogenic shock- 21, ventricular rupture 4, aortic rupture at cross clamp site 1, intractable arrhythmias 3)

Results: Mean grafts were 3.2 ± 1.4 (single -199, two -1266, three -2326, four- 630, five - 68 and six -16).Mean postoperative ventilation time was 7.4 ± 4.2 hours and ICU stay 2.9 ± 1.8 days. Renal dysfunction requiring hemdialysis was seen in 76 and Stroke in 14.There were 52 mortalities, cause being – Renal failure 28,Cardiac failure 8,Seticemia 11,intractable arrhythmias 5.

Conclusion: Off Pump Revascularisation decreases morbidity and mortality even in high risk patients. Complete Revascularization is feasible Off Pump in all except those with cardiogenic shock refractory to IABP, intractable arrhythmias and accidental ventricular rupture seen in acute MI.

QUALITY OF LIFE AFTER OFF PUMP CORONARY ARTERY BY-PASS SURGERY: SIX MONTHS FOLLOW-UP FROM THE DOORS-STUDY

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Objectives: We aimed to compare survival and Quality of Life (QoL) after Conventional Coronary Artery By-pass grafting (CCABG) and Off-Pump Coronary Artery Bypass (OPCAB) in patients above 70 years.

Methods: Nine-hundred patients above 70 years were randomized to either CCABG or OPCAB surgery. Surgery, anaesthesia and postoperative care were performed according to pre-defined protocols. Preoperatively, and six months postoperatively, Quality of Life (QoL) was assessed using the Medical Outcomes Study Short Form-36 (MOS SF-36) and EuroQol/5D (EQ-5) generic questionnaires, and questionnaires specifically addressing breathlessness and angina. Data were analyzed according to intention-to-treat.

Results: Six months follow up was 100% with regard to survival, and 93% of survivors completed the questionnaires. In the OPCAB group, overall mortality at six months was 19 compared to 21 in the CCABG group (P = ns). Physical Component Summary of MOS-SF-36 increased from 38 (9) (mean (SD)) preoperatively to 45 (10) at six months follow up in both groups ($P <$ .001, between time points, P = ns between groups). Mental Component Summary increased from 50 (11) to 53 (10) ($P < .001$) in the CCABG group and from 51 (11) to 52 (10) ($P = .06$) in the OPCAB group (P = ns between groups). EuroQoL-5D summary score increased from 0.75 (0.16) to 0.84 (0.17) in the CCABG group ($P < .001$) and from 0.75 (0.15) to 0.84 (18) ($P < .001$) in the OPCAB group (P = ns between groups).

Conclusion: No significant difference in mortality was found. Significant improvement in QoL was encountered in both groups. Both OPCAB and CCABG are safe and effective treatments for ischemic heart disease for elderly patients.

21st October 2010 Hall 2 Session 1 - Adult Valve Mitral

CLINICAL RESULTS OF COMPREHENSIVE MITRAL VALVE APPARATUS RECONSTRUCTION

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Objective: A Comprehensive Mitral Valve Apparatus Reconstruction(COMVAR) technique involving a special annuloplasty strip (Mitralift®) was performed for the past 6 years. Recently, the procedure was applied to patients with mitral stenosis as well as mitral regurgitation. This study is aimed to assess the efficacy of this new mitral valvuloplasty consisting of a lifting mitral annuloplasty (LMA) with posterior and/or anterior leaflet extension (PLE/ALE) to increase the coaptation surface.

Methods: The medical records of 456 patients (278 females and 178 males) who underwent a new mitral valvuloplasty from Mar 2008 to Apr 2010 were retrospectively reviewed. The mean age was 52 ± 15 years. LMA is a new mitral annuloplasty method which involves lifting up of the downwardly displaced LV wall by applying specially designing fabric annuloplasty strip (Mitralift®) on the left atrial wall along the posterior mitral annulus. PLE/ALE was applied to the patients who had contracted mitral leaflet by utilizing a patch of bovine pericardium tailored over a template (SC template®) according to the size of the annuloplasty strip. The patients were divided into two groups; MR group (n = 270) and MS group (n = 186).

Results: There were six early deaths (1.3%) and 6 follows up death (1.3%). Reoperations were performed for recurrent infective endocarditis in 1 case and recurrent MR in 2 cases. The mean MR grade was decreased from 3.0 ± 0.8 to 0.2 ± 0.6 ($P < .05$) in MR group. Mean effective mitral orifice area was increased from 1.2 ± 0.3 cm^2 to 1.9 ± 0.6 cm^2 ($P < .05$) in MS group.

Conclusions: The early outcome of the COMVAR shows favorable early results for various types of mitral valve disease.

ARTIFICIAL COAPTATION SURFACE IN MITRAL VALVE REPAIR

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Mitral valve repair is the current treatment of choice for patients with mitral valve dysfunction and generally preferred over valve replacement due to important patient benefits. The patient benefits of mitral valve repair versus replacement have been well documented and include reduced operative mortality improved long-term survival, better preservation of left ventricular function, and greater freedom from endocarditis, thromboembolism, and anticoagulant-related hemorrhage.

Various techniques have been used to achieve the goal of successful and long lasting mitral valve repair. Vast majority of them are based on arteficial ring which supports the natural mitral annulus with or without the implantation of the arteficial chordae tendineae which replace or support the natural suspensory apparatus of the mitral valve, and very few techniques deal with the third major functional part of the mitral valve – the coaptation surface.

In this paper development of the concept of the artificial coaptaion surface has been described.

First clinical implantation worldwide of the device that utilized the concept of the arteficial coaptation surface and subsequent feasibility study took place in Croatia. From October 2004 to April 2007 27 devices were implanted. More than 100 implants were performed to date worldwide.

Medical implications of the concept, potential fields of application, results of the feasibility study with the worldwide implantation statistics are discussed in this paper.

A NEW IDEA TO REPAIR FUNCTIONAL MITRAL REGURGITATION: A HELICOID METALLIC SPRING

Caterina Simon, Attilio Iacovoni, Maria Iascone, Paolo Ferrazzi

Introduction: The best way to repair functional mitral regurgitation is still debated. No device is able to abolish mitral regurgitation and replicate natural mitral annular dynamics. We have tested an elastic mitral spring in an acute animal study with the purpose of evaluating implantation technique, ring design and acute effects on the native mitral annulus.

Methods: Ten healthy sheep underwent surgical implantation of mitral devices, the elastic component of which is represented by a helicoid metallic spring. Preimplantation and postimplantation echocardiographic parameter measurements to evaluate annular dynamics and ventricular function were mitral annular motion, systolic tissue Doppler imaging peak wave, transmitral pressure gradient, peak transmitral flow velocity, and ejection fraction. Postimplantation angiographic analysis allowed measurement of the mitral annular area and perimeter variations by means of segmentation of the radiopaque mitral device contour.

Results: No significant difference in terms of ejection fraction (P ¼.13) and systolic tissue Doppler imaging peak wave (P ¼ .87) was found before and after implantation. Mitral annular motion (1.16 cm) was preserved. The percentage of systolic annular reduction derived from angiographic analysis was 14.1% (range, 7.7%–19.7%) in terms of area and 7.2% (range, 4.9%–10.0%) in terms of perimeter.

Conclusions: A mitral elastic spring, implantable by using a simple technique, acutely preserves mitral annular area and perimeter changes. Further chronic study is needed to verify the biocompatibility and durability of the device.

MITRAL VALVE REPAIR BY CHORDAL TRANSFER IN RHEUMATIC MITRAL REGURGITATION EARLY EXPERIENCE.

Shamsher Lohchab
PGIMS Rohtak

Recently there has been considerable progress in the development of techniques for MV Repair in degenerative MR. Mitral valve repair in rheumatic patients has remained challenging one but largely unexplored, hence we used chordal transfer technique for MR in rheumatic patients.

From October 2008 to March 2010, 57 patients having Rheumatic MR underwent MV repair with chordal transfer technique. There were 36 females and 21 male patients, age ranged from 11 to 53 years mean being 25 ± 4. TEE was used PreCPB for evaluation of MR. Normal chordae and a strip of leaflet tissue were transferred from the posterior leaflet to the free edge of anterior leaflet; the posterior leaflet was repaired as after a quadrangular resection. Additional procedures were Commissurotomy in 19 patients for MS, AVR in 1 for AR and Cryomaze in 21 having chronic AF. Post CPB TEE was done to assess the severity of MR. (Video Presentation)

Results: There was no hospital mortality. There was moderate MR in patient who had simultaneous AVR. There were not encountered any complications and all patients were discharged in satisfactory condition and were followed up. At a mean follow up of 6 months 56/57(98.2%) patients are in NYHA Class I/II and having no significant MR on transthoracic echo.

Conclusion: Chordal transfer technique for Rheumatic AML prolapse is effective, safe and can be performed in majority of patients who present early in the course of disease when MV is not much deformed.

EFFECTIVENESS OF SINGLE-SIZE SELF-MADE PTFE BAND FOR MITRAL VALVE ANNULOPLASTY IN DEGENERATIVE MITRAL REGURGITATION

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Objectives: Although the posterior mitral annulus is enlarged in patients with degenerative mitral regurgitation (DMR), there is no evidence that the intertrigonal distance is abnormal. Studies have shown that the normal MV circumference and the ratio of the anterior/posterior annulus don't vary in a large cohort of patients. Objective in this study was to determine hemodynamic and clinical outcomes of trigone-trigone annuloplasty using a self-made PTFE band in 62 mm single-size length.

Methods: Between October 2008 and March 2010, 150 patients (mean age: 66.3 ± 8.7 years; men: 62%) underwent mitral valve repair (MVR) for DMR. All patients received a posterior 4 mm Gore-Tex tube, sutured to the posterior annulus from trigone to trigone mm. In every case the tube length was 62 mm. All patients had fibroelastic deficiency etiology. Preoperative mean ejection fraction was 48% ± 7% and 85% of patients had severe MR.

Results: MVR included isolated or combined posterior leaflet resection in 105 patients (70%), artificial chordal insertion in 12

(8%), leaflet plication in 60 (40%). The 30-day mortality was 2%. At discharge none patient had MR > 1+. The mean gradient was 4.7 ± 3.1 mm Hg and mean mitral valve area 3.1 ± 0.4. At last follow-up 95% of patients had no or mild regurgitation, and the mean ejection fraction was 52% ± 8%.

Conclusions: Single-sized partial annuloplasty using a self-made PTFE band provided excellent early results in DMR. In our hand this technique was reliable, reproducible and economic. Long term follow-up is mandatory to validate this promising technique.

EAGLE SHAPE PATCH TO RESTORE MITRAL-AORTIC CONTINUITY: HOW TO DO IT

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Objective: The destruction of the architecture of aortic root in prosthetic aortic valve endocarditis is a serious complication. Infected tissue must be removed even if large defects are created. Here, we describe a simple technique for reconstruct the mitro-aortic discontinuity which happens because of a large gap after extensive resection of the infected tissue and for avoid the possibility of tension on the mitral valve or healthy near tissues.

Surgical Technique: Bovine pericardium patch of (60 × 30 mm) was folded into three and equal folds at its central part, and fixed by 4-0 polypropylene sutures, so the patch took an eagle shape with two wings and central body. The two sides of the incorporating body of the patch were attached to the lateral and medial fibrous trigones. While the upper wing was sutured to the healthy aortic wall, the lower wing was attached without tension to the anterior mitral leaflet. The body of the eagle-shape patch completed the aortic annulus on which will be based on the new prosthesis.

Results: We applied our technique in two cases of a 56 and 70 year old with a prosthetic valve endocarditis after aortic valve replacement. No hemodynamic abnormalities or periprosthetic leakage were found in echocardiograms at two years after the operation for patient 1 and at 3 months for patient 2.

Conclusion: We believe that the respect of the anatomy of the aortic annulus, by modification the simple-shape patch into eagle-shape, plays a role in reducing the tension on the patch and therefore on the anterior mitral valve and healthy near tissues.

TENT SHAPE TECHNIQUE: ANOTHER PROCEDURE TO REPAIR P2 OF POSTERIOR LEAFLET OF MITRAL VALVE: HOW TO DO IT

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Objective: Prolapse of central scallop of mitral valve is the most common lesion among patients who underwent mitral valve repair. We describe a novel procedure to repair prolapsing high mid scallop of the mitral posterior leaflet with no continuity interruption of the mitral posterior elements. There is a growing interest in artificial chordae implantation to correct mitral valve regurgitation caused by posterior leaflet prolapse.

Surgical Technique: A new artificial chord is implanted 1 cm away from the posterior annulus, and the rest part of prolapsing mid scallop of mitral posterior leaflet is fixed to the neochord taking the tent shape.

Results: From July 2009 to January 2010, we applied our technique in six patients with severe mitral insufficiency due to isolated mid scallop posterior leaflet prolapsed with excessive tissue (Barlow disease). After the mitral repair all patients were asymptomatic. Transthoracic echocardiography post-operation examination was performed for all patients which confirmed no regurgitation on short-term follow-up.

Conclusions: We believe that tent-shape technique is indicated in case of huge mid scallop of posterior leaflet with a height greater than 2 cm to minimize the risks of Systolic Anterior Motion. The wide edge and smooth surface of the posterior leaflet behaves as an airbag ensuring a good coaptation. Early results of our technique seem to be adequated for degenerative mitral valve insufficiency repair, and the encouraging outcome in this short series is to be confirmed with greater number of cases, and long-term follow-up will be required.

RESULTS OF MITRAL VALVE REPAIR VERSUS MITRAL VALVE REPLACEMENT FOR ISOLATED ACTIVE INFECTIVE MITRAL VALVE ENDOCARDITIS: 22-YEAR SINGLE CENTER EXPERIENCE

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Object: We retrospectively compared early and long-term results of mitral valve repair (MVRep) and replacement (MVR) in patients with isolated infective mitral valve endocarditis (MVE).

Methods: Between 04/1986 and 12/2008, 1393 infective endocarditis operations were performed including 488 in cases of MVE. Fifty-nine of these patients (39 men, median 49 years) received MVRep with pericardium and 194 MVR (124 men, median 57 years) for isolated MVE.

Probability of survival, freedom from recurrence and reoperation were calculated to identify predictors.

Follow-up (3 months–19.6 years) was completed in all survivors with 306 and 719 patient-years in the MVRep and MVR group, respectively.

Results: Compared to the MVRep group, MVR patients were significantly older, preoperatively significantly more often intubated, in more advanced cardiac decompensation and more often underwent emergency operation. MVRep patients had significantly more preoperative septic cerebral embolism.

MVRep was associated with significantly better survival: 30-day, 1, 5, 10 and 15 year survival rate was 91.4% ± 3.6%, 84.0% ± 5.0%, 76.6% ± 6.1%, 62.4% ± 8.2% and 62.4% ± 8.2% compared to 80.1% ± 2.9%, 66.4% ± 3.5%, 52.8% ± 3.9%, 39.8% ± 4.5%, and 36.9% ± 5.0% (P = .0050).

Freedom from MV reoperation due to failure of reconstruction at 1, 5 and 10 years was 86.6% ± 5.0%, 84.4% ± 5.4%, and 79.1% ± 7.2%.

Endocarditis re-occurred in 2/59 (3.3%) early after MVRep and 5/194 (2.5%) after MVR.

Conclusions: MVRep for MVE shows much better early and long-term survival than MVR. It should be performed when all infected material can be resected and the remaining tissue allows re-shaping of a competent valve.

Patients requiring MVR had advanced endocarditis with annular destruction and were more critically ill.

THE EFFECT OF MERCEDES PLASTY ON GIANT LEFT ATRIUM IN PATIENTS UNDERGOING MITRAL VALVE REPLACEMENT

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Giant left atrium is a condition where left atrial diameter exceeds 65mm and this has a strong association with chronic rheumatic mitral regurgitation. This enlarged left atrium exerts pressure on the surrounding structures like lung & main bronchus and left ventricle with corresponding cardiopulmonary embarrassment. Because giant left atrium can increase the risk of stroke and sudden death its existence merits careful evaluation and surgical intervention. The current methods for left atrial volume reduction maybe classified into three categories: Partial plication or excision of inferior atrial wall, Partial plication or excision of both superior and inferior atrial walls, and Partial auto-transplantation of the heart. In this study we assessed the effect of left atrial wall plication (Mercedes Plasty of the inferior wall of left atrium) in 20 patients undergoing mitral valve replacement.

Echocardiographic parameters like LA dimension and denominators of LV function and LA volume was calculated. Respiratory parameters were also studies preoperatively. The Echocardiographic and the respiratory parameters were studied at the time of discharge and at 3 months follow up. This study showed that those patients who received LA size reduction procedure showed decreased LA volume and improved LV function at 3 months' follow up as compared to the group where no LA size reduction was performed. The individual respiratory parameters though did not improve statistically, the overall respiratory function improved after LA size reduction. The CPB and cross clamp time did not increase significantly. Hence it can be recommended as a safe and effective procedure.

TRANSESOPHAGEAL MITRAL VALVE QUANTIFICATION FOR MITRAL VALVE SURGERY

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Objective: To reveal the peculiarities of mitral valve (MV) anatomy in patients with mitral regurgitation (MR) using geometrical Mitral Valve Quantification technique (MVQ).

Methods: Twenty five patients (mean age 45.5 ± 6.5 years) with MR were examined by transesophageal echocardiography using MVQ technique before MV surgery. We identified groups by MR Carpentier classification. Group 1 included 12 patients with type 2 MR; group 2 – 8 patients with type 3a MR and group 3 – 5 patients with type 3b MR.

Results: MV annulus height and dimension were significantly larger in group 1 as compared with group 2. Maximal MV dilatation was mainly attributed to group 3. MV tenting height and volume were significantly larger in group 3. The height of MV prolapse and its volume significantly prevailed in group 1 ($P < .05$). Analysis of chordae dimensions revealed that in groups 1 and 2 anterolateral chordae had maximal values, whereas in group 3 both chords had minimal values.

Conclusions: Transesophageal MVQ technique with highest accuracy allowed to analyze MV geometry - MV annulus height and dimension, height and volume of MV tenting, volume of MV prolapse, chord dimensions. MV dilatation, minimal dimensions of chordae, maximal height and volume of MV tenting in the presence of MR type 3b comprised patients for mitral valve repair.

21st October 2010 Hall 2 - Session 2 - Adult Valve - Aortic And Tricuspid

LONG TERM RESULTS AFTER CARPENTIER-EDWARDS PERICARDIAL AORTIC VALVE PLACEMENT WITH ATTENTION TO THE IMPACT OF AGE

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Purpose: The purpose of this study is to determine long term patient survival and valve durability of Carpentier-Edwards pericardial valves placed in the aortic position with specific attention to the impact of patient age.

Methods: We performed a retrospective cohort study of 2168 patients who underwent placement of a Carpentier-Edwards pericardial aortic valve from 1991 to 2008. Mean length of follow up was 4.5 years. Primary outcomes of interest were mortality and valve explantation. Survival curves and event-free curves were obtained using the Kaplan-Meier method and compared by log-rank test.

Results: Survival was 92% at 1 year, 73% at 5 years, 38% at 10 years, and 18% at 15 years. While the mortality rate of younger patients was worse than the general population, older patients had significantly better survival than their contemporaries. Age was the independent variable most significantly associated with explantation. There was an early hazard phase for patients 21-49 years of age such that freedom from explant was 89% at 3 years. By 10 years, freedom from explant was 58% for patients 21-49 years of age compared to 68% for patients 50-64 years of age, 93% for patients 65-74 years of age and 99% for patients 75 years of age and older.

Conclusion: We found good long term survival and durability. Older patients had excellent freedom from explantation, while younger patients fared worse. As our population ages this information becomes increasingly important. And assessing the durability of this pericardial aortic valve is important for predicting the durability of the transcatheter aortic valves which share the same leaflets.

PROTHESIS-PATIENT MISMATCH IN AN AORTIC VALVE REPLACEMENT PROGRAM WITH THE NEW GENERATION OF STENTLESS PROSTHESIS

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Introduction: Prothesis-patient mismatch (PPM) is directly related with high transvalvar pressure gradients (TPGs). Present when the indexed effective orifice area (EOA) of the prosthesis is < 0.85 cm^2/m^2, PPM is a common finding (20-70%). Moderate PPM is between 0.65-0.85 cm^2/m^2 and severe PPM less than 0.65 cm^2/m^2.

Although there are several discrepancies and contrasting publications about the effect of PPM on postoperative outcome, to the main stream of evidence PPM affects left ventricular remodeling, surgical outcome, and late mortality, and therefore should be considered a diseased state.

Stentless aortic valve prothesis are known for their superior hemodynamic profile, but because of technical difficulties, their implementation have been difficult. A new generation with a single suture line as the objective of facilitating their implantability.

Objective: In an historic patient court from the same population and with the same inclusion criteria fond a 50% of moderate and 15% severe PPM. With this study we pretend compare both courts with respect to the PPM prevalence.

Methodology: From April to November 2009, two surgeons consider all patients referred for aortic valve replacement (AVR), with or without associated procedures, as candidates to receive the stentless Freedom Solo® prosthesis. All clinical, laboratory and intraoperative findings were registered in a dedicated database. Patients were reevaluated clinically, with EKG and TTE at discharge and at 1st and 3rd-6th post-op months. The indexed EOA -AVA/BSA – was calculated at the last TTE.

Results: Fifty-seven patients underwent AVR by those surgeons over the study period. Twenty five patients had associated procedures: ascending aorta plasty (9 patients), tricuspid valve surgery (3), mitral valve surgery (2), tricuspid and mitral valve surgery (3), mini maze for AF ablation (6), carotid endarterectomy (1) and pacemaker implantation (1). Forty-two received the stentless valve (75%). No patient was excluded due either to important mismatch between the annulus and the sinotubular junction or to bicuspid aortic valve. The stentless valve was not implanted only in calcifications, deep in the aortic annulus and septum or extending from the annulus to the coronary ostia. No operative mortality or morbidity was observed. When compared with pre-op TTE the presence of extensive , at 3-6 months significant ($P < .05$) decreases of mean gradient (from 53.6+/-16.9 to 12.4+/-6.1 mm Hg), IV septum (from 13.3+/-1.9 to 12.9+/-1.8 mm) and posterior wall thickness (from 11.1+/-1.5 mm to 9.7+/-1.6 mm) were observed. A minor paravalvular leak was detected in one patient.

Despiste not all the patients with stentless prosthesis at this time had their 3 months ETT, 21 patients had, from those, 5 (24%) had a moderate PPM and any had a severe PPM.

Conclusion: PPM have negative implications on the clinical outcomes, this should be take in mind at the time of the surgery. The new generation of stentless prosthesis is less technically demanding and compliant with most aortic root anatomies. Their superior hemodinamic behaviour may decrease the prevalence of the PPM.

AORTIC VALVE REPLACEMENT IN OCTOGENARIANS IN THE ERA OF PERCUTANEOUS AORTIC VALVE INTERVENTION: RISK STRATIFICATION WITH EUROSCORE

Benjamin Medalion, Ariel Farkash, Eyal Porat

Objective: Increasing number of elderly patients require AVR. With the growing experience of transcatheter valve implantation it is important to evaluate the current surgical outcome of octogenarians after AVR.

Methods: All patients aged 80 years or older (n = 191), who underwent AVR alone (n = 73) or AVR and CABG (n=118), between October 2003 and September 2009 were assessed according to logistic EuroSCORE. Surgical risk was defined as low (score ≤ 10%), moderate (10% < score < 20%), and high (score ≥ 20%) risk. Mean EuroSCORE predicted risk of mortality was 8.3% ± 1.2% (low risk), 14.5% ± 2.9% (moderate risk), and 37% ± 14.5% (high risk; $P < .001$). Quality of life (QOL) was assessed by a questionnaire.

Results: In-hospital mortality was 4.7% (low risk), 5.1% (moderate risk), and 21.7% (high risk; $P = .002$) for all patients. It was 0 (low risk), 3.3% (moderate risk), and 18.5% (high risk; $P = .045$) for isolated AVR. One-year survival was 80%, 80%, and 54%; 5-year survival was 64%, 40%, and 37% ($P = .006$), for low-, moderate-, and high-risk patients, respectively. In the QOL assessment, 82% expressed improvement in QOL, 78% feel better, and only 22% describe some weakness and fatigue.

Conclusions: Currently, octogenarians with low and moderate risk have excellent short- and long-term results after AVR. High risk patients carry high early mortality. However, survivors, have life expectancy approaching that of age matched general population. Comparisons of less invasive techniques for AVR should rely on outcomes based in the modern era and decisions regarding surgical intervention in patients requiring AVR should not be based on age alone.

LONG TERM RESULTS FOLLOWING AORTIC VALVE REPLACEMENT IN OCTOGENARIANS

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Objectives: The ageing of the population has resulted in an increasing number of elderly patients undergoing cardiac operations. We reviewed our experience in patients over the age of 80 undergoing primary aortic valve replacement (AVR) with or without CABG.

Methods: Between 2000 and 2009, 495 patients (251 male) ≥80yr underwent primary AVR in our unit. The notes of these patients were retrospectively reviewed and follow-up information was obtained from their general practitioners. They had a mean age of 83.1 ± 2.5 years and a median logistic EuroSCORE of 13.8% (IQR 9.7, 19.4). Isolated AVR was performed in 213 patients (43%) and 282 (57%) patients underwent combined AVR and CABG.

Results: Hospital mortality (30days) occurred in 26 patients (5.2%), which was significantly lower than the mortality predicted by mean logistic EuroSCORE (16.4%, $P < .01$). Hospital mortality was comparable between patients undergoing isolated AVR and those undergoing additional CABG (4.7 versus 5.6% respectively). Actuarial survival at 1 and 5 years was 89.7 ± 1.4% and 79.5 ± 2.5% respectively.

Conclusions: Aortic valve replacement can be undertaken safely in octogenarians and the current risk is significantly lower than what is predicted with conventional risk-scoring systems. Advanced age per se is not an important factor when assessing a patient's suitability for surgical versus transcatheter aortic valve implantation (TAVI).

ULTRASOUND DECALCIFICATION OF AORTIC STENOSIS

Baretti, Amiri, Amiri, Siniawski, Dandel, Hetzer

Background: Advanced aortic valve (AV) stenosis (AS) is commonly treated with AV replacement (AVR). We tested surgical ultrasound decalcification (SUD) as an alternative procedure.

Methods: SUD was performed on 20 AS patients (age 72 ± 6 years) due to isolated AS grade III (single SUD, n = 12) and combined with coronary artery bypass grafting (CABG, combined SUD, n = 8) due to AS grade II plus coronary artery disease (CAD). Perioperative data (mean ± SD) of echocardiographically determined AV pressure gradient (Δp, mmHg) and area of AV orifice (AVO, cm^2) were evaluated pre-, intra- and postoperatively after 2 weeks and 23 ± 7 months (pre, intra, post-2 weeks, post-2 years). Patients' NYHA classes were evaluated preoperatively and at post-2 years.

Results: ($P < .05$ significance *pre vs intra and post-2-week, †pre versus post-2-year) at pre, intra, post-2 weeks, and post-2 years were: Δp 61 ± 18*, 18 ± 10, 18 ± 11, 24 ± 20; AVO 1.0 ± 0.3*†, 1.4 ± 0.2, 1.5 ± 0.2, 1.5 ± 0.1. NYHA classes were 3.1 ± 0.3 and 2.0 ± 1.1. No cardiac death occurred. The intraoperative, 30-day, 1- and 2-year mortality rate was 0, 2, 2, 1 for single SUD and 0, 2, 0, 1 for combined SUD. No cardiac death occurred.

Conclusions: Long-term results do not support SUD for patients with severe AS. Patients with moderate AS can benefit from SUD, especially the subgroup of patients with combined diagnosis of CAD and moderate AS with definitive need for CABG, who would have no indication for isolated AVR for single diagnosis of non-severe AS.

OBSERVANT - OBSERVATIONAL STUDY OF EFFECTIVENESS OF AVR-TAVI PROCEDURES FOR SEVERE AORTIC STENOSIS TREATMENT

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The OBSERVANT Italian Research Group

Objective: Aortic valve replacement (AVR) is the definitive therapy for patients with severe symptomatic aortic stenosis (SSAS). A new less-invasive alternative (transcatheter aortic valve implantation, TAVI) is now available for patients with prohibitive operative risk.

OBSERVANT marks the first observational multicenter perspective study on the comparative effectiveness of TAVI, AVR, and medical therapy in the Italian population with SSAS.

Methods: OBSERVANT includes SSAS patients admitted to hospitals and requiring treatment. For each SSAS patient, data on demographic characteristics, health status prior to intervention, presence of comorbidities and information on the type of treatment are collected.

The considered end-points are: mortality within 30 days from intervention, mortality within 12 and 24 months and the incidence of in-hospital major adverse cardiac and cerebrovascular events

Clinical monitoring procedures allow assessment of the reliability and completeness of the database and help maintain constant quality control. To compare the effectiveness of AVR, TAVI, and medical treatment risk adjustment techniques will be applied.

Results: Short-, medium-, and long-term outcome in patients undergoing a SSAS treatment; use, appropriateness, and economic and organizational impact of TAVI and AVR procedures; "indication criteria" to guarantee appropriate patient selection for AVR or TAVI; new pre-procedure risk score, specific for the elderly Italian population; guidelines on TAVI procedure coding and a system of administrative follow-up to be proposed to the regional health systems for managing the use of the AVR or TAVI procedures.

Conclusions: Knowledge derived from this study will be directly transferable to professionals and policy makers, for their evidence-based choices and decision-making process.

BIODEGRADABLE ANNULOPLASTY RING FOR THE TREATMENT OF FUNCTIONAL TRICUSPID REGURGITATION

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Objective: Ring annuloplasty has been shown to be superior to other repair techniques in functional tricuspid regurgitation. We report our initial experience with a novel biodegradable annuloplasty ring, which is inserted on a beating heart directly into the tricuspid annulus. The ring is replaced within 12 months by autologous fibrous tissue, to durably remodel the tricuspid annulus.

Methods: From April 2005 to August 2008, 39 patients with a mean age of 44.5 ± 26.6 years underwent tricuspid valve repair for grade ≥III functional tricuspid regurgitation (TR). Concomitant procedures were mitral valve repair (21), replacement (7), AVR (7), CABG (4), Maze (10) and RV-PA conduit replacement (4).

Results: There were no operative deaths. Early post-operative echocardiography showed a mean tricuspid regurgitation of 0.7 ± 0.75, with 1 patient in grade III TR with severe pulmonary hypertension requiring valve replacement, 3 patients in grade II and the remainder with grade I or 0, and a mean transvalvular gradient of 1.4 ± 2.2. There were 3 early deaths (7.7%) not related to the tricuspid valve repair. During a median follow-up of 27 months (range 2-40) of the 35 remaining patients, there were 2 late deaths (5.7%) from non-valve related causes. No patients required reoperation. At the latest echocardiographic follow-up, two patients remained in grade II TR and one developed asymptomatic severe TR.

Conclusions: This novel biodegradable ring offers a simple and quick implantation comparable to De Vega annuloplasty, with the annulus remodeling advantages of a prosthestic ring. It provides satisfactory mid-term clinical and echocardiographic results.

REPAIR OF THE TRICUSPID VALVE FOR RHEUMATIC LESIONS. A 30-YEARS EXPERIENCE

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Background: Analyze the 30-year long-term follow up results of patients who underwent repair of the tricuspid valve for rheumatic organic valve disease, and the predictive risk factors for mortality and valve-related complications.

Material and Methods: Between 1974 and 2007, 300 patients (mean age 50.8 ± 13.7 years) underwent surgical repair of the tricuspid valve for a multivalvular rheumatic organic disease. From this group of patients, 185 (61.5%) had a mitro-tricuspid lesion, 108 (36.1%) a triple valve lesion, 2 an aortic and tricuspid (0.7%) and 5 an isolated tricuspid disease (1.7%). Tricuspid valve repair was accomplished by means of prosthetic ring annuloplasty in 79 patients (26.1%), commissurotomy and ring annuloplasty in 82 (27.4%), isolated commissurotomy in 10 (3.3%), suture annuloplasty in 105 (35.1%), commissurotomy and suture annuloplasty in 24 (8.0%).

Results: Hospital mortality was 22 patients (7.4%). Previous valve surgery, and reoperation for bleeding were predictive risk factors for hospital mortality.

Mean follow-up was 19.7 years with a complete follow-up of 96.7%. Late mortality was 153 patients (51.2%) most of them due to cardiac causes. Date of surgery, NYHA class IV, aortic valve repair and tricuspid ring annuloplasty were detected as predictive risk factors for late mortality. Actuarial survival curve was 10.6 ± 4.4% at 30 years. Actual curve for a matched population of the same age and gender is 78% at 30 years.

A total of 106 (35.5%) patients required a valve reoperation, 69 for tricuspid valve repair dysfunction. Age, tricuspid stenosis and mitral commissurotomy without ring annuloplasty were the predictive risk factors for valve reoperation. Actuarial curve free from valve reoperation was 29.5 ± 6.1% at 30 years.

Conclusions: Tricuspid valve repair in rheumatic organic lesions can be done with satisfactory early results in terms of low 30-days mortality. Progression of the rheumatic disease is the cause of poor late prognosis with a high incidence of valvular reoperations and late mortality.

TRIPLE DELIGHT - TRIPLE VALVE REPAIRS IN YOUNG RHEUMATICS - NARAYANA EXPERIENCE

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Objectives: Facing young rheumatic patients, for which problems of long-term anticoagulation, we choose to attempt triple valve repair in order to avoid prosthetic implantation in this particular population suffering from triple valve disease.

Methods: Fifty two young rheumatic patients (mean age 24 + 5 years) underwent triple valve repair procedures. Valvular pathology characteristics according to Carpentier's classification include mitral insufficiency type III post + type II ant (n = 26), type III post (n = 10) + type I (n = 7), mitral stenosis (n = 30), type III aortic insufficiency (n = 36), type I (n = 16) and tricuspid insufficiency (n = 42), with tricuspid stenosis (n = 10).

Results: Firstly, mitral valve disease was corrected using carpentier's techniques of repair, prosthetic ring annuloplasty (n = 32), commisurotomy (n = 30), chordal transfer (n = 14), chordal shortening (n = 7), pericardiac patch leaflet augmentation (n = 18). Secondly, aortic lesions were corrected using glutaraldehyde stabilized autologous pericardium leaflet extension (n = 12), leaflet shaving , commisurotomy, free margin plication and subcommisural plication. Lastly, tricuspid repairs were done with commisurotomy (n = 10), prosthetic ring (n = 12), and other techniques of annuloplasty. The operative mortality of 1.92% (one patient died). Echo before discharged showed grade I mitral insufficiency in 8 patients and grade I aortic insufficiency in 6 patients. There was no late death during a mean follow up of 50 + 23 months. After 3years, 90% of patients were free from redo valve surgeries.

Conclusion: Triple valve repair, has provided satisfactory initial and mid term results and could be considered as an interesting palliative surgical approach.

RING VERSUS SUTURE ANNULOPLASTY IN PATIENTS WITH TRICUSPID REGUGITATION

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Objective: Authors performed comparative analysis of semi-rigid ring *(CardiaMed, Russia) versus suture annuloplasty (de Vega) effitiency for tricuspid regurgitation (TR).

Methods: During the period of 5 years, in 312 patients with moderate or severe TR, tricuspid annuloplasty was performed as a concomitant procedure with mitral valve surgery. In 54.5% of cases, semi-rigid ring was implanted (Group 1), and in 45.5% (Group 2) we used de Vega annuloplasty.

Results: In long-term follow-up, TR volume (% of S RA) was 29.9 ± 4.6 in Group 1, and 15.7 ± 3.2 in Group 2, TR grade was 2.3 ± 0.7 and 1.3 ± 0.5, respectively. Freedom from recurrent TR in 30th month after operation was 74.5% and 97.1%, respectively. Predictors of recurrent TR were TV annulus dilatation 55 mm and more (P = 0.032), and PA pressure higher than 60 mm Hg (P = 0.024). In de Vega group, 7 (4.9%) patients were reoperated for recurrent TR. In ring annuloplasty group there were no cases of recurrent regurgitation.

Conclusions: Suture annuloplasty for TR is associated with recurrent regurgitation in long-term follow-up, especially in patients with severe TR and pulmonary hypertension. Ring implantation is shown to prevent recurrent TR.

YOGA BREATHING EXERCISE TO REDUCE POSTOPERATIVE PULMONARY COMPLICATIONS IN PATIENTS UNDERGOING ELECTIVE VALVE REPLACEMENT FOR VALVULAR HEART DISEASE: A RANDOMIZED CLINICAL TRIAL.

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Background: Postoperative pulmonary complications (PPCs) increase the morbidity and mortality after valve replacement surgery for valvular heart disease and add to the prolonged hospital stay and cost. The efficacy of preoperative yoga breathing exercise (Sambavimagamuthra) in reducing the PPCs in patients undergoing valve replacement surgery is newly studied. The aim of this study is to find out the efficacy of preoperative yoga breathing exercise on the incidence of PPCs in patients undergoing valve replacement surgery for valvular heart disease.

Methods: 40 consecutive congestive cardiac failure controlled patients (patients with severe Pulmonary Hypertension on ECHO were excluded from the study) in normal sinus rhythm scheduled for elective valve replacement surgery at Government General Hospital, Chennai were randomly assigned to receive either conventional care respiratory therapy (Group 1) or Yoga + Conventional care (Group 2). Demographic data, anaesthesia, surgical and ICU protocols were similar in both groups. PFT's, ABG analysis, echocardiogram and chest x-rays were done pre and postoperatively. Incidence of PPCs, duration of ventilation, ICU stay and hospitalization were compared.

Results: After valvular surgery, PPCs noted in 16% of group1and 4% of group2. Pneumonia occurred in 12% of patients in group1 and 2% in group2. Median duration of postoperative hospitalization was 12days in group1versus 9 days in group2. A significant reduction of pulmonary function was noted in both groups until postoperative day5. When compared with preoperative value, the FEV1was lower in group1 than in group2 on postoperative days 3 (38.3% ± 7.4% versus 56.2% ± 8.8%), 5 (52.4% ± 8.6% versus 68.2% ± 7.2%), and 8 (58.4% ± 6.5% versus 74.5% ± 7.7%). Pao2 value and Pao2/Fio2 ratio fall significantly in group 1. Intubation time, ICU and hospital stay were lower in group 2.

Conclusion: Preoperative Yoga therapy improved the oxygenation, Pulmonary function and reduced the incidence of PPCs along with hospital stay in patients undergoing elective valve replacement surgery for valvular heart disease.

21st October 2010 Hall 3-Session 1-Pediatric Cardiac Surgery

WHAT HAPPENS TO THE PULMONARY ARTERY THAT WE SWITCHED?

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Objective: We analyzed the fate of the pulmonary arteries (PA) and its valve over time, after ASO in neonates with simple and complex transposition of great arteries (TGA).

Methods: ASO using Lecompte maneuver was performed in 222 neonates (mean age 1.7 ± 0.42 days) with TGA with intact ventricular septum (IVS) and in 150 neonates (mean age 3.62 ± 0.52 days) with TGA with ventricular septal defect (VSD). Complete medical records with serial echocardiograms were reviewed for any occurrence of postoperative pulmonary stenosis and insufficiency.

Results: TGA-IVS: During a mean follow-up of 14.4 ± 0.54 years, 17.8% children developed significant pulmonary stenosis (PS) after ASO. Serial echocardiograms showed that at 1 month postoperatively, pressure gradients in the range of 16-23 mm Hg occurred. Onset of significant PS occurred as early as 30 days and as late as 10 years after ASO. Freedom from intervention was 68.6±8.7% at 1 year and 42.8.1 ± 9.5% at 5, 10, and 15 years. **TGA-VSD:** Among 150 patients post-ASO, 10% developed significant PS and 4.6% developed significant pulmonary valve insufficiency during a mean follow-up period of 12.53 ± 0.78 years. Mean pressure gradients of 15 mmHg first occurred 2 months after ASO and became progressive to warrant intervention. The latest occurrence of PS was seen 9 years postoperatively. Freedom from intervention were 72.4 ± 9.6% at 1 year and 53.11 ± 10.9% at 5, 10, and 15 years. Multivariate analysis shows that the only significant risk factor contributing to the fate of the PAs, after ASO, is the use of two- patch technique for PA reconstruction.

Conclusions: After ASO, pulmonary arteries may become stenotic either at its valve, trunk, bifurcation or branch level, and/or the valve becomes insufficient, over a period of time.

PRIMARY AND TWO-STAGE REPAIR OF TRANSPOSITION OF THE GREAT ARTERIES AND DOUBLE OUTLET RIGHT VENTRICLE WITH AORTIC ARCH OBSTRUCTION

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Objective: To assess experience with repair of complex TGA and DORV with aortic arch obstruction by arterial switch operation and aortic arch reconstruction.

Methods: During 1993-2010 thirty pts, median age 8 days, with TGA/DORV and IAA (3 pts) or COA (27 pts) underwent two-stage (12 pts) or primary (18 pts) repair. In 12 patients resection of COA was performed first. The repair of intracardiac

lesions was performed in mid-hypothermic bypass. For reconstruction of the aortic arch isolated cerebral perfusion was used in 18 pts. Aortic arch was reconstructed by direct anastomosis of descending and ascending aorta. The intracardiac repair consisted of arterial switch operation in 30 pts, VSD closure in 29 and patch enlargement of the right ventricular outflow tract in 4 pts. Cardiopulmonary bypass time and aortic coss-clamp time were 280 ± 76 minutes and 146 ± 40 minutes, respectively.

Results: There were 4 (13%) early death, 2 (16%) in the two-stage group, and 2 (12%) in the primary repair group. No patient died late. In 2 (16%) pts in the first group, and in 4 (24%) pts in the second group reoperation for pulmonary stenosis was required. No patient required reoperation for aortic arch obstruction. Patients were followed for median 5.8 yrs (range 0.1-17 yrs). All 26 early survivors are in good or very good clinical condition.

Conclusion: TGA and DORV with aortic arch obstruction can be corrected with acceptable early mortality by two-stage or primary repair. The need for reoperation for pulmonary stenosis is increased. Supported by MZOFNM2005.

CONGENITAL HEART SURGERY IN NEWBORNS UNDER 2500 G

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Objectives: Congenital heart diseases in low birth weight infants are typically managed with maximal supportive therapy, palliative surgery, and definitive repair is delayed. This approach has been shown to have a high mortality. We report the outcome of complete repair of congenital heart defects in newborns less than 2500g.

Patients and Methods: Between 1987-2009, sixty seven infants (mean age 10.1 , median 8 , range 1-28, days) with mean weights of 1980 grams (median 2000g, range 900-2500g), underwent complete surgical repair of their congenital heart defects . Newborns with (isolated patent ductus arteriosus were excluded from this study. Modification of techniques of neonatal cardiopulmonary bypass were used.

Results: Survival rate was 69.17%, higher than those previously reported. No patient had evidence of postbypass intracranial hemorrhage. At a median follow-up of 56.8 ± 3.7 months, there were 2 late deaths, and 4 patients underwent a total of 5 surgical and catheter reinterventions. There was no evidence of neurological sequelae attributable to surgery.

Conclusions: Complete repair of both simple and complex congenital heart lesions can be performed successfully in neonates less than 2500g with good early and medium-term results.

ROTATION OF THE TRUNCUS ARTERIOSUS – ESTABLISHED SURGICAL PROCEDURE

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Background: Rotation of the truncus arteriosus enables the native pulmonary valve to be preserved during correction of transposition of the great arteries (TGA) with ventricular septal defect (VSD) and left ventricular outflow tract (LVOT) obstruction.

Patients and Methods: In a retrospective analysis we studied eight patients who have undergone surgery with rotation of the truncus arteriosus since 2006, with age at operation of 5-40 months and weight of 5-20 kg. In all patients the base of the heart with the great vessels was resected, rotated by 180° and then reimplanted, so that the aortic valve was positioned above the LVOT. The LVOT obstruction was relieved by resection of the muscular conus, the VSD was closed and the coronary arteries were reimplanted. In reconstructing the right ventricular outflow tract either the native pulmonary valve was preserved (n = 3) or a monocusp was used (n = 39). The perfusion time was 217-298 min and the aortic clamp time 139-239 min.

Results: All patients were extubated within 48 h and discharged home within 10 days. So far no reoperation has been necessary. Left and right ventricular function remained normal (ejection fraction >60%). There was no aortic valve incompetence or residual LVOT obstruction. One patient had mild pulmonary valve incompetence. On patient developed AV block grade III following extensive conus resection and received pacemaker implantation. All other patients showed sinus rhythm.

Conclusion: Rotation of the truncus arteriosus is a safe surgical method of anatomical correction of TGA with VSD and LVOT obstruction that can be performed with very low morbidity rates. In all children studied, the growth potential of the pulmonary valve was preserved.

AORTIC ARCH RECONSTRUCTION USING SELECTIVE CEREBRAL PERFUSION WITHOUT CIRCULATORY ARREST IN NEONATES AND INFANTS

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Objective: Deep hypothermic circulatory arrest in neonates prolongs myocardial ischemia and might induce cerebral and myocardial dysfunction. Selective cerebral perfusion might eliminate these potential side effects

Methods: From November 2009 to April 2010, one neonate and four infants underwent one stage repair using selective cerebral perfusion with innominate artery cannulation. The neonate was 30 day old and the mean age of the infant group was 10.75 months. The arch anomaly was an interruption in four and a coarctation with hypoplasia of the arch in one (neonate). In the infant group, the associated anomalies were perimembranous VSD (1), apical muscular VSD (2) and aorto-pulmonary window with RPA arising from the aorta (1). The neonate had a Taussig Bing anomaly. The innominate artery flow rate at deep hypothermia was regulated to about 30 to 40 mL/kg/min during cerebral perfusion.

Results: The mean regional perfusion time was 44 minutes. There was no operative mortality. Post operative 2D echocardiography confirmed normal cardiac function and unobstructed arch repair in all the patients. There was no neurological complication in any patient.

Conclusions: One stage total arch repair using selective cerebral perfusion is an excellent method that may minimize neurologic and myocardial complications without mortality. The major advantage of the technique is the feasibility to perform a wide end to side anastomosis of the descending aorta to the ascending aorta.

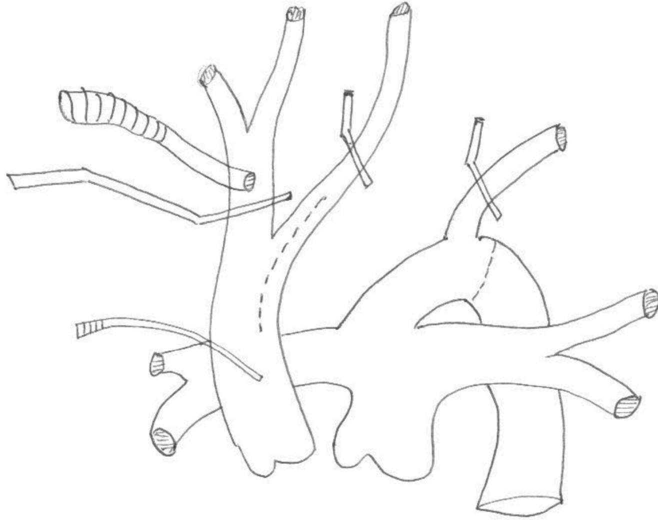

Figure: Shows the arterial cannula at the base of the innominate artery. The cross clamp is applied proximal to the cannula. The incision in the ascending aorta is depicted.

CLOSURE OF VENTRICULAR SEPTAL DEFECT, CONTINUOUS VERSUS CONVENTIONAL CLOSURE, COMPARATIVE STUDY

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The purpose of this study is to investigate the effect of continuous suture technique versus traditional interrupted technique for ventricular septal defect (VSD) closure, in pediatric patients.

Methods: Eighty children (with mean age of 32.85 months in group one and 26.42 months in group 2) were operated for VSD closure between January 2006 and January 2010.Divided into two groups forty patient each. Interrupted suture technique in group one and continuous suture technique in group 2,

Aortic cross clamp time, cardiopulmonary bypass time, inotropic usage, heart block, residual VSD, ventilation time, ICU stay, hospital stay and hospital cost, were studied.

Results: Differences in mean aortic cross clamp time (58.75-+5.2 to 45.57-+23.08) with significant, P = .001, and mean cardiopulmonary bypass times group 1 (86.60-+6.22) than in group 2 (73-+32.5) with significant P = .016. Intensive care stay was longer in conventional group (5.90-+1.29) than continuous group (4.6-+3.5) with significant P = .034. Hospital stay was longer in conventional group (23.47-_4.06) than in group 2 (9.12-+4.12) with significant P = .001. Hospital cost was higher in group one than group 2 with highly significant P = .00 statistical significance, need of inotropic support to was higher in group 1than group 2 with significant P = .001. These translate into clinical benefits such as reduced ventilation time, reduced ICU and in hospital stay. Incidence of postoperative bleeding and need for blood and blood products, inotropic usage show high statistically significant difference P =0.001.There is a considerable saving per patient in the cost of the sutures.

Conclusions: Continuous suture technique for closure of ventricular septal defect is safe and easy, with short ischemic time, pump time, short hospital stay, ICU stay, and total hospital cost.

Keywords: VSD- continuous suture

PARTIAL STERNOTOMY FOR REPAIR OF CONGENITAL HEART DEFECTS

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Background: We describe our experience with the use of partial sternotomy for the repair of simple congenital heart defects.

Materials: A series of 8 children with ages ranging from 6 months to 10 years (weighing 5kg to 22 kg) underwent repair of simple congenital heart defects (VSD-6, ASD-2) through a partial sternotomy. The total procedure time ranged from 75 to 122 min and the CPB time ranged from 36 to 64 min. All patients spent less than 6 hours on the ventilator and less than 24 hours in the ICU. All patients made an uneventful recovery and were discharged home between the third and sixth post operative days.

Conclusions: Partial sternotomy is feasible and safe for the repair of simple congenital heart defects. The advantages are mainly cosmetic but not at the cost of compromising exposure and without the need for any special equipment.

SURGICAL TREATMENT OF CONGENITAL HEART DISEASES COMBINED WITH TACHYARRHYTHMIAS

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Objective: to evaluate the efficacy of surgical correction of congenital heart diseases (CHD) combined with tachyarrhythmias (TA).

Methods: 277 patients with CHD combined with TA at the mean age of 22.9 ± 12.8 years old were operated in 25 years period of time. All patients underwent surgical correction of CHD (septum defects, Ebstein's anomaly, pulmonary veins anomalous drainage, atrioventricular canal) and TA (Wolff-Parkinson-White syndrome, ectopic supraventricular and ventricular arrhythmias, atrial fibrillation, nodal tachycardias). Routine examination, electrophysiological investigation and angiography were undertaken. For surgical elimination of TA in patients with CHD were used the same techniques as for the removal of isolated cardiac arrhythmias: cryoablation, Sealy operation, surgical isolation, epicardial electrodestruction, laser isolation, radiofrequency catheter ablation.

Results: Hospital mortality was 3.7%. In early postoperative period positive results were obtained in 85.7% of patients, in long-term follow-up - in 70.5% patients.

Conclusions: Based on the analysis of short and long-term follow-up results, it can be assumed that simultaneous surgical correction of CHD and TA is efficient management tactics of combined pathology, which substantially prolongs patients' lives and improves quality of life.

PULMONARY VALVE PRESERVATION IN TETRALOGY OF FALLOT WITH A MILDLY HYPOPLASTIC ANNULUS-SHOULD WE DO IT?

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Background: The decision to preserve the pulmonary valve during intracardiac repair of Tetralogy of Fallot [TOF] is traditionally based on the intra-operative measurement of pulmonary annulus by a Hegar dilator as per Rowlatt's table. We sought to evaluate if there can be flexibility in not using a transannular patch repair in Indian population with mildly hypoplastic pulmonary annulus.

Methods: Over a two year period 20 cases of TOF with a pre-operative diagnosis of mildly hypoplastic pulmonary annulus ($Z < 0$ but ≥ -4) and who at surgery, after pulmonary valvotomy accepted a maximum Hegar dilator of one size less than the recommended minimum (group I), were treated with valve sparing procedure and prospectively compared with 23 similar cases, in whom an elective trans-annular incision was used (group II).

Results: 5 cases had to be converted from a valve sparing repair to a trans-annular one, because of unacceptably high right ventricular pressures or hemodynamic instability. The immediate post-operative mean right ventricular outflow tract (RVOT) gradients were significantly higher in group I compared to group II. Early morbidity including intensive care unit (ICU) stay and incidence of right ventricular diastolic dysfunction was significantly increased in group I. There was no difference in mid term survival as well as in the last estimated mean right ventricular pressures in the two groups.

Conclusion: Patients of TOF with a mildly hypoplastic pulmonary annulus may not be managed with a pulmonary valve sparing approach. We believe in such patients a lesser risk lies in inserting a trans-annular patch.

SINGLE STAGE OR DOUBLE STAGE REPAIR FOR UNIVENTRICULAR HEART – OUR EXPERIENCE

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Background: Definitive palliation for complex cardiac anomalies with a functional single ventricle usually involves different modifications of Fontan operation/ total cavopulmonary connection (TCPC). However, whether it should be done as one-stage procedure or two-stage procedure with initial bidirectional Glenn shunt remains an area of debate though many recent studies have shown benefit of two stage procedure particularly in high risk cases.

Objective: This retrospective study has been undertaken to compare the operative outcome and morbidity following one stage TCPC with that of two stage TCPC with preliminary BDG in our setup.

Material and Methods: We retrospectively reviewed the clinical records of all the patients of single ventricle physiology who underwent cavopulmonary connections (TCPC) at our institution during the period of January 2001 to December 2009. 15 patients (9 male and 6 female) underwent single stage TCPC. 31 patients underwent initial bidirectional Glenn procedure (BDG) procedure of which 24 patients (14 male and 10 female) underwent completion TCPC 6 months to 26 months later (two-stage TCPC group). For all the patients in the two study groups various peri-operative parameters were analysed including cardiopulmonary bypass duration, ventilation time, ICU stay, hospital stay, postoperative pleural drainage and other complications rate, in-hospital mortality and TCPC takedown.

Results: Overall mortality in two-stage TCPC is lower than one-stage TCPC (4.2% in two-stage TP versus 13.3% in one-stage TCPC). There is no mortality with initial BDG in two-stage TCPC. TCPC has to be taken down in 2 patients in one-stage TCPC. In two-stage TCPC completion TCPC could not be carried out in 5 patients due to high pulmonary artery pressure and small pulmonary arteries. Others postoperative outcomes are comparable in both groups.

Conclusion: Two-stage TCPC with intervening bidirectional Glenn shunt can offer a higher probability to proceed successfully to complete palliation in patients with single ventricle.

Staging theTCPC also lowers the postoperative mortality in the present study.

USE OF POLYTETRAFLUOROETHYLENE NEOCHORDAE IN REPAIR OF DYSPLASTIC TRICUSPID VALVES

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Use of the extended polytetrafluoroethylene neochordae (ePTFE) is an established modality in the repair of mitral valve. The most common congenital malformations involving the tricuspid valve are Ebstein's anomaly and tricuspid valve dysplasia. There are only a few isolated case reports of the use of ePTFE in the management of congenital tricuspid anomalies. We are presenting here 2 cases of congenital tricuspid dysplasia where ePTFE was successfully used as neochordae in the correction of tricuspid pathology. Both the cases had severe low pressure tricuspid regurgitation with absence of chordal attachment to the anterior leaflet. 4-0 PTFE was used for reconstruction of neochordae. One end of the pledgetted suture was fixed to the free wall of the right ventricle and the other end was passed through the free margin of the anterior leaflet. The length was assessed by floating the leaflets to apposition by saline insufflations of right ventricle. Two sets of chordae were used to distribute the stress over larger surface area. Both the patients had good early and medium term results.

21st October 2010 Hall 3-Session 2-Pediatric Cardiac Surgery -RVOT

10 YEARS OF RVOT-RECONSTRUCTION IN A SINGLE CENTRE

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Objective: Various valved and non-valved substitutes are available for RVOT (right ventricular outflow tract) reconstruction in primary RVOT- pathology and during the Ross- procedure in congenital heart disease. Operative results and midterm outcome are reported for a single centre within the last 10 years.

Methods: Between 2000 and 2010 outcome for 105 patients who underwent RVOT-reconstruction were analysed. Patient characteristics, operative and hemodynamic results are reported and compared relating to the different substitutes used.

Results: 105 patients with a median age of 7years and 4months (range 5days to 22y3m) underwent RVOT-reconstruction during 139 operations. Diagnosis was primary RVOT- pathology in 83 patients: TOF 51, TOF/PA 10, Absent pulmonary valve syndrome 4, Truncus arteriosus communis 5, DORV/PS 4, Taussig-Bing 4, PS 2, others 3 and Ross-Procedure for Aortic valve disease in 22 patients. 64% were reoperations.

Substitutes used to reconstruct the RVOT were transannular patches in 26 patients (19%), a monocusp patch in 1 (0.7%), Homograft in 21 (15%), stentless valves in 23(18%) and decellularized xenografts in 67 (49%). Operative mortality was 5.0%, there was no late mortality. 35.9% had RVOT- Reoperation within the follow-up period (TA-Patch 41.2%, Homograft 31.6%, Xenograft 29.4%, Matrix P 53.1% and MatrixPplus 11.1%). Median time interval for Redo was 29 months (TA-Patch 21 months, Homograft 75 months, Xenograft 40 months, MatrixP 18 months and MatrixPplus 15 months).

Conclusion: There are different options to reconstruct the RVOT yielding good results and low complication rates, although reoperations during childhood are common.

RESULTS OF PEDIATRIC RVOT RECONSTRUCTION WITH DECELLULARIZED PORCINE PULMONARY VALVES

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Charité University Hospital, Berlin

Objectives: Decellularized xenogenic pulmonary valves have been introduced for RVOT reconstruction in congenital heart disease. 3 year results from 3 institutions are analysed.

Methods: From January 2006 to September 2008 69 patients (pts) 4.1 ± 3.3 years of age (range 9 days - 59 years) underwent RVOT-reconstruction with Matrix P or Matrix P plus decellularized heart valves. 35 pts suffered from TOF, 16 aortic stenosis requiring Ross or Ross Konno procedures, 10 pts had complex TGA requiring Rastelli repair, 4 pts truncus, 2 pts HLHS, 2 pts DORV, 1 pt had pulmonary atresia and intact ventricular septum, 1 pt absent pulmonary valve syndrome. 19 operations were exchanges of degenerated RVOT valves.

Results: Valve sizes ranged from 14 - 28 mm. 4 patients died up to 3 months after the operation from non valve related causes. During follow up no patient died. Actuarial 1, 2 and 3 year survival is 94%. Reoperation became necessary in 2 patients and catheter intervention due to pulmonary branch stenosis in 2 more patients. Freedom from reoperation is 97% at 1 year and 95% at 3 years. CT-scans showed no evidence of calcification and echocardiography gave normal findings in 77% and trivial to mild pulmonary stenosis or regurgitation in 23%.

Conclusions: The tissue engineered decellularized Matrix P / Matrix P plus conduit represents a viable alternative for RVOT reconstruction in patients with congenital heart disease. Short term results were favourable as compared to other available implants.

INTERMEDIATE FOLLOW-UP OF A COMPOSITE STENTLESS BOVINE VALVED CONDUIT OF BOVINE PERICARDIUM AND VALVE FROM GLISSON'S CAPSULE OF LIVER IN THE PULMONARY CIRCULATION FOR TREATMENT COMPLEX CONGENITAL HEART MALFORMATIONS

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Background: In the pediatric population, glutaraldehyde-preserved bovine pericardium conduit containing a stentless bovine valve from Glisson's capsule of liver has been proposed as an alternative to homografts and autopericardial conduits for right ventricular outflow tract reconstruction in our center.

Methods: Between June 2001 and March 2010, a total of 75 patients, 32 with truncus arteriosus, 23 with pulmonary atresia with ventricular septal defect, and 20 with miscellaneous defects, received this conduit. Median age at implantation was 12.6 months (range, 30 days to 11 years), and 16 patients (21.3%) were less than 3 months old. Clinical outcome, echocardiographic data, and pathologic analysis were recorded. End points for conduit failure were conduit replacement or dilation. A mean follow-up of 28.7 ± 12.9 months (range, 2 to 60 months) was available for 53 survivors.

Results: Procedure for conduit obstruction was required in 21(28%) patients. The most common procedure was operation, and all but 5 patients had an unsuccessful balloon angioplasty before reoperation. Actuarial freedom from conduit dilation or reoperation was 92.1% (95% confidence limits, 83% to 99%), 78.3% (95% confidence limits, 71% to 90%), 73.5% (95% confidence limits, 36% to 78%), and 58.1% (95% confidence limits, 29% to 71%) at 1, 2, 3, and 4 postoperative years, respectively. Univariate analysis identified small conduit size as a risk factor for conduit obstruction.

Conclusions: Although this new conduit was not free from progressive obstruction, our clinical results (easy to work and good valvular function) and the availability in small sizes encouraged us to use it as an alternative to small-size homografts when those were not available.

VALVED AUTOPERICARDIAL CONDUIT REPAIR OF THE COMPLEX CONGENITAL HEART DEFECTS (CONOTRUNCUS MALFORMATIONS) IN EARLY INFANCY

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Background: Valved autopericardial conduit repair in neonates and young infants creates a physiologically normal biventricular circulation.

Methods: Retrospective chart review was used for 34 patients operated on between 1994 and 2001 (mean age 37 ± 28 days, mean weight 3.9 ± 0.9 kg) undergoing autopericardial valved conduit repair in the first 3 months of life. Cases were divided into simple and complex, e.g. absent pulmonary valve syndrome and pulmonary trunk atresia. Mean autopericardial size was 10.7 ± 2.9 mm.

Results: Early mortality was 8.1% (simple) and 18,7% (complex). Mean hospital stay was 13.1 ± 10.4 days. Mean follow-up was 36 ± 12 months. Two (5.9%) patients underwent conduit replacement. Median time to reoperation was 6.4 ± 2.1 years. Mean size of replacement autopericardial conduit was 18.2 ± 4.8 mm. There were no deaths at reoperation. Mean hospital stay at conduit change was 9.4 ± 6.2 days. Probability of survival at 5 years is 94.1%.

Conclusions: Biventricular repair employing a conduit can be performed safely in noncomplex anomalies in the first 3 months of life. Time interval until repeat surgery is relatively not short but equal or greater than that with most palliative procedures.

RIGHT VENTRICULAR OUTFLOW TRACT RECONSTRUCTION WITH AN ALLOGRAFT CONDUIT FOR TREATMENT COMPLEX CONGENITAL HEART DEFECTS IN INFANTS.

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Background: Allograft conduits are used for reconstruction of the right ventricular outflow tract in patients aged less than 3 years, with congenital heart defects (cono-truncus malformations). A retrospective evaluation of our experience with the use of allograft conduits for reconstruction of the right ventricular outflow tract was conducted.

Methods: Between August 1987 and March 1996, 36 allografts (20 pulmonary, 16 aortic) were implanted in 31 patients for reconstruction of the right ventricular outflow tract. Main diagnostic groups were truncus arteriosus, (n = 11, 30.6%), tetralogy of Fallot (n = 5, 13.9%), and pulmonary atresia with ventricular septal defect (n = 9, 25%), double outlet right ventricle (n = 4, 11.1%), and transposition great arteries with ventricular septal defect and stenosis pulmonary artery (n = 7, 19.4%). Kaplan-Meier analyses were done for survival, conduit-related reoperation, and conduit-related events. In addition, Cox regression analysis was used for evaluation of potential risk factors.

Results: Mean age at operation was 22 ± 13 months (range, 30 days to 36 months). Mean follow-up was 4.5 ± 1.7 years (range, 15 days to 15 years). Three patients (8.3%) died within 30 days after operation. Patient survival was 90% (95% confidence interval [CI], 84% to 95%) at 5 years and 83% (95% CI, 81% to 92%) at 8 years. Seven (19.4%) reoperations were required for allograft dysfunction in 11 patients; 5 allografts were replaced. Freedom from conduit-related reoperation was 90% (95% CI, 83% to 95) at 5 years and 82% (95% CI, 80% to 91%) at 8 years. Nine conduit-related events were reported (1 death, 5 reoperations, 2 balloon dilatations, and 1 endocarditis). Freedom from conduit-related events was 87% (95% CI, 84% to 93%) at 5 years after implantation, and 81% (95% CI, 77% to 90%) at 8 years. Risk factors for accelerated allograft failure were extra-anatomic position of the allograft (P = .03; hazard ratio, 9.6) and the use of an aortic allograft (P = .03; hazard ratio, 2.7).

Conclusions: Right ventricular outflow tract reconstruction with an allograft conduit has good medium-term results, although progression of allograft degeneration is noted. Aortic allografts should preferably not be used for reconstruction of the right ventricular outflow tract for infants.

RIGHT VENTRICULAR OUTFLOW TRACT RECONSTRUCTION WITH AN ALLOGRAFT CONDUIT IN CONO-TRUNCUS MALFORMATIONS: RISK FACTORS FOR ALLOGRAFT DYSFUNCTION AND FAILURE

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Background: Allograft conduits (AC) are used for reconstruction of the right ventricular outflow tract (RVOT) in children with RVOT hypoplasia or atresia of pulmonary artery and for absent of pulmonary valve. A retrospective evaluation of our experience with use of AC for reconstruction of the RVOT of patients with cono-truncus malformations was conducted to determine the risk factors for failure.

Methods: Between January 1986 and December 1995, 47 non-Ross patients received AC (25 pulmonary and 22 aortic) for RVOT reconstruction. Median age at implantation was 28 months (mean 2.7 ± 1.1 years; range, 30 days to 43 months). There were 12 children (25.5%) less than 12 months of age. Endpoints were AC failure (valve explant, balloon dilatation), and AC dysfunction (AC stenosis > 40 mm Hg and AC insufficiency more than 2+). There were no device-related deaths.

Results: Overall patient survival was 63% at 15 years. Freedom from AC failure was 56% at 5 years and 41% at 15 years. Freedom from failure was worse in infants (43% and 31% at 5 and 15 years, respectively). Freedom from AC dysfunction was 34% at 5 years and 19% at 15 years. Freedom from dysfunction was worse in infants (18% and 12% at 5 and 15 years, respectively). Univariate analysis identified younger patient age, smaller AC size, diagnosis of truncus arteriosus, and the presence of aortic AC as

risk factors for AC dysfunction and failure. Multivariate analysis identified smaller AC size and the presence truncus arteriosus as risk factors for AC dysfunction and failure.

Conclusions: Right ventricular outflow tract reconstruction with an AC in non-Ross patients has poor performance at mid-term follow-up with AC dysfunction and failure of, respectively, 56% and 34% for the entire group and 75% and 54% in the infant group at 5 years. An alternate conduit for this application must be considered.

EARLY RESULTS OF BOVINE XENOPERICARDIAL VALVED CONDUIT VERSUS BICUSPID ALLOGRAFT FOR RIGHT VENTRICULAR OUTFLOW TRACT RECONSTRUCTION

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Background: Allograft conduits are preferable for right ventricular outflow tract reconstruction in children, but their limited availability remains a major concern. Recently, bovine xenopericardial valved has been introduced as a potential alternative conduit for treatment most of complex congenital heart defects in our center.

Methods: Early clinical and echocardiographic results of right ventricular outflow tract reconstruction were retrospectively compared between 63 children (mean age, 1.4 ± 1.3 years), receiving a bovine xenopericardial valved conduit and 17 patients (mean age, 2.5 ± 1.3 years) with a size-reduced pulmonary allograft.

Results: Clinical outcome was comparable with three early deaths in the allograft group and two in the xenopericardial valved conduit group. There were no conduit-related complications in either population. Early echocardiographic assessment showed only trivial to mild regurgitation in 4 (23.5%) allografts versus 5 (7.9%) xenopericardial valved conduits. The peak gradient across the right ventricular outflow tract conduit was comparable for both groups, although a larger number of patients, treated with a downsized homograft, had a small gradient at the distal junction with the pulmonary arteries (12 versus 6 patients). None of the patients had a gradient at the valvar level.

Conclusions: The xenopericardial valved conduit offers a promising substitute for right ventricular outflow tract reconstruction in infants and children, with an early hemodynamic performance that compares favorably with downsized, bicuspid allografts. Clinical advantages are greater shelf availability. However, durability must be determined, even though most of these children will require right ventricular outflow tract reoperation after outgrowing the conduit.

BOVINE XENOPERICARDIAL TRILEAFLETS VALVED CONDUIT FOR RIGHT VENTRICULAR OUTFLOW TRACT RECONSTRUCTION: EVALUATION OF RISK FACTORS FOR MID-TERM OUTCOME

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Background: The bovine xenopericardial tri-leaflets valved conduit is one option for right ventricular outflow tract reconstruction. We examined the effect of patient age, conduit size, hemodynamics, and cardiac malformation on early and mid-term outcome.

Methods: Fifty-two bovine xenopericardial tri-leaflets valved conduit implantations were performed over 9 years. Follow-up averaged 46 ± 18 months. Risk factor and adverse event analyses for graft dysfunction were performed by multivariate logistic regression and Kaplan-Meier analysis.

Results: There was no early mortality. Three late deaths (5,8%) occurred after 7, 11 and 19 months respectively. Early postoperative echocardiography revealed bovine xenopericardial tri-leaflets valved conduit regurgitation greater than 2+ in 3 patients, all of which had conduit dilatation, had received a 12-mm conduit, and had a right-ventricular-to-left ventricular pressure ratio greater than 0.6. Three additional patients had severe conduit incompetence develop at the 2-year follow-up. During follow-up, mean gradients increased from 14 to 27 mm Hg ($P = .03$) and stenosis at the proximal anastomosis occurred in 10% and distal anastomosis in 15.4% of patients. Percutaneous interventions were performed in 8 patients (15.4%). Conduit exchange was required in 5 patients (9.6%) after a mean of 23.7 ± 10.9 months for severe graft incompetence (2 patients) and progressive valvular stenosis (3 patients). Freedom from reoperation was 79.3% and 60.2% at 1 and 5 years for patients less than 1 year of age compared with 90.4% and 82.7% for patients older than 1 year of age ($P < .001$). Risk factors for reoperation were age less than 1 year, correction of truncus arteriosus, conduit size of 12 mm, and persistently elevated right-ventricular-to-left ventricular pressure ratio greater than 0.6 ($P = .001$ each).

Conclusions: Bovine xenopericardial trileaflets valved conduit implantation is associated with low reoperation and acceptable reintervention rate in patients older than 1 year of age. In infants with persistently elevated right ventricular pressure, reoperation rate was high and had to be compared with other established surgical options.

AUTOLOGOUS RECONSTRUCTION OF PULMONARY TRUNK AT REOPERATION AFTER EXTRACARDIAC CONDUIT REPAIR FOR CONGENITAL HEART DEFECTS

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Background: Between 1999 and 2002, Nine patients underwent reoperation for critical stenosis of extracardiac conduits.

Methods: Indication for extracardiac conduit repair was pulmonary truncal atresia in 6 (66.7%) patients and tetralogy of Fallot's with coronary anomaly including single left coronary artery and left anterior descending artery from right coronary artery in 3 (33.3%) patients. Age at reoperation ranged from 5 to 15 years (mean, 10.1 years). Preoperative systolic pressure ratio of right to left ventricles ranged from 0.89 to 1.08 (mean, 0.95), with the pressure gradient across the conduit ranging from 61 to 114 mm Hg (mean, 76.2 mm Hg). At reoperation, stenotic conduit was completely removed and central pulmonary artery was extensively mobilized. In 3 (30%) patients who had a relatively short distance (12 to 24 mm) between the pulmonary arterial stump and the right ventriculotomy incision, the distal pulmonary arterial stump was anastomosed directly to the cranial margin of the right ventriculotomy incision to serve as a floor made of autologous tissue by Makoto Ando's method. In 6 (60%) patients with a long distance, eg, more than 30 mm, right ventricular–pulmonary arterial continuity was restored with a tailored autologous pericardial tube.

Results: There were no early or late deaths. Postoperative catheterization study revealed a satisfactory reduction of right ventricular pressure with the systolic pressure ratio ranging from 0.41 to 0.54 (mean, 0.48) and the pressure gradient across the right ventricular outflow tract ranged within 17 mm Hg (mean, 9 mm Hg).

Conclusions: Restoration of right ventricular–pulmonary arterial continuity was successfully achieved by introducing the concept of autologous tissue repair even at reoperation instead of the insertion of new extracardiac conduit in patients with complex congenital heart malformations after extracardiac conduit repair.

EARLY RESULTS OF INDIGENOUS DECELLULARISED PORCINE XENOGRAFTS IN RVOT RECONSTRUCTION

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Objective: To study the results of indigenously prepared decellularised porcine xenografts in RVOT reconstruction. Four year results from 2006 is analysed.

Methods: The tissue is procured from Govt approved abattoirs, after dissection and a series of steps involving decellualarisation, cross linking, antithrombogenic and anticalcification treatment, the material is preserved for clinical use. Before clinical application the material was put through a series of validation process to ensure its safety for clinical use. A total of 86 patients had porcine pulmonary artery implantation for RV – Pulmonary artery conduit as a part of tetralogy repair (54), Rastelli procedure (13), Truncus arteriosus (7) repair , Ross procedure (10) and others (3). Age range (3m – 59 yrs)The size used ranged from 14 – 23 mm and the length ranged from 2 – 6 cm.

Results: There were 10 deaths (10%) in the early postoperative period (3months), due to non conduit related causes. 3 conduits required replacement , 1 for aneurysmal dilatation in truncus arteriosus, 1 for infective endocarditis (IE) (for TOF PA) and 1 for aneurysm + IE (Rastelli procedure). Acturial survival is 93% at 3 years. Freedom from reoperation due to conduit related causes is 95% at 3 years. Eighty percent of patients showed normally functioning conduit by echocardiographic evaluation, 20% showed mild to moderate regurgitation with conduit dilatation at follow-up.

Conclusion: Decellularised porince pulmonary artery are useful alternative for RVOT reconstruction. The problem encountered was mainly due to conduit dilatation when used in conditions having high pulmonary artery pressure, which we have tried to overcome using electrospun nanofibre coating the results of which are awaited. Long–term follow up would be necessary to see if these decellularised xenografts gets populated by native cells and undergoes active remodeling.

BOVINE PERICARDIUM FOR THE CORRECTION OF CONGENITAL HEART DESEASES, 20 YEARS EXPERIENCE.

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The patch of pericardium has been used usually as an alternative as part of the processing for different surgical procedures, among which congenital abnormalities are included.

Objective: The Objective of this study is to assess the use of bovine pericardium as part of the process of surgical treatment of different congenital heart diseases, in the national Institute of Cardiology "Ignacio Chavez" México.

Methods: We search in the historic file of the Institute to determine the use is revised to the one which was subjected more than 3000 awarded pericardium pieces to the department of Heart Surgery of the Institute Is determined the congenital heart disease in which was used and the surgical procedure, palliative or corrective of the same one even as the anatomical position in which was positioned.

Results: Were processed 3269 bovine pericardium pieces and they were destined and used in the department of Heart Surgery in the INC, this pericardium gets ready basically with glutaraldehyd, and a system of anticalcification and antimineralisation developed in the Department of Applied Biotechnique, these products developed have the approval of the Health secretariat of México (SSA) and they cover all requested requirements for the NOM. 2179 (67%) were set aside for 1392 surgeries with different diagnostics between complex congenital heart disease or not, the average years-old of the patients was 8,9 years and the range is from newborn until 68 years.

Of the total out of the 1392 procedures surgical the 49.7 corresponded to septal defects (Atrial septal defect, ventricular septal defect, atrioventricular septal defect), 12% to patients with Fallot, 7% total anomalous pulmonary venous connection.

With 4.8% patients with open sternum, double outlet right ventricle, DORV, Complete Transposition of the Great Arteries and

another. That represent between the 1 and 2% of the total. The index of calcification is low 1,1% above all found in procedures for pulmonary branch extension.

Conclusions: The patch of bovine pericardium is an useful tool for the repair of congenital heart diseases complex or not, characteristics of the fabric allow the surgeon an easy handling of the patch to be positioned in different anatomical regions without affecting its functionality nor the survival of the patient.

It is a sure alternative and the cost is smaller by contrast with other prosthetic materials' use.

Thanks to technological advances of the medicine and specifically of the heart surgery, procedures with greater degree of complexity have been done, most notably in patients with congenital heart disease.

21st October 2010 Hall 4- Thoracic & Esophagus

PRIMARY BONE TUMORS OF THE CHEST WALL

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Objective: Chest wall tumors are rare. Most chest wall resections are undertaken for tumor metastasis and local chest wall invasion of malignant tumors. Of the benign tumors chondromas, osteochondromas and fibrous dysplasias are the commonest. We present our experience to highlight some of their management challenges.

Methods: We retrospectively reviewed all consecutive patients who underwent surgery for benign, primary chest wall tumors between May 2009 and May 2010 in our unit.

Results: All patients presented with painless slow growing masses. Patient 3 presented with a recurrent swelling. All underwent core biopsy prior to surgery.

Patient	Age	Sex	Site	Procedure	Histology
1	30 y	F	Manubrium and clavicular head	Resection of manubrium and clavicular head; Reconstruction with inlay polypropylene mesh, wires and pectoral flap	Chondroma
2	27 y	M	Left 6th rib	Wide local excision of rib with tumour and direct closure	Osteochondroma
3	20y	M	Right 5, 6, 7 ribs	Wide local excision of ribs with tumor; reconstruction with polypropylene mesh and methyl methacrylate 'sandwich'	Osteochondroma

Patient 1 needed bilateral ligation of internal mammary arteries and bilateral intercostals tube drainage due to intraoperative damage to the internal mammary arteries and pleural apices. All three had a smooth postoperative recovery. The functional and cosmetic outcomes were excellent.

Conclusions: Preoperative tissue diagnosis is essential prior to undertaking surgery. An individualized approach with careful preoperative planning is the key to optimal reconstruction to ensure good results.

PRIMARY MIDDLE MEDIASTINAL LYMPHOMA MIMIC LUNG CANCER

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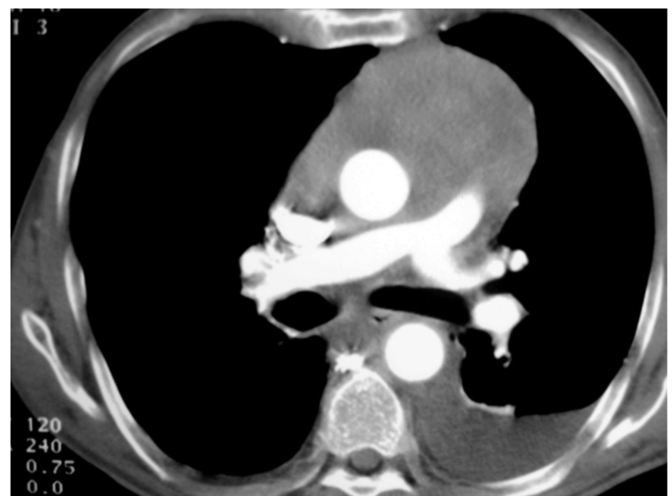
Objectives: Tumors of the middle mediastinum often impose great clinical challenges in terms of diagnosis and treatment. We report a case of primary middle mediastinal B lymphoma. The best way to approach and the collaboration of surgeon and pathologist are essential to correct diagnosis.

Methods: A 66-year-old male, heavy smoker was admitted in CCU with resting chest pain, progressive dyspnea and recent significant weight loss. Transthoracic and transesophageal echocardiography showed a large mass obliterated RV and LV out flow tract. Thoracic CT angiography confirmed a mass encased ascending aorta with involvement of superior pericardium with pressure effect on outflow of heart chamber with bilateral pleural effusion, more on the left. Thoracoscopy through left pleural cavity was revealed normal pleura with only superior pericardial mass without any extrapericardial extension. We decided to change approach and had open biopsy through limited left thoracotomy because of bulky mass around ascending aortic root and firm adherent of pericardium. Biopsy was taken through small transverse incision on pericardium.

Results: The initial report by pathologist was small cell tumor in favor of small cell lung cancer. Further laboratory work up was done for patient due to the solitary intrapericardial mass with no evidence of pleural pathology and hilar mass. Immunohistochemistry was positive for tumor markers LCA, KI67 and CD20. Other investigations for finding extrapericardial source were negative. Primary B cell lymphoma was the final diagnosis. The patient was discharged from CCU and was referred to oncology ward for complementary treatment.

Conclusion: Primary middle mediastinal lymphoma is a rare entity. It needs biopsy and complete work up and close cooperation between surgeon and pathologist to confirm diagnosis.



SCOPE OF CHEMOTHERAPY AS A NEOADJUVANT MODALITY FOR MANAGEMENT OF NON - SMALL CARCINOMA OF LUNG: A PROSPECTIVE STUDY FROM A CANCER BELT (KASHMIR)

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Background: Although surgical excision is the mainstay treatment for all variants of non- small carcinoma of Lung, irrespective of their biological behavior but neo- adjuvant chemotherapy has emerged as an important tool to improve the resectability of locally advanced non-small cell carcinoma and enhance the survival of these patients.

Objectives: The aims behind this study was to ascertain the disease progress in terms of reduction in loco- regional macroscopic disease, debulk the tumour and assess the resectibility and outcome.

Methods: Prospective, random, controlled trial including 100 patients, divided into 2 groups with 50 patients in

Group A receiving 2 cycles of induction chemotherapy , another 50 patients in Group B who were subjected to surgery directly without prior chemotherapy , after registration in Regional Cancer Center ,SKIMS and proper selection over a period of 3 years from Oct 2006 to Sept 2009. Tumour resolution and operability were assessed after chemotherapy before patients were subjected to surgery.

Results: Mean age of presentation was 47.63 years, with male: female ratio of 5.2:1 in study group. 16% of patients in study group had complete pathological response, 64% had partial response and another 16% had static tumour size. Pulmonary functions improved in 32% patients who received induction chemotherapy. Resectability rate was 85% in study group in comparision to 64% in control group. Lobectomy was the commonest surgical procedure done overall. 20 % (8) and 28% (14) of patients in study and control group, respectively died till last follow up of 48 months. Thus, survival was better in patients who received induction chemotherapy, though statistically not significant (*P* value > .05).

Conclusion: Neoadjuvant chemotherapy is well tolerated, improves the resectability by significantly downstaging the tumours and improves the survival of patients with locally advanced non-small carcinoma of lung.

THORACIC TUMORS IN CHILDHOOD AND ADOLESCENCE: LONG TERM RESULTS OF MULTIMODAL TREATMENT

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Objective: To review the treatment of 26 cases of chest wall and neurogenic tumors operated on two universities hospitals in the last 15 years.

Methods: Patients were submitted to multimodal protocol of treatment for neurogenic and for primitive neuro-ectodermic tumors (PNET) from 1995 -2009. Fourteen were male and twelve female. Age ranged from 3 to 17 years old. Patients were split in two groupes (PNET group = 13 and Neurogenic Group = 13). The most frequent symptom was chest pain with mass growing at lateral chest wall in cases of PNET. In this group the diagnosis was made in the majority by surgical biopsy. A panel of immunohistochemistry markers were positive in 09 of them. Pre-operative reduction chemotherapy with EVAI regimen (etoposide, vimblastin, adriamycin, iphosfamide) in all patients was administrated. In Neurogenic Group diagnosis was made by X-Ray findings and the majority of patients did not referred symptoms. Chest CT and trans thoracic needle biopsy were the most current diagnostic procedure. Pre-operative chemotherapy only in one patient of neuroblastoma and schwannoma was made.

Results: Complete remission of pleural effusion and tumor reduction in 8 cases (70%) were achieved in PNET. Surgical resection by thoracectomy and reconstruction in 9 patients were performed. Survival rate for 5 years and 14 years were respectively 77% and 66%. In Neurogenic Group the 5 and 10 years survival rate was 75%

Conclusion: Nowadays PNET have a good prognosis when multimodal treatment are used and mediastinal posterior mass had different prognosis according to histologycal neurogenic type.

Minor lung resections (wedge 3, segmentectomy 1, lobectomy 1) were required in 5 cases. Post-operative adjuvant chemotherapy was administrated by the same regimen in all the cases. Post-operative adjuvant radiotherapy was also performed in 2 cases due to limited margins of the resection with the vertebral foramen

CONGENITAL LOBAR EMPHYSEMA: 30 YEARS REVIEWED SERIES

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Objective: To review the cases of Congenital Lobar Emphysema (CLE) operated on two hospitals in the last 30 years.

Methods: Retrospective collected series of 20 cases of children with CLE. Patients were analyzed in terms of symptoms, physical examination, radiographic findings, diagnosis, surgical treatment, and post-operative follow up. Age ranged from 9 days to 4 years old. All cases presented symptoms at birth or in the first 3 months of life. In all cases chest X-ray suggested the diagnosis. In cases with mild respiratory distress, Chest CT were performed. One case with severe respiratory distress was misdiagnosed as tension pneumothorax and a chest tube inserted without success. Rigid bronchoscopy was only performed in cases with mild respiratory distress in order to investigate tracheobronchial abnormalities. Surgical approach was by lateral minimally sparing thoracotomies.

Results: Left upper lobe was the most affected followed by the middle lobe. Lobectomy was performed in 18 cases, bilobectomy in one and bilobectomy plus bronchogenic cyst resection was performed in one case. Post-operative complications were not observed. Post-operative follow up time was at least over 24 months (mean 60 months) and no late abnormalities were observed.

Conclusion: Regarding the surgical approach at first few days of life, minimally sparing thoracotomy at the auscultatory triangle was first reported. The overdistended lobe herniates spontaneously through the incision likes “treetop” becoming easier perform resections.

COMPARABLE OF SUTURE METHODS OF STUMP OF MAIN BRONCHUS: EXPERIENCE OF 20 YEARS

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Objective: The aim of study was to evaluate and compare the suture methods of stump of main bronchus, the cause of fistula and survival of patients according to stage and morphology of tumors.

Material and Methods: In the course 1990-2009 years 580 pneumonectomy was performed at Thoracic Surgery and Oncology Department of the Institute of Oncology Vilnius University: 327(53.3%) right pneumonectomy and 253 (43.6%) –left pneumonectomy. The suture methods of the stump of main bronchus were: to 190 (32.7%) patients (pts) of I Group the stump of bronchus was stapled with soviet construction apparatus UKL-40, UKL-60, UO-40, UO-60 to 220 (37.2%), 170 (29.3%) pts) of II Group with staplers TA-30, TA-40, Proximate RL plus -30,60, Linear stapler40.170((29.3%), pts of III Group the stump of bronchus was handsutured (3.0 PDS thread): 15 (8.8%) pts with Sweet method, 63(37%) pts- with Owehold method and 92 (54.1%) pts sutured with Goldstraw method.

Results: Bronchial fistula was detected till 10days after surgery to 7(3.7%) pts, in 10-30 days to 14 (7.3%) pts and after 30 days- 3 (1.6%) pts of I Group. In II Group: 3 (1.4%) pts, 6 (2.7.%), 0 pts accordingly. In III Group 4 (2.4%) pts, 7 (4.1%) pts, 3 (1.7%) pts accordingly. Bronchial fistula was detected to 7% pts whom lymphonodectomy was performed of one region, 13% pts, whom lymphonodectomy of two regions.

Conclusions:

1. 1. Result of comparing the suture methods of stump of bronchus was: bronchial fistula was detected to 24 (12.6%) pts of I group, to 9 (4.1%) pts of II group and 14 (8.2%) pts of III group.
2. 2. The main cause of formation of bronchial fistula was the number of lymph nodes, who
3. were clean during surgery: 7% cases was after lymphonodectomy from one region and 13% cases from two regions.
4. 3. 1-year and 5- years survival of pts with IIA stage of disease was 69.8%, survival of pts with IIB was 60.3% and 36.0% accordingly. One-year survival of pts with IIIA and IIIB stage of disease was 50.8% and 36.0% and 5-years-12.9% and 5.5%. No pts with IV stage of disease survived 5-years.

TRIPLE REINFORCEMENT OF THE BRONCHIAL STUMP: DECREASES CHANCES OF POST–RESECTION BRONCHOPLEURAL FISTULA

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Various methods are being practiced to prevent the bronchopleural fistula following anatomical lung resection, which is the life threatening complication. Pleural flaps are less vascular where as the intercostal muscle flap though vascular, does not provide strength to the repair. Authors developed a technique, in which pleural flaps are used to reinforce the repair while the intercostal muscle flap is used to cover the stump, which enhances its vascularity.

Step 1: The flaps of parietal pleura measuring 3 centimeters in length and 0.5 to 1 centimeter in width are developed from anterior (12 to 4 O'clock) and posterior (8 to 12 O'clock) part of hilum. Horizontal mattress sutures of non absorbable material are passed from the pleural flaps with bronchial stump in between, just below the bronchial clamp (Figure 1).

Step 2: Another flap of parietal pleura of similar measurements developed from 8 to 5 O'clock position. Bronchial stump is covered with the pleural flap and continuous running sutures are taken with fine, non-absorbable material like Polypropelene 4-0 (Figure 2).

Step 3: Now, the intercostal muscle flap pedicle which was harvested at the time of thoracotomy is buttressed over the nearly buried bronchial stump. It is fixed to the tissue around the stump with interrupted non- absorbable sutures (Figure 3).

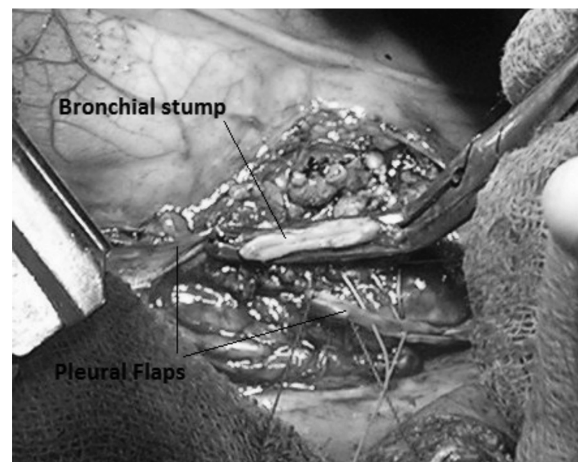

Figure 1. Horizontal mattress sutures passing through bronchial stump and pleural flaps.

Figure 2. Covering bronchial stump with pleural flap.

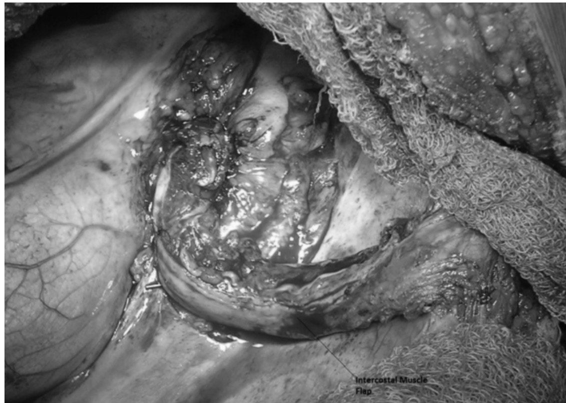

Figure 3. Butressing of intercostals muscle flap over the bronchial stump.

PREDICTION OF POST-OPERATIVE PULMONARY FUNCTION AFTER PULMONARY LOBECTOMY USING QUANTITATIVE CT VOLUMETRIC ANALYSIS DERIVED EQUATION

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Background: Preoperative pulmonary function test (prPFT) is an important part of pulmonary assessment prior to pulmonary lobectomy in order to predict the post-operative pulmonary reserve (poPFT) remaining after surgery. Current poPFT is calculated base on the number of pulmonary segments resected which has been shown to significantly under-estimate the measured poPFT. We aimed to derive a more accurate equation for the prediction of poPFT after lobectomy using CT lung volume.

Methods: Medical notes from 30 patients who have undergone pulmonary lobectomy between the years 2005-2009, identified from the Operation Theatre registry and Database, were retrieved and their current status recorded. Only patients who were still alive were included in our analysis. Measured prPFT and poPFT were recorded. Predicted poPFT termed qualitative poPFT, were calculated using the formula (Predicted poPFT = prPFT x (1-[Segments resected x 0.0526]). Quantitative CT volumetric analysis was performed to calculate the pre-operative and post-operative lung CT volumes for 10 patients. From these volumes, a new equation for predicting poPFT termed quantitative poPFT, was derived and compared with the measured actual poPFT and predicted qualitative poPFT.

Results: Of the 30 patients, 13 patients have died and 3 patients did not have prPFT performed. Thus only 14 patients were suitable for analysis. The mean age of these 14 patients (9 males: 5 females) were 63.6 (11.2) yrs. Nine cases underwent lobectomy for NSCLC while 2 were for TB. There were 6 cases of right upper lobectomy, 1 case of right lower lobectomy, 3 cases of left upper lobectomy and 4 cases of left lower lobectomy.

The mean actual prFEV1 and prFVC were 1.74 (0.5) L and 2.13 (0.78) L respectively. The mean actual poFEV1 and poFVC were 1.49 (0.4) L and 1.89 (0.5) L respectively. Predicted Qualitative poFEV1 and poFVC were 1.41 (0.45) L and 1.72 (0.68) L respectively, which correlated well with the actual poFEV1 (r = 0.88, $P < .001$) and actual poFVC (r = 0.92, $P < .001$).

The ratio of post-operative quantitative CT volume to pre-operative quantitative CT volume was 0.88 for right lobectomy and 0.87 for left lobectomy and the respective Quantitative poPFT equations were Quantitative poPFT=prPFT x 0.88 and Quantitative poPFT=prPFT x 0.87. Using these equations, the mean predicted Quantitative poFEV1 and poFVC were 1.55 (0.5) L and 1.95 (0.77) L respectively. This correlated much better with mean actual poFEV1 (r=0.96, $P < .001$) mean actual poFVC (r = 0.98, $P < .001$).

Conclusions: Quantitative poPFT prediction using quantitative CT lung volumetric analysis derived equations predicts the poPFT much more accurately than the qualitative methods using number of segments excised.

UNIPORTAL VATS: EXPERIENCE FROM A SINGLE CENTRE.

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Objectives: Video-Assisted Thoracoscopic Surgery is well adopted in Thoracic centres across the world as the new gold standard in treatment for many thoracic diseases. Uniportal VATS is an emerging and evolving new technique. We present our single-centre uniportal VATS experience.

Methods: Between April 2009 and September 2009, 37 patients (mean age = 45.1yr, 73% male) underwent operations by single-port VATS access at our centre. Camera, instruments and stapler guns were inserted through a single 2.5 cm incision. The procedures included 19 (51.4%) operations for treatment of pneumothoraces/airleaks, 8 (21.6%) wedge resections for metastasis, 7 (18.9%) lung biopsies for interstitial lung disease, 2 (5.4%) empyema drainages /debridements and 1 (2.7%) pleuropericardial window associated with drainage of pericardial effusion.

Results: There were no conversions to more invasive techniques. Mean operative time was 51.8±14.7 mins. Blood loss was minimal and transfusion was not required in any patient. 36 patients (97%) were sent to level-1 care (ward) immediately after the operation but 1 patient required level-2 (HDU) stay. Postoperative need for analgesics was minimal. Complications included haemothorax and wound dehiscence in 1 patient (2.7%) each. One patient required VATS re-intervention (LVRS) for prolonged air leak and one patient was discharged with a flutter-bag device. Mean and median postoperative lengths of hospital stay were 3.27 ± 2.75 and 2 days respectively. On follow-up, all biopsied patients had tissue diagnosis and all metastasectomy specimen had clear margins. None of the patients treated for pneumothorax had any recurrence.

Conclusion: Uniportal VATS is safe, quick, reproducible and efficient for selective thoracic procedures.

EFFECTIVENESS OF VATS DECORTICATION AND INTRAPLEURAL ANTIBIOTIC WASHOUT IN THE MANAGEMENT OF EMPYEMA THORACIS

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Objectives: To evaluate the effectiveness of early VATS decortication and intrapleural antibiotic washout for empyema thoracis in terms of clinical, microbiological, radiological and functional improvement.

Methods: Between September 2008 and May 2010, 23 consecutive patients (Median age = 44yrs; Range 17–77yrs; 19 males) underwent decortication for empyema thoracis at our institution. Early VATS decortication followed by a period of cyclical intrapleural antibiotic washout was instituted. Post-operative intrapleural antibiotic was guided by microbiological cultures. Intrapleural washout was continued until three consecutive pleural fluid cultures were negative. Post-operative clinical, microbiological, radiological outcomes were recorded. Functional improvements were assessed at follow up done six weeks post-discharge.

Results: The VATS approach was used in 23 patients with Empyema. Three (13%) patients required conversion to thoracotomy. Mean operative time was 138 ± 13 mins and median intraoperative blood loss was 200 mls (range: 30-2000 mls). There was 1 (4.3%) in-hospital death. Air leak persisted for a mean 6.8 ± 2.1 days. Post-operative negative bacteriological samples were obtained in 21 (95.4%) patients ($P = .02$). The mean drain dwell time was 9.5 ± 2.1 days and the length of hospital stay was 10.9 ± 1.9 days. Three patients (13%) required VATS re-intervention before discharge. Mean lung expansion improved from 58.6 ± 3.4% to 92.1 ± 2.7% ($P < .0001$). The mean follow up was 41.7 ± 6 days. At follow-up, the median WHO performance status was 0.5 (0-3; $P = .004$), significantly better compared to pre-treatment.

Conclusions: VATS decortication achieved significant post-operative radiologic and functional improvements in patients. Addition of intrapleural antibiotic washout leads to effective control of sepsis and early removal of chest drains.

VATS SYSTEMATIC MEDIASTINAL NODAL DISSECTION AND STAGE MIGRATION: IMPACT ON CLINICAL PATHWAY

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Objective: Stage migration could be a source of misleading statistics for survival in lung cancer. This study investigates the role of Systematic Mediastinal nodal dissection (SND) as a staging tool for lung cancer, compared to preoperative staging by conventional PET/CT.

Methods: Between 2007 and 2009 patients with primary NSCLC proceeded to SND during VATS resection. All patients were staged by CT/PET preoperatively. On the right side, stations 2-4, 7, 8, 9, 10 and 11 and on the left stations 4-6, 7, 8, 9, 10 and 11 were dissected. Pre and postoperative staging, stage migration and impact on clinical pathway were noted.

Results: 64 consecutive patients were operated by VATS, 62 lobectomies, 1 bilobectomy and 1 pneumonectomy. SND resulted in 12 stage migrations (18.8%), upstaged 7 patients (10.9%), and down staged 5 patients (7.8%). One PET negative patient had multilevel N2 positive nodes (#2-4 & #7) postoperatively. All upstaged patients had adenocarcinoma (100%), whereas 4/5 (80%) of downstaged patients had squamous cell carcinoma.

Conclusions: SND remains the best tool to stage lung cancer, decide on adjuvant chemotherapy, and reduce the chance of stage migration. PET sensitivity is reduced in adenocarcinoma and might result in significant stage migration.

IS THORACOSCOPIC LOBECTOMY SAFE IN OCTOGENARIANS?

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Objective: Advanced age has been a deterrent to resection of lung cancer. In this study we investigate the safety of first time VATS lobectomy in patients ≥80 years of age.

Methods: Patients were accepted for lobectomy if the CT/PET was suggestive of T1-3, N0-1 and M0 lesion. Age was not a criterion for exclusion. Data was collected prospectively, and comparison was made between 2 groups (A) < 80 years of age and (B) ≥ 80 years, with emphasis on safety.

Results: Between April 2005 and December 2009, 159 consecutive patients were considered for VATS major resection, 141 Group (A) and 18 group (B). Octogenarians undergoing major VATS resection had a higher incidence of admission to ITU/HDU for cardiopulmonary support, but otherwise were no different to younger age groups with regards to rate of conversion, hospital stay, morbidity and mortality.

Conclusions: Advanced age should not be a criterion to deny the elderly curative VATS resection, if not associated with other co-morbid factors.

VATS IN THE SURGICAL TREATMENT OF PULMONARY HYDATID CYSTS

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Objectives: To estimate the role of VATS in the surgical treatment of pulmonary hydatidosis.

Material and Methods: This study is a retrospective evaluation of 169 patients diagnosed with hydatid lung cyst (HLC) treated by VATS between January 1996 and December 2007. These represent 10.5% of all HLC treated in the same period (1588 cases).

Diagnosis was mainly based on chest X-ray exam. In 62.7% of cases additionally thoracic ultrasound exam was performed that also confirmed the evolution stage of the HLC. In 47% of cases CT scan was done, 42% of cases required fibroscopy and 38% of cases undertook ELISA test since the diagnosis was dubious.

Results: All of these identified 251 cysts, that needed 212 surgical procedures of which 195 VATS (26 bilateral, 25 simultaneous) and 17 contralateral thoracotomy (13 simultaneous) Conversion to thoracotomy was necessary in 12 cases (5.5%).

The rate of complication was 6%. Operative and postoperative mortality was nil.

Conclusions: The potential advantages of VATS include less postoperative pain, earlier mobilization, lower overall morbidity, a shortened hospital stay with reduced costs, a cosmetic incision, and for some procedures, a reduced operating time. VATS is a promising method in the treatment of lung hydatidosis and early diagnosis increases the possibility of using it.

SURGICAL TREATMENT OF PULMONARY HYDATID CYST: A REPORT OF 2794 OPERATED CASES

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Objectives: Hydatidosis is a frequent disease in Tunisia with a population incidence rate of 15/100 000. Once diagnosed surgery is the unique treatment. This report summarizes our experience in surgery of hydatid cyst of the lung.

Methods: From January 1984 to December 2007, 2794 consecutive patients underwent surgery for pulmonary hydatid cyst.

There were 1391 males (49,8%) and 1401 females, ranging from 1 to 86 years of age, with a mean of 27 years.

Single cysts were treated in 242 3patients (86.7%), the cysts were ruptured in 1244 cases (53.5%), there were several cysts in a single lung in 371 patients (13.3%) and both lungs were concerned in 263 patients (9,4%).

Results: Therapy consisted in parenchyma-saving surgery in 2261 patients (81%) (cystectomy or pericystectomy).

Since 1996 we have introduced thoracoscopic surgery and 169 patients among a total of 1588 (10.6%) has been proposed for video-assisted approach.

Pulmonary resections were completed 533 times (19%) consisting in 104 segmentectomies, 425 lobectomies and 4 pneumonectomies.

Post operative course was uneventful in 2305 patients (82.5%), there were 20 hospital deaths i.e. a mortality rate of 0.7%.

Conclusions: Surgery for hydatic cyst must be conservative with regard to the parenchyma as long as it often involves young patients.

Pulmonary resections must be indicated only in cases of lobar or segmental destroyed parenchyma. Video-assisted surgery can be proposed in selected cases with good results.

PULMONARY HYDATID DISEASE: IS CAPITONNAGE MANDATORY FOLLOWING CYSTOTOMY?

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Pulmonary hydatid disease still remains an important healthcare problem. Conservative operative interventions including cystotomy or cystotomy with capitonnage are the two commonly used techniques. There is still significant controversy, however, over selection of these two procedures. In this retrospective analysis of 66 patients with hydatid disease, we employed three types of interventions, Group A, (n ¼ 5) cystotomy alone with closure of bronchial openings; Group B, (n ¼ 54) cystotomy with capitonnage and Group C, (n ¼ 7) lobectomy over a period of seven years in our patients and compared their postoperative outcome in terms of morbidity and mortality. Our data show that cystotomy with capitonnage is associated with low rates of postoperative prolonged air leak, bronchopleural fistula formation, empyema formation [mean complication rate 0.12% (Mean 0.08; 0.151e95% CI)] as compared to cystotomy alone with closure of bronchial openings [mean complication rate 44% (Mean 2.20; 3.18e95% CI)]. The lobectomy group was excluded from the comparison, as this approach is quite different from the cystostomy based enucleation techniques. We conclude that capitonnage with cystotomy may be a preferred procedure due to its lower rate of complications.

Keywords: Pulmonary hydatid disease, Capitonnage, Cystotomy

MINIMALLY INVASIVE SINGLE STAGE APPROACH FOR MULTI-SYSTEMIC ABDOMINO-THORACIC HYDATIDOSIS. A VIABLE ALTERNATIVE

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Introduction: Conventionally abdomino-thoracic hydatid disease has been treated by multi- staged standard posterolateral thoracotomy and laparotomy. Though lower partial sternotomy has been recommended as a minimally invasive approach for left anterior descending coronary artery bypass grafting in the past, we have utilised this approach for managing mult-isystemic abdomininal-thoracic hydatid disease.

Methods: Prospectively from July, 2007 to Sept, 2009, 27 patients with diagnosed multisystemic hydatid cystic disease were subjected to this approach after properly assessing the location, accessibility, number of cystic lesions, sepsis and concurrence. Strict selection criteria were followed before subjecting the patients to ministernotomy.

Results: Hydatid disease was found to affect mostly young males and females with an equal distribution and rural background (92.6%) with farming practice (66.7%). Lower lobes of both lungs and right lobe of liver with predominant involvement of Segment VII and VIII segments, were mostly affected. Left lung-liver was the commonest mode of concurrence (48%). Ministernotomy was sufficient to approach the lesions in 20 of 27 cases (74.1%). However, 7 of 27 patients required extended ministernotomy. All patients survived. 1 patient had a delayed and sudden onset hemothorax on 14th postoperative day due to secondary hemorrhage which needed exploration and repair of the source. 4 patients had prolonged air leak which closed spontaneously. Average hospital stay was 5-10 days. Overall results were very encouraging.

Conclusion: We have found Ministernotomy very economical, cost effective, less morbid, cosmetically attractive, convenient for multi-systemic disease and an ideal approach for patients with deranged pulmonary functions, though challenging for surgeons.

IVOR LEWIS ESOPHAGECTOMY WITH TWO-FIELD LYMPHADENECTOMY FOR CARCINOMA OF THE THORACIC ESOPHAGUS-10 YEARS EXPERIENCE IN A TERTIARY CARE HOSPITAL

Nadeem Ul Nazeer, Abdul Majeed Dar, Nadeem Ul Nazeer Kawoosa, A.G. Ahangar, Mukand Lal Sharma, Mohammad Akbar Bhat, Shyam Singh
Kashmir

Objective: To evaluate the clinical outcome of Ivor Lewis subtotal esophagectomy with two-field lymphadenectomy for patients with thoracic esophageal carcinoma.

Methods: We analyzed the cases of 354 patients who underwent subtotal esophagectomy with extended 2-field lymph node dissection through Ivor Lewis approach for esophageal cancer from September 1999 through December 2009. One hundred and ninety two patients were operated on for cancer of the midthoracic esophagus and 162 for cancer of the lower thoracic esophagus.

Results: There were 238 men (67.23%) and 116 women. Mean age was 56.9 ± 11.1 years (range 37–75 years). Postsurgical pathological studies revealed squamous cell carcinoma in 210 patients (59.32%), adenocarcinoma in 116 patients (32.76%), and anaplastic carcinoma in 28 patients (7.9%). The mean number of lymph nodes removed was 23 (range from 10 up to 33) in each patient. Postsurgical staging was as follows: Stage I in 24 patients (6.77%), stage II in 138 (38.98%), stage III in 160 (45.19%), and stage IV in 32 (9.03%). The in-hospital mortality rate was 3.38%, and overall complications (both early and late) occurred in 56.49% of patients. The overall 5-year survival rate was 32.76% (median survival 36 months). The 5-year survival rate for patients in stage IIa was 40.25%; for those in stage IIb, 36.5%; for patients in stage III, 20.7%; and 0% for patients in stage IV.

Conclusions: Ivor Lewis subtotal esophagectomy with two-field (total mediastinum) lymphadenectomy is a safe and appropriate operation for carcinoma middle and lower oesophagus. Long-term survival is stage dependent.

COMPLICATIONS REQUIRING REOPERATION AFTER OESOPHAGECTOMY FOR OESOPHAGEAL CARCINOMA: 10 YEARS EXPERIENCE IN A TERTIARY CARE HOSPITAL IN KASHMIR

Nadeem Ul Nazeer, Nadeem Ul Nazeer Kawoosa, Abdul Majeed Dar, A.G. Ahangar, Mukand Lal Sharma, Mohammad Akbar Bhat, Shyam Singh

Objective: Morbidity and mortality rates following oesophageal carcinoma surgery are still high. Our study documented complications requiring reoperation after oesophagectomy for oesophageal carcinoma and described surgical management for each complication.

Methods: From 1998 to 2008, a total of 964 esophagectomies were performed for esophageal cancer at SKIMS Institute Srinagar and the records were reviewed.

Results: Of these patients, 39 (4.04%) developed complications requiring a second operation. The majority of the carcinomas were located in the mid esophagus. Histopathological examination of specimens revealed squamous cell carcinoma in most cases. Seventeen patients (43.58%) had a standard Ivor-Lewis resection, 16 (41.02%) had a transhiatal resection, 6 (15.38%) had a trans-abdominal approach. Complications requiring reoperation were the following: intestinal obstruction in 8 patients, anastomotic leak in 6, major bleeding in 5, wound dehiscence or eviseration in 4, tracheo-esophageal fistula in 3, feeding tube malposition in 3, incisional hernia in 3, bowel perforation in 2, intraabdominal abscess without leakage in 1, biliary peritonitis due to common bile duct injury 1, acalculous cholecystitis in 1, empyema in 1, metastasis to fingers of both hands in 1. There were 8 cases of in-hospital mortality (20.51%) from anastomotic leakage (two patients), major bleeding (two patients), intestinal obstruction (one patient), tracheo-esophageal fistula (one patient), bowel perforation (one patient) and biliary peritonitis (one patient).

Conclusion: Proper preoperative preparation and faultless surgical skills are required during initial surgery to reduce complications and the need for reoperation.

OUR EXPERIENCE WITH THE DIAGNOSIS AND TREATMENT OF ESOPHAGUS PERFORATION

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Introduction: Perforation of the Esophagus has a vast etiology and treatment delay reduces survival.

Aims: We tried to focus on a single and aggressive treatment, primary repair.

Methods: We retrospectively analyzed all cases of esophageal perforations admitted to our department over a 3 years period (2006–2009). There were 6 cases (one women and 5 men with ages between 29 and 69 years). Out of these 3 were foreign bodies (one voluntary ingestion, one dental work and one fish bone), one stented esophageal tumor and one iatrogenic. The diagnosis was based on history, clinical exam and contrast agent ingestion which only confirmed the topography of the lesion. In 4 cases we performed surgery (primary repair) and in one case nonoperative management. The time span from the perforation until the treatment was between 12 hours and 4 days.

Results: One patient died (stented esophageal tumor). The case with nonoperative management (cervico mediastinitis after fish bone ingestion) healed without sequel. The 4 cases in which we performed primary repair healed without sequel. Contrast agent ingestion only confirmed the topography of the lesion.

Conclusions: The diagnosis is based on history and clinical exam. Contrast agent ingestion only confirmed the topography of the lesion. Primary repair is the treatment of choice no matter the time span elapsed from the perforation.

22 October 2010

22nd October-Hall 2 Session 1 & 2-Evolving technology, arrhythmias and Misc

EECP REVERSE THE LEFT VENTRICLE REMODELING IN PATIENT WITH MODERATE LEFT VENTRICULAR DYSFUNCTION BY IMPROVING MYOCARDIAL PERFUSION

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Background: EECP has been reported to improve left ventricular function in patients with heat failure on maximal medical therapy with poor quality of life. However mechanism of EECP treatment in improving left ventricular function is not clear.

Method: 65 consecutive patients with Left ventricular dysfunction who have completed a 35 hours course of EECP therapy are evaluated pre and post by Echocardiography. In this group 35 patients have pre and post arterial stiffness assessment by SphygmoCor device.

Results: Patients mean age 58.3 ± 8.9 yrs, 84% were male with, 68% of the patients had DM, 54% had hypertension, 62% had history of prior Myocardial Infarction, 40% had prior CABG and 44% had TVD. All the parameter changes pre and post EECP are shown in the table given below.

	Pre-EECP	Post -EECP	*P*
EF (Simpson)	43.20 ± 21.86	49.58 ± 19.82	.01*
EDV	118.69 ± 64.06	112.23 ± 56.15	.07*
ESV	78.18 ± 46.95	67.92 ± 40.40	.001*
Aix @ 75 heart rate	23.51 ± 10.59	20.97 ± 8.80	.124

Conclusion: EECP therapy associated improvement in Left ventricular ejection fraction is predominantly by reducing the end systolic volume with no change in peripheral arterial resistance. The possible mechanism of action is mostly by improving myocardial perfusion and reversing the Left ventricular remodeling rather than altering the arterial stiffness.

SAFETY AND EFFICACY OF STEM CELL TRANSPLANT IN CARDIOMYOPATHY OF ISCHEMIC AND NON ISCHEMIC ORIGIN: EARLY RESULTS

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Introduction: The introduction of stem cells and/or progenitor cells into damaged myocardium has promising therapeutic potential in ischemic heart disease and dilated cardiomyopathy. Several preclinical as well as clinical trials have shown that transplantation of autologous bone marrow cells or precursor cells improved cardiac function in ischemic and non-ischemic cardiomyopathy and heart failure. These findings may open

a new insight into the pathology and treatment of cardiomyopathy. Current treatments have not been able to reverse this scenario, creating the need for the development of new therapies.

Study Aim: Outcome measured separately for ischemic and non ischemic cardiomyopathy at 3 months, 1 year, and 2 year follow up

1. Changes in left ventricular EF, fractional shortening, LA size, mitral regurgitation, TR gdt, RVSP
2. Regional wall motion by echocardiography
3. Clinical improvements, including change in angina/dyspnea score
4. Incidence of a major adverse cardiac event

Methods: This study enrolled 22 patients of dilated cardiomyopathy in the age group of 31 to 70, and divided into 11 ischemic and 11 non ischemic groups out of which one was female. PBSC was given to 1 patient who was from ischemic group; BMSC was given to 10 patients in ischemic and 11 patients in non ischemic group. Non ischemic group was given transcoronary stem cell implant and ischemic group was given stem cells through various routes, 7 patients were given transcoronary, 3 intramyocardial, 4 through coronary graft, and 1 through coronary sinus. There were patients who were given through dual routes. 2 patients from ischemic group died during hospitalization. The patients were followed up after 3 months and on 1st and 2nd year from the date of enrollment.

Results: In ischemic group there was significant difference in dyspnea, RWMA score, and ejection fraction at 3 months and in non ischemic group there was no significant difference at 3 months in all the parameters

Conclusion: Early results show stem cells are safe in cardiomyopathy. Efficacy of stem cells is more in ischemic group at 3 months. Associated procedures like CABG , CRT were confounding factors. Long term follow up in more number of patients with standardized route of administration needs to be carried out to find the efficacy of this procedure.

FIRST EXPERIENCE OF TRI-LEAFLET HEART VALVE PROSTHESES TRICARDICS IN PATIENTS WITH AORTIC AND MITRAL HEART DISEASE

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Objective: Clinical evaluation of tri-leaflet valve prosthesis TRICARDIKS in prosthetics of mitral and aortic valves.

Implantation of artificial heart valves is one of the main methods of surgical treatment in patients with valvular heart diseases. Russian firm «Roskardioinvest» has developed a new unique model of artificial tri-leaflet heart valve. "Tricardiks" combines the advantages of mechanical and biological valve prosthesis, provides the central blood flow, creates conditions close to physiological. It has no analogues in the world market.

Methods: In the period August 2007 to May 2008 in the Russian Research Scientific Centre of Surgery on the program of clinical trials, there were performed 15 operations prosthetics aortic or mitral valve, using TRICARDIKS - 9 implanted in the aortic position, 6 prostheses - in the mitral position.

Results: Clinical evaluation of implanted prostheses was based on intraoperative transesophageal echocardiography and postoperative transthoracic echocardiography. It estimated rates of cardiac output, gradients, as well as the estimated area of the prosthesis opening.

It was noted that the prosthesis mitral valve cardiac output increased from an average of 3.0 L/min to 5.3 L/min. There was an increase in the mitral orifice up to 2.8 cm in aortic valve prosthesis, there also occurred an increase in cardiac output from 3.0 L/min to 5.4 L/min, reduction of peak gradient to 16 mm Hg, decrease of the average gradient up to 9 mm Hg. Regurgitation on all the implanted valves was 0-1 degree. All patients are on ambulatory monitoring.

Conclusions: This clinical experience has shown that tri-leaflet valve "Tricardiks" provides adequate performance of intracardiac hemodynamics on mitral and aortic valve prosthesis, which allows them to recommend for widespread use.

MORPHO-PHYSIOLOGICAL ASPECTS OF BIO-PROSTHESES IN VALVULAR HEART DISEASE; APPLYING THE EXPERIENCE TO IMPROVE DURABILITY OF BIO-PROSTHESES

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Introduction: Almost half of all the 275 thousand Valve Replacements performed every year in the world use Bio-prosthesis. While the use of Bio-prosthesis is advantageous as this doesn't mandate use of anti-coagulants in the Post-operative period along with maintaining low levels of gradients, it has its own disadvantages in the form of valve failure with structural dysfunction owing to progressive tissue deterioration (including calcification and non-calcific damage) in the long-term (within 15 years) leading to Calcification of the Bio-Prosthetic valve in about >50% of patients undermining their attractiveness. We, at The Bakulev's Scientific Centre for Cardiovascular Surgery, have done an extensive study of the patho-physiological mechanisms underlying the processes of degeneration of the Bio-prostheses and also investigated into the distribution of mechanical loads in and along the valves and paravalvular structures during the functioning of the Valves (Normal and Prosthetic) with the aim of (i). Coming up with our recommendations for the choice of Prosthetic Valves in various positions in the heart and (ii). Applying the lessons learnt to construct spatial models of Valves for various positions and hence for advancing the Manufacture of Bio-prostheses that will have prolonged durability with a target of 15-20 years or more.

Methods and Materials: We used methods of Morphometry and TEE for understanding the Normal Anatomy, Spatial Orientation and the Topography of MV, AV, TV, STJ and Aortic Root and also of the Bio-Prosthetic valves, commonly used in Our Centre. We calculated the Average and Peak Systolic And Diastolic Tensile strengths (Young's Modulus,) in the Cusps of Normal Valves and Prosthetic Valves with an aim to arrive at a comparative study of performances of various valves commonly used in Our Centre.

Results and Discussion: By the above methods we have come up with Systolic and Diastolic tensile Strengths in the cusps of The AV, MV TV, and also in the Aortic Root and STJ

and then attempted to arrived at Mathematical Laws which will help us exactly calculating average and peak systolicTensile strengths for various conditions viz., at rest, normal physical activity and maximum physical activity and this knowledge could be applied for coming up with new modifications of Bioprostheses.

A NEW STENTED BIOPROSTHESIS TO OPTIMIZE THE EFFECTIVE ORIFICE AREA AND HEMODYNAMIC PERFORMANCE OF A PORCINE VALVE: DESIGN AND PRECLINICAL EVALUATION

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Introduction: A new porcine biological valve was developed ***(by inserting 0.6 mm titanium wires within the aortic wall in the commissural and inter-commissural areas and fixing them to a 1.5 mm-thick titanium ring)*** in order to combine the technical advantages of a stented valve with the hemodynamic advantages of a stentless valve. The laboratory evaluation of hydrodynamic function and durability of this new valve was described. Its surgical handling and calcification properties were tested in an animal model.

Methods: The effective orifice area (EOA), the stroke work loss (SWL) and the energy loss (EL) for each of the valve sizes (between 19-31) were measured at four different cardiac outputs (between 2 and 7 L/min) in a pulsatile flow model (Vivo-Vitro Systems). The stroke work loss measured in the pulse duplicator, for the tested and five different commercially available valves (Carpentier Edwards Magna, Sorin Soprano, Sorin mitroflow, St Jude Medical Epic Supra and Medtronic Mosaic), fitting the largest tissue annulus diameter of each valve model able to superimpose the 21 mm valve holder ring which would mimic a 21 mm aortic annulus. The in vivo part of this study has performed using a juvenile sheep model (n = 8). After sacrifice of the animals, macroscopic and histological examination of the implanted valves has been performed to assess calcification.

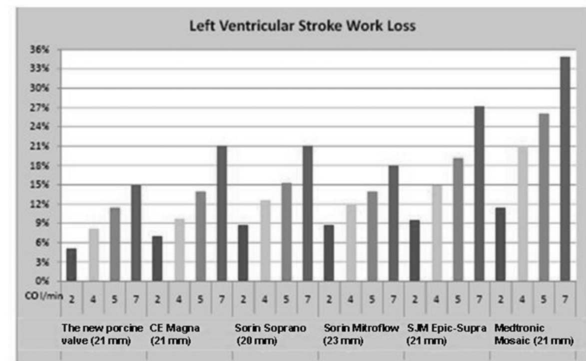
Results: The valve characteristics, EOA, EL as well as left ventricular SWL for different sizes are showed in Figure 1-A. Figure 1-B shows the comparison of SWL between different bioprostheses including the new tested valve. The EOA values of this porcine valve were very close or bigger than those of the new generation supra-annular pericardial bioprostheses. The SWL for the aortic annulus diameter 21 mm showed smaller values at different cardiac outputs in comparison with the other commercially available pericardial and porcine bioprostheses. No calcifications were found at the histological analysis in the animal model.

Conclusion: The EOA, SWL and EL of this new porcine stented bioprosthesis show optimized systolic performance rendering it a promising alternative valvular substitute to the new generation, supra-annular pericardial bioprostheses.

Figure 1-A. In vitro characteristics and orificial surface areas of the new aortic bioprosthesis

External stent diameter (mm)	Internal orifice diameter (mm)	Stent height (mm)	Effective orifice area (EAO) (cm²)	Geometric orifice area (GOA) (cm²)	Mounting area (MA) (cm²)	GOA/ MA	Transvalvular pressure gradient (mmHg)	Energy loss (%)	LV stroke work loss (%)
19	16	13.7	1.4	25.1	29.8	0.84	30	23	7.0
21	18	14.7	1.8	28.2	32.9	0.86	20	17	4.9
23	20	14.7	2.3	31.4	36.1	0.87	11	19	3.7
25	22	16.7	2.4	34.5	39.2	0.88	7	10	2.7
27	24	17.7	2.7	37.6	42.3	0.89	6	11	2.3
29	26	18.7	3.4	40.8	45.5	0.90	3	9	2.3

Figure 1-B. Relationship between the left ventricular stroke work loss and different sizes of the new porcine prosthesis and commercially available aortic valves with increasing cardiac output



PERFORMANCE OF A NEW ANNULOPLASTY RING PROTOTYPE IN VIVO IMPLANTATION FOR ANNULAR DILATATION IN AN ANIMAL MODEL OF CHRONIC TRICUSPID REGURGITATION

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Background and Objective: We previously created a successful simple novel porcine model of chronic tricuspid regurgitation from annular dilatation. We aimed to evaluate the in vivo functional and hemodynamic performance of a newly developed prototype of a computer-based model of an annuloplasty ring.

Methods: Five weeks after operative creation of tricuspid valve regurgitation from annular dilatation in a 41-kg Yorkshire pig, preimplantation echocardiographic evaluation revealed severe tricuspid regurgitation from a markedly dilated annulus measuring 36 mm. Under general anesthesia, cardiopulmonary bypass and beating heart, the tricuspid valve was approached through a right atriotomy incision. After saline injection through the valve, it was found to have inadequate leaflet coaptation and its annular size was measured as 36 mm. A 30 mm new annuloplasty ring prototype was implanted using interrupted 3-0 nonabsorbable sutures.

Results: Saline injection through the valve and intraoperative transesophageal echocardiography performed to assess the adequacy of repair revealed good coaptation of leaflets and absence of tricuspid regurgitation. Hemodynamic parameters were normal. The animal tolerated the procedure well, without any intraoperative or postoperative morbidity. Serial postoperative transthoracic echocardiography was carried out every 4 weeks and the degree of tricuspid valve regurgitation was estimated by means of standard echocardiographic measurement techniques. Three months after ring implantation, tricuspid valve competence is maintained with good leaflet coaptation and no trace of regurgitation and the animal is thriving.

Conclusion: This experimental study shows the possibility of applying this new annuloplasty ring model for treatment of severe chronic tricuspid regurgitation from annular dilatation.

CARDIAMED-2 MECHANICAL HEART VALVE IMPLANTAION: 6 YEAR FOLLOW-UP

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Purpose: Assessment of the long-term results of heart valves CARDIAMED replacement.

Material and Methods: 420 patients operated on in 2003-2004 in 7 heart surgery institutions (isolated mitral (MVR) or aortic (AVR) valve replacement), and returned for the follow-up in 2006-2010 were included. MVR – 209 pts, AVR – 211 pts; mean age 52.2 + 10.2 year (ranged 12-78); 47.4% females. Completeness of the study was 99.05%, maximum term of observation 6.45 years, and observation volume was 1876 pts/years,

Results: Average NYHA functional class was II (1.6 for AVR and 2,0 for MVR). Peak (mean) pressure gradient: AVR 21.3 ± 7.8 (11.4) mm Hg, MVR 11.8 ± 1.75 (6,9) mm Hg. INR target levels achieved in AVR - 12.5%, in MVR –11%; and INR lower than recommended AVR 68.5%, MVR – 80%. Overall 6 year survival rate was 89.4% ± 3.4%. Six-year survival in AVR pts was 88.8% ± 5.2%., MVR - 89.9% ± 4.5%. Valve-related death free survival in 6 years was 95.5% ± 2.0%. Valve-related death free survival in 6 years without 30-day mortality was 96.0% ± 2.7% for AVR and 96.0% ± 2.7% for MVR. Linearized valve-related event rates were the following; throm-bosis – 0,3% pts/year; embolic events rate was 2.66%, hemorrhage 0.1% pts/year; pros-thetic endocarditis – 0.1%, hemolysis – 0%.

Conclusion: "CardiaMed-2" mechanical heart valve prostheses meet the contemporary world standards.

REDO SURGERY FOR PROSTHETIC VALVE DYSFUNCTION IN PATIENTS WITH RUSSIAN MECHANICAL VALVE BRANDS

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Objective: to estimate the long-term results of 2 Russian mechanical heart valve brands implantation – "MedEng" and "Carbonics".

Methods: For the period of 10 years (1996-2006), we performed 987 heart valve replacements (846 "œdEng" and 141 "Carbonics" valves). There were 561 mitral, 416 aortic and 10 tricuspid implantations.

Results: Freedom from reoperation was 95.8%. Prosthetic valve failure was seen in 42 valves (40 patients): 24 mitral, 8 tricuspid and 10 aortic dysfunc-tions. Pannus formation caused the mechanical valve failure in 61.9% of cases, thrombus in 23.8%, and fistula in 7.1%. The average time to reoperation was 25.3 weeks. Patients' age was 32.4 ± 5 (10-57) years, 32.5% of them were in NYHA Class III, and 67.5% in Class IV. Valve re-replacement was performed in all the cases; in 82 % it was the emergent procedure. Hospital mortality was 15% (6 patients), with acute heart failure, multiorgan failure, and aortic ruptures on cannula removal as the major causes of death.

Conclusion: Redo surgery for mechanical valve dysfunction should be an emergent operation, as the patients present with severe, rapidly progressing heart failure. "MedEng" and "Cardiomedics" mechanical heart valves are durable and demonstrate low rate of dysfunction.

TRANSAPICAL AORTIC VALVE IMPLANTATION: EXCELLENT RESULTS IN VERY HIGH-RISK PATIENTS

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Objective: Transapical aortic valve implantation has been introduced to treat high-risk patients with severe aortic stenosis. However, mid-term and long-term results are still unclear and need to be evaluated.

Methods: Since April 2008, 245 patients (age 79 ± 8 years; range, 36 to 99 years) have been treated with transapical aortic valve implantation. The mean logistic EuroSCORE for the whole group was 39 ± 19% [range 6% to 97%] and the mean STS score 20 ± 16% [range 3% to 90%]. Sixteen patients were in cardiogenic shock. Combined planned additional procedures were performed in 36 patients, including simultaneous coronary stenting in 26.

Results: Technical success of the procedure was 99.6%. The 30-day mortality was 4.9%. The cumulative survival for all patients without cardiogenic shock was 83% at 1 year, 77% at 1.5 years, and 71% at 2 years. Univariate regression analysis indicates cardiogenic shock and pulmonary hypertension as predictors for early death during the first 30 postoperative days. Cardiogenic shock, NYHA class IV, high BNP levels, high risk scores, severe renal insufficiency, and poor left ventricular performance are risk factors for cumulative late mortality.

Conclusions: The outcome of transapical aortic valve implantation is very favorable. The method has become de facto the primary choice at our institution for the treatment of high-risk patients with severe aortic valve stenosis.

INITIAL CLINICAL EXPERIENCE WITH INCOR SUPERIOR LEFT VENTRICULAR ASSIST DEVICE

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Objective: Since its clinical introduction, the INCOR® Superior Pump (Berlin Heart GmbH, Berlin, Germany) left ventricular assist device (LVAD) has been successfully implanted in a total of 21 patients in Europe. Main design improvements in comparison with the original INCOR device include a titanium-texturized inflow cannula and a device operating mode (PFC) providing periodic flow reversal and leading to regular aortic valve opening and LV washout. We report on our initial institutional experience with the device.

Methods and Results: Five patients (all male, median age 65, range 39-71 years) underwent INCOR Superior LVAD implantation for dilative (n = 4) and ischemic (n = 1) cardiomyopathy between September 2009 and February 2010 in our institution. The aim of treatment was bridge to transplantation in 2 and permanent therapy in 3 patients.

Surgical access was via median sternotomy in 3 and left lateral thoracotomy in 2 patients. Intraoperative survival and discharge rate was 100 %. Postoperatively all patients received heparin i.v. switched later to coumadin p.o. and aspirin, dipyridamole and omega-3 fatty acids. Postoperatively, 3 minor gastro-intestinal bleeding complications occurred (POD 22, 31 and 49), requiring abdominal surgery in one patient with documented acquired von Willebrand factor deficiency syndrome.

Conclusion: The INCOR Superior Pump has shown excellent short- to mid-term clinical results with a tendency towards a less strong anticoagulation regime being required. It has proven to be a valid option for mechanical circulatory support in our institution.

AORTIC SURGERY IN OCTOGENARIANS

Christof Stamm, Burkhardt Zipfel, Boris Nasseri, Roland Hetzer

Background: While CABG and valve surgery are usually well tolerated in patients of advanced age, the risk of aortic surgery is believed to be high, and the benefit of endovascular procedures has not been evaluated in elderly patients.

Methods and Results: The data of all patients >80 years who underwent aortic surgery in our institution between 1987 and 2008 patients were analyzed. A total of 185 operations were performed on the thoracic and/or abdominal aorta, 83 (45%) as elective procedures and 102 (55%) as emergencies. Median patient age was 83 years (range 80-92 years), and the preoperative risk profile predicted a procedural mortality of 38 ± 22% by logistic EuroScore. Diagnoses included aortic aneurysm in 85 (46%), aortic dissection in 51 (28%), with aortic perforation in 53 (27%). A total of 145 patients had open surgery, while 40 underwent endovascular stent placement. Overall, 30-day mortality was 27% (38% in emergencies and 13% in elective cases). The Kaplan-Meier estimated survival rate was 58% at 1 year, 42% at 5 years, and 15% at 10 years. Multivariate analysis identified a higher EuroSCORE risk profile, aortic perforation, and open surgery as independent predictors of death. At the cost of a substantial re-intervention rate (17.5%), endovascular procedures were associated with decreased mortality (12.5% versus 31% for open surgery, $P = .02$)

Conclusion: Elective aortic surgery in octo- and nonagenarians can be performed with good results. Emergency surgery is associated with high mortality and requires careful case-by-case decision making, but modern endovascular techniques offer new perspectives for amenable aortic diseases.

COMBINED SURGERY FOR HEART DISEASE AND SEVERE PECTUS EXCAVATUM

Christof Stamm, Rainer Petzina, Boris Nasseri, Roland Hetzer

Objective: Patients with congenital fibrous tissue abnormalities sometimes present with heart disease and severe pectus excavatum. We studied whether heart surgery combined with chest wall repair yields satisfactory results.

Methods: Between 1993 and 2007, 15 patients underwent combined heart surgery and chest wall repair; all but one had evidence of collagen synthesis abnormalities such as Marfan's syndrome. Twelve patients underwent aortic valve/root replacement or repair, four patients required mitral valve repair, and one patient underwent isolated CABG. Until 1998, the Ravitch technique was applied for pectus excavatum repair, with or without implantation of a Rehbein splint. Since 2000, a modification of Robiczek's repair with complete mobilization of the corpus sterni, resection of elongated ribs, and sternal elevation using individual mesh graft strips has been applied.

Results: All patients survived the operation without major complications. There were no late deaths, and heart function at follow-up is adequate in all patients. The cosmetic result is considered good by 12 patients and satisfactory by 3, with no residual or recurrent major chest wall depression or sternal instability. However, lung function, as assessed by inspiratory vital capacity (IVC) and forced expiratory volume (FEV-1), tended to decrease postoperatively (IVC 68 ± 15% preoperatively versus 57 ± 12% postoperatively, $P = .1$; FEV-1 54% versus 42%, $P = .1$)

Discussion: Concomitant repair of heart disease and pectus excavatum can be performed with very good results. However, the indication for pectus repair is purely cosmetic, since lung function may even decrease due to extensive scarring of the anterior chest wall.

MINIMALLY INVASIVE PECTUS EXCAVATUM REPAIR IN ADULTS

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Introduction: With an incidence of 1: 800 children, pectus excavatum (PE) is one of the most common thoracic malformations. In 1998 Donald Nuss developed a method for the minimally invasive PE repair (MIRPE). Meanwhile this method is established as the golden standard in pediatric surgery. Despite of higher complication rates in adults compared to children, MIRPE was successfully introduced in adult thoracic surgery.

Methods: Retrospective chart review of 24 patients operated on PE in a single institution from 2003 to 2010. Indications for repair were primary concern about the cosmetic appearance. Only a small number of patients had a restricted or obstructed ventilation disorder.

Results: The mean patient age at the time of operation was 20.0 years (16.3 – 33.3), the mean postoperative length of stay was 6.8 days (4 – 13). In 73% of the cases the postoperative analgesic management was conducted by peridural catheter. In 7 patients the pectus bar was removed electively after 3.0 years. These patients showed excellent results with a significant reduction of Haller's index from an average of 4.1. to 2.4. In 3 patients the bar had to be removed prematurely for dislocation, 2 patients refused a re-implantation. In 3 patients pneumothoraces had to be treated by chest tube insertion. No other complications occurred.

Discussion: Ten years after its first publication, MIRPE has become the preferred method for PE repair in children. In adults with PE in whom the cosmetic appearance is the primary concern, the NUSS procedure shows promising results. Therefore the establishment of MIRPE as standard repair in young adults is expectable.

OUR EXPERIENCE IN DIAGNOSIS AND TREATMENT OF SYMPTOMATIC MYOCARDIAL "BRIDGES"

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Objective: To inform our experience in diagnosis and treatment of symptomatic myocardial "bridges" (MB).

Methods: During 6 years we observed 140 patients with symptomatic MB (108 men, 32 women). All patients had angina pectoris (100%), 90 (64.2%) patients had dyspnea. 72 (51.4%) patients had acute myocardial infarction. For all patients the following clinical studies have been done: ECG, echocardiography and coronary angiography in some cases with intracoornary provocation tests.

Results: Mostly (95.7%) MB was settled down at the LAD.

The average systolic compression was 70%, average length 28 mm. Intracoronary provocative tests with Isosorbide dinitrate has improved the diagnosis of MB at 76.2%. We use individual approach in treatment, that was based on the compression level for tunneled part of the coronary arteries (CA), the presence of atherosclerotic plaque, accompanying heart pathology. 106 (75.7%) patients received medication. Drug-eluting stents implantation of the tunneled artery was carried out for 14 patients (10%), for 3 (21.4%) patients in stent restenosis appeared. 20 (14.3%) patients had surgical correction, among them: 14 – CABG; 1 – supracoronary myotomy; 3 – epicardiotomy with dennervation of CA; 2 patients with hypertrophic cardiomyopathy had undergone Maron operation. All patients have significant improvement in their health condition.

Conclusion: Difficult MB visualisation during coronary angiography associated with dynamic compression of the CA. Intracoronary provocative tests with Isosorbide dinitrate can improve the diagnosis of MB. Individual approach in treating patients with this anomaly helps to avoid life-threatening events and to improve the quality of life for patients with this anomaly.

USE OF FLOURO TO FACILITATE A REALLY MINIMALLY INVASIVE AND SAFE OPEN HEART SURGERY

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Background: Right antero-lateral thoracotomy has been is use for minimally invasive repair of atrial septal defect and mitral valve repair/replacement. However there is some concern about the safety of venous and arterial cannulation due to the limited working area . The use of femoral or jugular cannulation requires additional incisions which can be of cosmetic concern. We have used a mobile catherisation laboratory in the Operating Room to facilitate safe and secure cannulation with a very small thoracic incision.

Methods: The mobile cath lab is set up in the OR. A small sub-mammary anterolateral thoracotomy is made. Femoral and internal jugular venous and femoral arterial cannulation is done in a percutaneous manner under fluoroscopic control. CPB is instituted and the procedure performed .

Results: A safe and secure cannulation allowed the incision to be small without compromising on safety. The flouro control gives an exact and safe placement of cannulae . We have used this technique in 16 cases (ASD repair : 7, MVR: 5, MVrepair :1, MVR + TV repair 3) in the age group 18 to 48 years with no need to convert to standard incision or to enlarge the incision.

Conclusions: We advocate the routine use of the cath lab / flouro in the OR to make safe minimally invasive open heart surgery possible.

LEFT ATRIAL VERSUS COMPLETE MAZE ABLATION PROCEDURE DURING VALVE SURGERY

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Objective: Atrial bipolar ablation using maze III scheme most effective treatment of atrial fibrillation (AF). This study was conducted to evaluate the effectiveness of the radiofrequency modified maze operation for the treatment of chronic AF and compare the results of different techniques left and bi-atrial procedures.

Methods: From 2007 to 2010 121 patients received intraoperative treatment of atrial fibrillation with bi-polar ablation systems, including 15 (12.4%) cases of paroxysmal AF and 31 (25.6%) persistent and 85 (70.2%) permanent cases. The main concomitant heart diseases were rheumatic mitral valve diseases. Medtronic Cardioblate Irrigated used in 92 (76.0%) and AtriCure Ablation System in 29 (24.0%). The ablation lesion patterns included complete maze III (Benussi's modification) – I group (42 patients), modified maze technique which includes left side (box lesion) + plus cavotricuspid isthmus ablation (79 patients).

Results: We used complete maze III (I group) in cases of right atriomegalia and in patients with severe tricuspid regurgitation.

Postoperative atrial fibrillation occurred in 11 patients (9.1%) – I group and 13 (10.7%) in II group, and was successfully controlled with additional antiarrhythmics as above. Postoperative sinus node dysfunction demanded implantation atrial-chamber pacemaker were observed in 12 (9.9%) patients of I group and 7 (5.8%) in II group. No ablation-related complications occurred. No patient died.

Conclusion: Intraoperative radiofrequency ablation with Bipolar systems is a feasible, safe and highly effective surgical option in different ablation modifications.

SURGICAL TREATMENT OF ATRIAL FIBRILLATION COMBINED WITH RHEUMATIC VALVE DISEASE USING A BIPOLAR RADIOFREQUENCY ABLATION SYSTEM

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Objective: Atrial fibrillation is the most prevalent arrhythmia and is frequently associated with rheumatic valve disease, resulting in significant morbidity and mortality. The aim of this study is to evaluate the effectiveness and advantages of the bipolar radiofrequency ablation system in the treatment of atrial fibrillation associated with rheumatic valve disease.

Methods: Between January 2008 and December 2009, 50 patients underwent operation procedure for atrial fibrillation associated with rheumatic valve disease. 39 had mitral valve disease, 4 had aortic valve disease and 7 had mitral and aortic valve disease. The mean age was 53.7 +- 10.6 years, 41 patients had persistent atrial fibrillation and 9 intermittent type with a mean ejection fraction of 58.6% +- 13.4. The patients` follow-up was done with ecocardiogram and 24 hours holter between 6 and 18 months after surgery.

Results: The operative mortality was 4% (2 patients), both deaths unrelated to the atrial ablation procedure and the hospital mortality was 12%. Eighty percent of patients were free of atrial fibrillation upon discharge, and six patients (12%) had recurrent AF during the follow-up period. Up to now, 32 patients have done the ecocardiogram study, with a important improvement of the ejection fraction.

Conclusions: The radiofrequency ablation procedures using a bipolar system are safe and effective in treating chronic atrial fibrillation associated with rheumatic valve disease, with good outcomes after a 2 years follow-up.

CLINICAL OUTCOMES OF MINIMALLY INVASIVE SURGICAL ABLATION FOR ISOLATED ATRIAL FIBRILLATION

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Objective: Minimally invasive surgical ablation for AF is emerging as an effective curative modality for atrial fibrillation. We sought to determine the clinical outcomes of surgical ablation for isolated AF.

Methods: Consecutive patients who underwent minimally invasive surgical ablation for recurrent AF were enrolled in this prospective study. Freedom from emergency visits, hospitalizations, cardioversions, antiarrhythmic and anticoagulation drugs was analyzed in the 6 months pre and post ablation period.

Results: Eighty-eight consecutive patients with a mean age of 58.5 ± 14.6 years, 68% male, mean LA diameter of 4.9 ± 0.8 and mean LVEF of 52 ± 9.7 % were enrolled in the study. Mean follow up was 9.4 ± 7.2 months. The mean number of hospitalizations significantly reduced from 1 ± 1.2 to 0.2 ± 0.4 ($P < .0001$) and the mean length of stay reduced from 3.8±2.7 to 0.6 ± 2 days ($P < 0.0001$). The mean number of ER visits significantly reduced from 1 ± 2.7 to 0.1 ± 1.3 ($P < .0001$).The mean number of cardioversion's reduced from 1.84 ± 2.2 to 0.24 ± 0.58 ($P < .0001$). There was a significant decline in the usage of antiarrythmic drugs like Sotalol ($P < .0008$), Flecainide ($P < 0.0008$), Propafenone ($P < .03$), Amiodarone ($P < .0001$) and Tikosyn ($P < .009$) along with a significant decline in the usage of Coumadin ($P < .0001$).

Conclusions: Minimally invasive surgical ablation for isolated AF is an effective modality for the treatment of AF. There is a remarkable reduction in the incidence of hospitalizations, emergency visits, cardioversion's along with freedom from antiarrythmic drugs and Coumadin following the ablation.

CONCOMITANT ATRIAL FIBRILLATION ABLATION USING EPICARDIAL HIGH INTENSITY FOCUSED ULTRASOUND

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Background: Patients in Atrial Fibrillation (AF) at the time of cardiac surgery exhibit an increased operative morbidity and mortality and decreased survival compared to those in sinus rhythm. The use of energy based ablation now allows an AF procedure to be performed with little or no additional risk. We prospectively reviewed our experience of concomitant AF ablation using the HIFU system.

Methods: Between April 2006 and Dec 2009, 88 patients underwent concomitant ablation. 29 had mitral valve surgery (±CABG), 19 aortic valve surgeries (±CABG) & 25 CABG and 7 have loan AF ablation. The AF was paroxysmal in nature in 25 patients. Mean Euroscore was 5.72. Patients were deemed to be in SR if they had no Atrial arrhythmias lasting greater than 30 seconds on their 24 hr tape.

Results: There was one operative death an 85-year-old MV Repair with pulmonary hypertension. Median length stay on ITU, HDU and in hospital was 1 day, 1 day and 7 days respectively. For all comers sinus rhythm rates were 78% at six months and 68% at one year. Freedom from AF was 70% for intermittent AF. Eighty-eight percent of patients exhibited satisfactory left atrial transport.

Conclusions: Concomitant epicardial HIFU ablation produces encouraging restoration of SR rates with no additional morbidity. The vast majority of those patients in sinus rhythm exhibit satisfactory left atrial function.

THE OUTCOMES OF BIPOLAR RADIOFREQUENCY MODIFIED MAZE PROCEDURE FOR TREATING CONCOMITANT ATRIAL FIBRILLATION IN VALVE SURGERY

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Objective: To access the conversion rate outcomes of bipolar radiofrequency modified maze procedure for treating concomitant atrial fibrillation in valve surgery.

Methods: From June 2006 to June 2009, bipolar radiofrequency (Aricure) was used to perform modified Maze procedure for concomitant atrial fibrillation (AF) in fifty two patients undergoing valve replacement surgery. The main procedures included left and right pulmonary vein isolations, cut off Marshall ligament, left atrial appendage resection and the ablation lines connecting left atrium and left superior pulmonary vein, the left atrial roof line connecting left and right PV isolation, and the line between right inferior pulmonary vein and posterior ring of mitral valve. Amiodarone was used as a routine anti-arrhythmia drug.

Results: One patient died in early postoperative period because of low cardiac output syndrome, and the mortality is 1.9%. There was no redo operation for bleeding and no worse heart rhythm occurred. During hospital stay, twenty eight patients had temporary atrial fibrillation and arrhythmia, Forty patients remained in sinus rhythm when discharged from hospital. In the period of 9 to 35 months follow-up (mean time 20.3 ± 8.6 month), sinus rhythm conversion rate is 71.2% (37/52).

Conclusions: Bipolar radiofrequency modified Maze procedure is a safe, simple and effective method for treating concomitant AF in valve replacement surgery.

Key Words: Bipolar radiofrequency, Heart operation, Maze procedure, atrial fibrillation

22nd October - Hall 3 Session 2 - Aorta and Vascular

HYBRID MANAGEMENT IN PATIENTS WITH COMPLEX AORTIC PATHOLOGY–SINGLE CENTER EXPERIENCE

Dimitar Petkov, Vassil Papantchev, Boian Baev, Gencho Nachev

Objective: The aim of present work is to overview the experience in our center with hybrid management of high risk patients with complex aortic pathology.

Methods: From 2003 to 2010 a total number of 11 patients, 10 male and 1 female with average age 51.7 years (from 26 to 69 years), underwent hybrid management of complex aortic pathology.

The pathology was aortic dissection in 9 patients, aneurysm after aortic coarctation surgery in 1 patient and coronary artery disease, combined with severe aortic stenosis, peripheral artery disease and lead pipe aorta in 1 patient.

The procedures were as follows:

- Aorto-carotid bypass with consecutive endovascular stent-graft (EVSG) implantation – 4 patients;
- EVSG implantation after conventional surgery – 4 patients;
- Single-stage Bentall/De Bono procedure + EVSG implantation – 1 patient;
- Conventional surgery after EVSG implantation – 1 patient;
- Transapical aortic valve replacement after OPCAB surgery – 1 patient.

Results: One patient died in aorto-carotid bypass + EVSG group, because of aortic rupture.

Two patients died in surgery + EVSG group, because of aortic dissection complications – one from intestinal ischemia and one from bronchomalacia.

One patient in aorto-carotid bypass + EVSG group developed stroke.

All other patients had uneventful recovery and were discharged home.

Conclusions: Our experience shows that hybrid management in patients with complex aortic pathology is a reasonable approach for management with acceptable morbidity and mortality. We can suggest that hybrid management is an optimal therapy for these high risk patients.

PITFALLS IN SIZING OF STENT-GRAFTS FOR ACUTE TRAUMATIC AORTIC RUPTURE BY DIAMETER CHANGES WITH HYPOTENSION

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Purpose: We aimed to analyze the reliability of aortic CT measurements from the acute posttraumatic period for endovascular repair.

Methods: Straight thoracic stent-grafts (27 Talent; 16 Relay and 11 E-vita) were implanted in 54 patients with acute traumatic ruptures; 39 cases were analyzed in which CT scans were available with detailed measurements both preoperatively with a maximum delay of 48 hours after the trauma and within 30 days postoperatively.

Results: Age was 17–81 (median 35) years. Time between trauma and stent-graft implantation was 3 hours – 60 days (median 11 hours). The postoperative diameter increase in the ascending aorta (A) was 1.9 ± 2.9 mm; in the proximal neck in the aortic arch (B) 2.1 ± 3.2 mm; and in the distal neck (D4) 3.3 ± 3.0 mm. The implanted stent-grafts had been oversized at the proximal landing zone (B) by 16 ± 11% (range 5–33%) related to the preoperative CT scan and by 11±10 % (range -4–33%) related to the postoperative scan; at the distal landing zone (D4) by 45 ± 16% (range 14–87%) and 24 ± 13% (range 5–59%), respectively.

Conclusions: The measurements of aortic diameter in CT scans acquired in the early posttraumatic period may lead to undersizing of thoracic stent-grafts by diameter increase with normalization of the circulating blood volume. Therefore we oversized stent-grafts more generously related to early posttraumatic CT measurements. Despite this practice, we did not experience any stent-graft collapses in the entire series.

IMPORTANCE OF DISTAL AORTIC STUMP CONSTRUCTION IN THE SURGICAL REPAIR FOR STANFORD TYPE A AORTIC DISSECTION

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Objective: To evaluate the importance of distal aortic stump construction in the surgical repair for Stanford type A aortic dissection (AAD).

Methods: Sixty-four patients who underwent the operation for AAD between 2000 and 2010 were reviewed. The mean age was 66 ± 13 years, and 35 patients (54.7%) were male. Extent of repair included hemiarch (HAR) (n = 37), subtotal aortic arch (SAR) (n = 6) and total aortic arch (TAR) (n = 21). Distal aortic stump construction was performed in 36 patients (SC group: adventitial inversion technique was used at HAR or SAR in 22, elephant trunk technique at TAR in 14). Distal aortic anastomosis was carried out without construction in 28 (NSC group). The operative results were retrospectively compared between two groups.

Results: The hospital mortality rate was 5.6% in SC group and 7.1% in NSC (*P* = 0.79). Computed tomography revealed leakage of the distal anastomotic site was detected 3 patients (8.6%) of SC group and in 11 (39.3%) of NSC (*P* < .01). Thrombotic closure of false lumen at descending aorta in 25 patients (69.4%) of SC group and in 16 (57.1%) of NSC (*P* = .45). In mid-term follow-up period of 36months range,1 to 106,the survival rate at 3 years was 71.3% in SC group and 89.1% in NSC (*P* = .66). Aortic reoperations were required 17.9% of patients in NSC group, 0% in SC (*P* = .25).

Conclusions: Our data indicated that distal aortic stump construction was essential for progressing thrombotic closure of false lumen.

AORTIC ROOT REPAIR: ALTERNATIVE OF FLORIDA SLEEVE AND VALVE SPARING PROCEDURES

Paata Kalandadze, Salvatore Spagnolo

Different surgical approaches have been suggested for aortic root repair. Forty years ago Bental and DeBono described a technique for composite aortic valve and root replacement. In the mid 1990s Yacoub and David independently developed techniques for valve sparing approach with the goal of preserving morphologically intact cusps of the aortic valve. Last 2 years Florida Sleeve repair become increasingly popular. We have developed our own operation technique for aortic root repair with preservation of the aortic cusps.

Operative procedure: Diseased aortic segment is resected above the senotubular junction. Three or more pledgeted mattress sutures are placed from ventricular to aortic aspect in the subannular subcomisural triangles in order to fix the diameter of the annulus. The sinuses of valsava then are plicated from the annulus towards sinotubular junction. Once we have obtained the normal anatomy of the aortic sinuses and senotubular junction we are preceding towards stabilization of the aortic annulus and aortic root. Three pericardial patches (one for each sinus) are used to fix the aortic root from outside with previously placed subannular mattress sutures. The patches are fixed one to another with the same subannular mattress suture. The distal end of this patches are fixed at the level of senotubular junction between each other and with commissural aortic wall In this way we create external wall as the unique structure supporting the aortic root. Dacron tube placed between aortic arch and senotubular junction establishes the continuation of the ascending aorta.

From January 2000 to December 2010 we operated 110 patients. There were 2 hospital deaths. 3 patients reoperated for aortic valve replacement.

This technique gives opportunity to conserve and repair the sinuses of valsalva, not to use prosthetic material for reconstruction of the aortic root, there is no need for the coronary artery reimplantation and the learning curve for this type of operation is not significant.

CONTEMPORARY APPLICATION OF CRYOPRESERVED ALLOGRAFT AORTIC VALVES FOR AORTIC ROOT PROCEDURES

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Background: The long-term results of surgical treatment of aortic root infection using cryopreserved aortic homograft (AH) are presented.

Methods: Aortic valve (AVR: 99) and root replacement (ARR: 322) using AH were performed in 421 patients between 1987 and 2009. It was inserted into a sterile aortic root in 102 patients and into an infected aortic root (active n = 297, healed n = 22) in 319 patients. Median age of the patients was 51 years, range 2 to 83 years. The maximum follow-up was 22 years (median 6.1 years). Aortic root abscess was confined to the annulus in 93 patients and advanced (circular, burrowing and fistulated) in 194 patients. Concomitant mitral valve repair and replacement were performed in 45 (10.9%) and 17 (4%) patients, respectively, and coronary artery bypass in 22 (5.2%) patients.

Results: Multivariate analysis determined that operation for prosthetic valve endocarditis was a risk factor for early death, and freehand subcoronary AVR was a risk factor for reoperation. Actuarial freedom from structural valve deterioration (SVD) was 87% (2.7 % SEM) at 5 years and 84% (3.6 % SEM) at 10 years. The 15-year freedom from SVD in patients below 40 years was 68.4%. Two patients with failed homograft received Edwards Sapien transcatheter valve-in-valve implants. The actuarial freedom from recurrent infection at 5 and 10 years was 93% (2.0 SEM) and 92% (2.5% SEM), respectively.

Conclusions: Cryopreserved AH has shown good long-term performance in patients >40 years but limited durability in patients <40 years old.

ALTERNATIVE TECHNIQUES IN SURGICAL APPROACH TO CHRONIC TOTAL OCCLUSION OF ABDOMINAL AORTA

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Objective: Alternatively, ascending or descending thoracic aortobifemoral bypass or extra-anatomic axillo-femoral and femoro-

femoral bypass can also be performed for CAAO (1). Nowadays, ABFB is the gold standard for treatment of aorto-iliac occlusive disease and juxtarenal aortic occlusions.

Methods: Twenty consecutive male patients aged 61.76 ± 8.01 years undergoing surgery for chronic totally occluded abdominal aorta. Aortobifemoral bypass (ABFB) with bifurcated knitted dacron graft and proximal aortic thromboendarterectomy was performed in all patients. In a patient with left renal artery duplicaton, visceral revascularization was performed from abdominal aortic graft to left renal artery with saphenous vein graft. A concomitant femoropopliteal bypass was performed on four of these patients.

Results: In our series, we did not need any alternative technique. There was no mortality with complete immediate success. The average length of hospital stay was 7.12 ± 1.35 (5–11 days) and an average intensive care unit stay was 2.43 ± 0.63 (1-3) days. No complication was met during and after the operation. Neither revision nor reintervention was required during hospitalization.

Conclusion: Other procedures must be reserved for situations in which the abdominal aorta is not suitable for anastomosis as in porcelain aorta, in graft infections to prevent contamination and previous multiple operations not suitable for abdominal exposure (1).

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REPAIR OF LARGE ANEURYSM OF THE DISTAL ARCH AND DESCENDING THORACIC AORTA: ANALYSIS OF THE TECHNICAL ASPECTS OF THE PROCEDURE

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Objective: The repair of large aneurysm of distal arch and descending aorta is not a rare procedure. Two patients with very large aneurysms, one of them who had a concomitant coronary artery disease underwent repair and repair plus CABG. We present the technical aspects of these two cases where the approach was made through a median sternotomy plus a left antero-lateral thoracotomy owing to its sheer size.

Method: The aneurysms were 20 x 15 cm and 17.5x10 cm each. CPB was established through cannulation of the ascending aorta, right atrial appendage and the femoral artery. Retrograde cerebral perfusion and myocardial protection by retrograde cardioplegia were used. Under deep hypothermic circulatory arrest, aneurysmal sac was opened and proximal anastomosis between distal arch and the synthetic graft was done. The rest of the repair and CABG with saphenous grafts were performed by the conventional method. The bypass time was 120 and 170 minutes each, aortic cross-clamp time was 65 and 89 minutes each with circulatory arrest time of 28 and 42 minutes each respectively.

Result: Both patients had no neurological deficits. One Patient had thoracotomy wound infection and temporary evidence of ischemia of index finger of left hand, both of which improved after proper care. The patients were discharged after two and four weeks of operation respectively.

Conclusion: The standard left thoracotomy approach has its limitations in terms of exposure for very large aortic aneurysms. The enormous size of the aneursyms in our patients demanded a good exposure which was gained by our approach. This approach has the following diverse technical advantages, (1) provides good surgical exposure of aneurysm as it can be dissected safely even without using CPB and CPB time can be reduced, (2) retrograde cerebral perfusion can be done with ease, (3) the proximal anastomosis of vein graft can be done at ascending aorta and the complete myocardial revascularisation is possible with ease in this approach.

FOLLOW UP OF PATIENTS AFTER AORTIC ROOT RECONSTRUCTION OPERATIONS WITH TORONTO ROOT AND STENTLESS AORTIC VALVE AND EVALUATION OF EARLY AND MIDTERM CLINICAL AND HEMODYNAMIC OUTCOMES

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Objectives: In this retrospective study clinical and hemodynamic outcomes of 83 patients after aortic valve replacement with stentless xenograft valve implanted in a subcoronary or a full root fashion we analyzed.

Methods: Data were divided in to 4 groups: preoperative, early postoperative, one-yearafter operation, and five-and-more years after operation. The LV dimensions and EF, aortic root dimensions, peak-aortic velocity, mean aortic gradient and aortic insufficiency were statistically assessed.

Results: Five-year survival rate for men was 59% and women 81% (*P* = .01), age and frequency of concomitant operations didn't differ. Worse survival rates were in patients with EF less than 40% and NYHA functional class IV (*P* = .02), which more often were observed in men.

Analysis of echocardiography data showed significantly decreased LV hypertrophy, peak aortic velocity and mean transvalvular gradient after operation. No one patient exhibited any signs of moderate or severe aortic regurgitation at any time during follow-up.

Table. Echocardiography data

Variable	Preoperative	Early Postoperative	1 year after operation	5 and more years after operation
Aortic peak velocity (m/s)	48 ± 0.9*	2.5 ± 0.5*	2.4 ±0.5*	2.2 ± 0.6*
Mean gradient (mmHg)	56 ± 18*	14 ± 6*	18 ± 9	11 ± 8
LVEDDi (mm/m^2)	27.1 ± 3.7*	24.6 ± 5.4*	24.6 ± 3.9	25.3 ± 3.5
LVMMI (g/m^2)	168 ± 43*	130 ± 32*	121 ± 28*	112 ± 26*
EF (%)	47 ± 14	46 ± 11	50 ± 11	49 ± 11

*$P < .05$ Wilcoxon signed rank tests between groups. EF = ejection fraction; LVEDDi = left ventricular end-diastolic diameter index, LVMMI = left ventricular myocardial mass index.

Conclusions: St. Jude Toronto root, St. Jude Medical-Toronto SPV provided good early and mid-term results in terms of survival and hemodynamic performance. LV size and mass regression was significant.

INITIAL EXPERIENCE WITH THE JETSTREAM™ PATHWAY DEVICE FOR FEMORO-POPLITEAL DISEASE

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Objectives: To report safety and efficacy of Jetstream™ Pathway rotational atherectomy/ thrombectomy device for the treatment of femoro-popliteal arterial lesions with special emphasis on rate of re-intervention and intervention free period.

Materials and Methods: Duration of study is from Mar 2008 to Nov 2009 (21Months). Total numbers of patients is 86. Males are 55 (64%) & Females are 31 (36%). Age range is 36 to 87 Years. All patients underwent Pathway Atherectomy during this time period regardless of their previous status were included. Re intervention in the same limb after atherectomy was endpoint of the study.

Results: TLR (Target Lesion Revascularization) was 15% in patients during follow up period. Re intervention was more common in first 3 months after first intervention. It was more common in TASC II type B lesions and mostly managed by Balloon Angioplasty. Conclusion: The JetStream™ Pathway device with thrombectomy and aspiration capabilities has added advantages to femoro-popliteal atherectomy. Adjunctive stenting remains very low in this difficult segment.Long term follow up will definitely be needed for durability and patency.

Key Words: Femoro-Popliteal Disease, JetStream™ Pathway device, Re intervention.

THE RADIAL ARTERY AS A CONDUIT IN FEMORO-POPLITEAL BYPASS

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Background: A reliable conduit for use in femoro-popliteal bypass has still not been found – the autologous greater saphenous vein – the present 'gold standard' – having a sub-optimal 5 year patency rate. We propose the use of the autologous radial artery as the conduit of choice and present our series of 50 cases.

Methods: 50 patients underwent femoro-popliteal bypass using the radial artery between Sept 1996 to November 2009. The age range was 55 to 78 years. 80% patients were diabetics, while 46% were smokers . 8 patients needed additional combined procedures – a CABG in 6 and a CEA in 2. Bilateral procedure using bilateral radial arteries was required in 1 patient.

Results: The radial artery was a good size match. In 20 patients a proximal extension with a saphenous vein was required as the length was inadequate. The radial artery is a flexible graft which does not kink at the knee joint unlike a vein or a prosthetic graft. Clinically there was improvement and a return of distal pulses in all cases. 2 patients needed amputation of the toes. A postoperative angiogram in 11 patients showed an excellent anastomosis and run off. Follow up ranges from 1 month to 13 years. ABI improved from an average of 0.35 to 0.72.

Conclusions: We recommend the radial artery as the conduit of choice for femoro-popliteal bypass.

EFFICACY AND SAFETY OF A LOW MOLECULAR WEIGHT HEPARIN BEMIPARIN IN VASCULAR TRAUMA PATIENTS IN THE DISTURBED STATE OF KASHMIR.

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Objective: To study the clinical profile of vascular injuries in the disturbed state of Kashmir.

To determine the efficacy and safety of bemiparin compared with unfractionated heparin as post operative thromboprophylactic agent in vascular trauma patients.

Methods: A prospective, single centre based study carried out in our teritiary care institute. One group of patients received bemiparin and the other group received slow infusion of unfractionated heparin postoperatively. Treatment with bemiparine or unfractionated heparin was overlapped and then substituted by aspirin or clopidogrel.

Results: Most of the patients operated were young; (mean age 38.9 and 37.6 years for patients receiving bemiparine and unfractionated heparin respectively). Popliteal vessel was mostly injured. The incidence of post operative complications was higher in the unfractionated heparin group. Gangrene of some part of distal extremity occurred in 3.2% of patients who received bemiparine and in 4.31% of patients who received unfractionated heparin. The incidence of hemorrhagic complications was 4.81% and 23.27% and moderate thrombocytopenia was 1.06% and 5.17% in bemiparine and unfractionated heparin receiving patients respectively. A clinically significant increase in alanine aminotransferase was observed in 1.6% patients who received bemiparine and 7.75% patients who received unfractionated heparin. The overall incidence of death during the study was comparable in both the groups.

Conclusion: Vascular injuries are very common in the state of Kashmir. Bemiparin given in twice daily doses is safe and effective when used as thromboprophylactic agent in vascular trauma patients. There is a trend in risk reduction for various complications in favour of bemiparin.

22nd October 2010-Hall 1-Session 1 & 2 - Heart Failure

LEFT VENTRICULAR DYSSYNCHRONY OF CONTRACTION AND REDUCED COMPLIANCE PREDICT SHORT-TERM CLINICAL WORSENING IN TRANSPLANT CANDIDATES WITH DILATED CARDIOMYOPATHY

M. Dandel, H. Lehmkuhl, C. Knosalla, R. Hetzer

Background: With increasing heart transplant (HTx) waiting times, anticipation of short-term cardiac worsening, and finding predictors of short-term outcome without HTx or ventricular assist devices (VADs) are major goals. In patients with dilated cardiomyopathy (DCM) referred for HTx, we assessed the predictive value for clinical worsening of echocardiography, exercise tolerance and NT-ProBNP plasma levels at follow-up.

Methods: In 1/2006-1/2009 all DCM outpatients in stable NYHA-class III with sinus rhythm and LVEF <30% at selection for the study underwent serial echocardiography including 2D-strain imaging, exercise testing, and plasma NT-ProBNP measurements. Parameters were tested for ability to predict further clinical course of heart failure (HF) during the first 6 months after inclusion in the study.

Results: During the first 6 months, 31 (44.3%) of the 70 evaluated patients showed severe cardiac deterioration (9 died, 19 received VADs, 4 underwent HTx). Comparing the initial parameters of these patients with those of the 39 who remained stable, we found no differences in exercise tolerance (including VO_2max) or LV enddiastolic volume (290 ± 90mL versus 278 ± 80mL) or ejection fraction (21 ± 7% versus 20 ± 6%). However, patients with subsequent clinical worsening had initially more altered transmitral flow profiles (shorter E-wave deceleration time, higher E/A ratios) and higher NT-ProBNP levels ($P < .05$). Also, strain imaging revealed lower systolic strain rate (SSR), higher systolic dyssynchrony, lower late diastolic strain rate (DSR_A) and higher strain rate DSR_E/DSR_A ratios ($P < .05$). At certain cut-off values, the transmitral E/A ratio, the 2D-strain derived dyssynchrony indexes and the DSR_A showed positive and negative predictive values for short-term cardiac stability of between 83%-89% and 85%-90%, respectively.

Conclusions: In clinically stable HTx candidates with DCM, the transmitral flow profile and certain 2D-strain imaging parameters reflecting alterations of LV compliance and regional synchrony of contraction are predictive for the short-term (6 month) course of HF and may therefore be valuable in guiding listing procedures for HTx.

ECHOCARDIOGRAPHY CAN PREDICT SHORT-TERM COURSE OF RIGHT HEART FAILURE IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION REFERRED FOR TRANSPLANTATION

M. Dandel, H. Lehmkuhl, C. Knosalla, R. Hetzer

Background: With prolongation of waiting times for heart transplantation (HTx), identification of patients with the need for HTx, anticipation of clinical worsening and finding predictors of HTx-free outcome are major goals. We assessed the predictive value of echocardiography (ECHO), exercise testing, and NT-pro-BNP in HTx candidates with pulmonary arterial hypertension (PAH) to gain information useful in guiding HTx listing procedures.

Methods: We selected all consecutive Tx candidates with PAH, except those with systemic-to-pulmonary shunts, who were stable in WHO/NYHA class III at first evaluation performed between 1/2006 and 6/2007. Initially, after NT-proBNP measurements, patients underwent exercise testing and ECHO including tissue Doppler and strain imaging. All examinations were repeated at each further follow-up during the next 12 months. Parameters were tested for ability to predict HTx-free outcome.

Results: During the first year after initial evaluation, 17 (34.7%) of 49 HTx candidates showed clinical worsening despite maximum medical therapy and 9 of them died. Only 4 survived without Tx. Comparing parameters obtained from these patients at first evaluation with those from the 32 patients who remained stable, we found no differences in systolic pulmonary arterial pressure (PAP_{syst}), right ventricular (RV) size and ejection fraction, right atrial size, tricuspid annulus plane excursion (TAPSE) or NT-proBNP plasma levels. However, those with subsequent worsening had initially lower RV wall motion peak velocities and higher systolic PAP_{syst} / stroke volume (PAP_{syst}/SV) ratios ($P < .05$). In unstable patients, strain imaging revealed higher early per late diastolic strain rate (SRE/SRA) ratios and higher RV longitudinal systolic dyssynchrony ($P < .05$). At certain cut-off values, the PAP_{syst}/SV and SRE/SRA ratios showed predictive values of between 83% and 90% for 1 year clinical stability.

Conclusions: In clinically stable HTx candidates with PAH, the PAP_{syst}/SV ratio and the RV longitudinal diastolic strain rate are predictive for the short-term (12 month) course of RV function and may provide valuable guidance in listing procedures for HTx.

TISSUE DOPPLER AND 2D STRAIN IMAGING IMPROVE THE EVALUATION OF UNLOADING-INDUCED CARDIAC RECOVERY AND FACILITATE PROGNOSTIC ASSESSMENTS BEFORE AND EARLY AFTER ASSIST DEVICE REMOVAL

M. Dandel, Y. Weng, T. Krabatsch, R. Hetzer

Background: Echocardiographic (ECHO) monitoring of cardiac size and function during "off-pump" trials is useful for detection of myocardial recovery during mechanical unloading. Parameters such as left ventricular (LV) diameters and ejection fraction (EF) can predict the outcome after LV assist device (LVAD) removal. However, high inter-observer variability and load dependency of EF measurements are relevant limitations. Because velocity parameters measurable by tissue Doppler (TD) and 2D strain imaging are more reliable for estimation of LV systolic function, we assessed their usefulness for evaluation of LVAD-promoted cardiac recovery.

Methods: Data collection for TD evaluation was started in 1999. Pulsed-wave TD (PW-TD) measurements of systolic wall motion peak velocities (Sm) at the basal posterior wall were performed during "off-pump" trials before LVAD removal and during all follow-up examinations of cardiac function after LVAD removal. Since 2005, also strain and strain rate (SR) measurements (radial, circumferential and longitudinal) were performed. Sm, strain and SR were tested for relationship with stability of cardiac improvement.

Results: Post-weaning heart failure (HF) recurrence occurred in 9 (33.3%) of 27 patients who underwent PW-TD. Longitudinal and radial Sm was lower in these 9 patients than in those with post-weaning cardiac stability ($P < .01$). Off-pump radial and longitudinal Sm ≥8cm/s showed predictive values of 87 and 90%, respectively, for 5 year post-weaning stability. Strain and SR measured in 17 patients revealed higher systolic values and better intraventricular synchronicity in post-weaning stable patients ($P < .01$). In post-weaning stable patients global systolic strain and SR values were: ≥30% and ≥0.95/s for radial thickening, ≥15% and ≥0.8/s for circumferential shortening, ≥12% and ≥0.65/s for longitudinal shortening, respectively. Sm, strain and SR instability before and early after LVAD removal appeared predictive for post-weaning HF recurrence.

Conclusion: PW-TD and 2D-strain imaging, which are highly sensitive for detection of myocardial dysfunction, easy to perform and not time consuming, are useful for evaluation of unloading-induced cardiac recovery and helpful for prognostic assessment before and early after VAD removal.

ASSESSMENT OF ELECTRO-MECHANICAL DISSYNCHRONY IN PATIENTS WITH ISCHEMIC HEART FAILURE

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Purpose of our study was identification and prognostic evaluation of segmental contractility and intraventricular dissynchrony in patients with ischemic heart failure (IHF).

Methods: Forty six patients with various forms of IHF– left ventricular (LV) aneurysm, myocardial scar without LV aneurysm and angina pectoris without myocardial scar were examined. Patients were divided into 3 groups by NYHA classification: group 1 [15%] (I functional class-FC), group 2 [24%] (II FC) and group 3 [61%] (III-IV FC). We performed three-dimensional echocardiography (3D Echo) to calculate LV systolic dissynchrony indices – SDI and Tmsv 16-Diff. By Strain Rate Imaging (SRI) we calculated following dissynchrony indices: Ts-SD, Ts-Diff and kinetic heterogeneity index (KHI). QRS duration and internal deviation time (IDT) were calculated by body surface potential mapping (BSPM) to estimate intraventicular conduction.

Results: 3D Echo dissynchrony indices (SDI and Tmsv-Diff-16) significantly differed in all 3 groups: in group 1 SDI was 3.1 ± 2.9%, Tmsv-Diff-16 12.8 ± 2.4%; in group 2 SDI was 5.5 ± 2.5%, Tmsv-Dif-16 20.8 ± 9.7%; in group 3 SDI was 9.6 ± 3.9%, Tmsv-Dif-16 35.7 ± 7.2% ($P < .05$). KHI was 1.99 ± 0.28 in group 1, 1.07 ± 0.37 in group 2 and 0.84 ± 0.22 in group 3 ($P < .05$). LV dissynchrony indices negatively correlated with LV ejection fraction (EF) and NYHA FC. Significant differences in QRS duration and IDT were revealed between groups 1 and 3 and 2 and 3.

We found high positive significant correlation of LV aneurysm area, calculated by isointegral QRST maps, with deformation indices. (r = 0.76, $P < .05$). We also found significant positive correlation of KHI with LV EF and its negative correlation with NYHA FC.

Conclusion: Intraventricular dissynchrony indices (SDI, Tmsv-Dif-16, Ts-SD), LVEF, mitral regurgitation and KHI are most informative parameters, significantly correlating with HF FC.

EVEROLIMUS PREVENTS ENDOMYOCARDIAL REMODELLING AFTER HEART TRANSPLANTATION

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Background: Endomyocardial remodelling after heart transplantation is characterized by a patho-anatomical shift from a regular myocardial syncytium to progressive fibrosis and scars. The potential of everolimus to prevent this process has not been evaluated as yet.

Methods: We studied prospectively 132 patients who underwent biopsy follow-up at 4 weeks, 1 year and 3 years after heart transplantation. Fibrosis and scars (Zeiss Vision, in Sirius), collagens III and IV (immunohistochemistry) and cellular rejection (H&E) were studied in biopsy. Transplant vasculopathy was assessed by coronary angiography at each follow-up.

Results: Fibrosis increased slightly from 7.7 ± 0.4% to 8.0 ± 0.7%, while the amount of scar tissue ranged between 24.4 ± 1.2% and 30 ± 1.4%. Patients on everolimus presented with less fibrosis (6.6 ± 0.5% versus 8.7 ± 0.6%, $P = .012$; 6.8 ± 0.6% versus 8.4 ± 0.7%, $P = .013$; 6.6 ± 0.6% versus 10.9 ± 1.9%, $P = .007$) and less scarring at 3 years post-transplant (19.9 ± 1.9% versus 31.9 ± 4.6%, $P = .006$). Patients with angiographic peripheral obliterations showed in the 1- and 3-year follow-up higher amounts of fibrosis (9.9 ± 0.9% versus 7.9 ± 0.6%, $P = .030$; 7.1 ± 0.6% versus 10.0 ± 1.6%, $P = .041$). In regression analysis, everolimus and beta blockers were identified as anti-fibrotic factors, while peripheral obliterations were pro-fibrotic. Acute cellular rejection episodes were not correlated to biopsy findings or immunosuppression.

Conclusions: Everolimus prevents endomyocardial remodelling after heart transplantation and has beneficial effects on preservation of the myocardial syncytium. Angiographic peripheral obliterations are linked to increased amounts of endomyocardial fibrosis, suggesting a relevant effect on microvascular perfusion.

STANFORD TYPE B LESIONS IN CORONARY ANGIOGRAPHY INDICATE MICROVASCULAR DYSFUNCTION AFTER HEART TRANSPLANTATION

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Background: Transplant vasculopathy (TVP) presenting with microvascular dysfunction has been shown to indicate poor survival after heart transplantation (HTx). We hypothesized that angiographic Stanford type B lesions (proximal negative or positive remodelling combined with peripheral obliterations) correlate with microvascular dysfunction and might be a marker for relevant deterioration of coronary perfusion in patients with TVP.

Methods: We prospectively studied 66 pts (54 men, mean age 50 yrs) who underwent coronary angiography and Doppler flow velocity measurements (basal flow velocity, flow velocity after NTG and coronary flow reserve [CFR] after adenosine administration) at 4 weeks and 1 year after HTx. Coronary angiograms were assessed using the modified Stanford classification (type A [focal stenosis], B1, B2 lesions, peripheral obliterations).

Results: At 4 wks, basal flow velocity, flow after NTG and CFR were 23.9 cm/s, 17.5 cm/s and 2.8, respectively. At 1 year, basal flow velocity was 24.7 cm/s, flow after NTG was 15.9 cm/s and CFR was 2.8. Stanford type A, B1 and B2 lesions and peripheral obliterations were present in 7%, 12%, 16% and 28% of pts at FU1 and in 32%, 32%, 37% and 59% of pts at FU2, respectively. Eight pts had undergone PCI and stent implantation at 4 wks and another 8 pts at 1 year post-transplant. No correlations were found between Stanford lesions or peripheral obliterations and functional tests at 4 wks post-transplant. However, decreased basal flow velocities early after HTx were found in pts presenting at 1 year with type A lesions (25 ± 1 versus 19 ± 1 cm/s; $P = .008$) or type B lesions (25 ± 1 versus 19 ± 1 cm/s; $P = .008$). At 1 year after HTx (FU2), CFR was significantly lower in pts with type B lesions (2.5 ± 0.2 versus 3.1 ± 0.1; $P = .006$) and in pts with peripheral obliterations (2.6 ± 0.1 versus 3.1 ± 0.1 cm/s; $P = .018$).

Conclusions: Stanford type B lesions and peripheral obliterations in coronary angiography indicate microvascular dysfunction as assessed by functional intracoronary tests and seem to be a marker for relevant deterioration of coronary perfusion in patients with TVP.

ADAPTIVE GROWTH AND REMODELLING OF TRANSPLANTED HEARTS IN CHILDREN

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Background: Adaptive and remodeling mechanisms of the transplanted heart itself has not been well studied.

Objective: To evaluate the remodeling behavior and adaptive growth of the transplanted hearts in pediatric heart transplant recipients by comparing the age, size and histocompatibility of the donor heart to that of the recipient at the time of transplantation and over a period of time.

Methods: One-hundred sixty seven children (median age 9 years; range 0-17 years) underwent orthotopic heart transplantation in our institution from 1987 to March 2010.

Results: Kaplan Meier-survival analysis showed a survival rate of 60.7 ± 4.61 % at 15 years. Among the 101 heart transplant survivors, 57 (46.6%) had right and left ventricular dimensions and area significantly greater in relation to their body surface area (z score 3.8, $P = .001$)). Right and left ventricular end-diastolic volumes were also found to be significantly increased (z score 4.96, $P < .005$) in relation to the recipients' body surface area. At a median post-transplantation time of 9 months (range 3 months -2 years), there is a significant reduction of the right ventricular area (z score = 1.8, $P < .003$), left ventricular dimensions (z score = 1.20, $P < .001$), right ventricular end-diastolic volume (z score 1.4, $P < .001$) and left ventricular end-diastolic volume (z score 1.38, $P < .001$).

Conclusions: This study demonstrated that the transplanted heart undergoes remodeling process and grow adaptively, in relation to the body surface area, over a period of time.

HYPERTROPHIC CARDIOMYOPATHY: A MODERN LOOK ON THE DEVELOPMENT AND STAGES OF TREATMENT

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Objective: Hypertrophic cardiomyopathy (HCM) is a complex and relatively common genetic cardiac disease and has been the subject of intensive scrutiny and investigation for over 40 years. The aim of this nonrandomized cohort study was to compare subjective and objective outcomes in HCM patients (pts) undergoing drug therapy, surgical myotomy- myectomy, DDD pacing and alcohol septal ablation.

Methods: We examined 184 pts: 103- nonobstructive HCM and 81 with obstructive form (HOCM). All pts with nonobstructive form were on drug therapy. 81 conseqútive pts with drug refractory HOCM were treated invasively. Dual chamber pacemaker implantation was performed for 49 pts with previous positive temporary DDD pacing test (group 1). In 28 pts with massive LV hypertrophy and its cavity obliteration extensive myotomy-myectomy was performed (group 2). In 4 pts with midventricular obstruction and appropriate coronary anatomy alcohol septal ablation was performed (group 3).

Results: Peak LVOT gradient was 84.1 ± 15.2 mm Hg in group 1, 113.3 ± 14.9 mm Hg in group 2 and 98.5 ± 7.9 mm Hg in group 3. DDD pacing with optimal atrio-ventricular delay (85-180 ms for atrium pacing and 45-120 ms for atrial sensing) brings dramatic decreasing LVOT gradient to 17.6 + 11.8 mm Hg and FMR degree. After extensive myoectomy we observed reducing LVOT gradient to 17.3 ± 10.2 mm Hg. Septal alcohol ablation in group3 brings LVOT gradient decrease from 98.5 ± 7.9 to 31.4 ± 4.3 mmHg.

Conclusions: Surgical myectomy, DDD pacing and alcohol septal ablation are equally effective in reducing obstruction. DDD pacing is preferable in cases without massive LV hypertrophy and its cavity obliteration. Alcohol septal ablation is preferable in cases with midventricular obstruction and appropriate coronary anatomy. Surgical myotomy- myectomy remains the gold standard for HOCM treatment.

ISOLATED EXTENDED MYECTOMY TO CORRECT MITRAL DISEASE AND LEFT VENTRICULAR OUTFLOW GRADIENT IN HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY

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Objective: Septal myectomy (SM) has become the treatment of choice for symptomatic patients with hypertrophic obstructive cardiomyopathy (HOCM). However SM is frequently associated to mitral replacement or repair considering this definitive approach more effective for relieving both obstruction and functional mitral regurgitation (MR). The purpose of the study was to examine if isolated extended septal myectomy (Messner Technique) is effective in complete and permanent left ventricular outflow gradient (LVOT) and MR reduction.

Methods: We assessed 63 consecutive patients with HOCM undergoing extended septal myectomy during a 12 years period (between January 1996 and December 2008). Mean age at operation was 53.2 ± 17.9 years, (63% female). Preoperative LVOT gradient was 101.5 ± 38.1 mmHg, mean MR was 2.4 ± 1.1: trivial in 12 (17.1%) patients, mild in 22 (31.4%), moderate in 15 (21.4%) and severe in 19 (27.1%) .

Results: No hospital death occurred. At discharge the peak rest LVOT gradient decreased to 16.7 ± 10.6 mmHg ($P < .001$) and a significant reduction in the degree of MR 0.9 ± 0.7 ($P < .001$) was noticed. At mean follow-up, 2.7 ± 2.69 years, there was one death for pneumonia (0,6%); the majority of patients (98.5 %) were in NYHA class I or II ($P < .0001$); LVOT gradient was reduced to 14.2 ± 7.6 mm Hg ($P < .001$) and the mean decreased of MR was 0.9 ± 0.7 ($P < .001$) follow-up.

Conclusions: In our HOCM cohort, extended surgical myectomy without any other mitral valve procedure is effective in improving symptoms reducing significantly LVOT gradient and mitral regurgitation in early and late follow-up.

ECMO FOR THE TREATMENT OF SEVERE RESPIRATORY AND HEART FAILURE FOLLOWING CARDIAC SURGERY

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Introduction: The aim of the study was to review our experience of use of ECMO for the treatment of cardiogenic or respiratory failure following cardiac surgery.

Patients and Methods: We reviewed the records of 32 consecutive adult patients, who underwent 34 ECMO placement for the treatment of refractory cardiogenic shock or respiratory failure from January 1, 2008 to June 31, 2010. Indication for cardiac ECMO was inability to wean from cardiopulmonary bypass or post-cardiotomy heart failure refractory to medical treatment. Indication for pulmonary ECMO was respiratory failure with low arterial PaO_2 despite optimization of mechanical lung ventilation. In all cardiac ECMO cases thoracic cannulation were used. For lung support percutaneus canulation of femoral and jugular veins were performed.

Results: Four patients were after isolated CABG surgery, 6 after CABG/valve surgery, 14 after valve repair/replacement, 1 after heart transplantation and in 1 case surgical correction was not performed. The mean age of the patients was 63 ± 15 (range 21-81) years, the average preoperative euroscore 7 ± 3.0. In 6 cases ECMO was used after unsuccessfull weaning from CPB, 19 patients had an intraaortic ballon as initial device for hemodynamic stabilization. All patients were on high doses of inotropes. The average time on ECMO support was 121 ± 116 (range 6 – 530) hours. In 17 (53%) cases patients were successfully weaned from the device and 8 (25%) survived to hospital discharge.

Conclusion: ECMO is a valuable tool for the treatment of refractory cardiogenic shock or respiratory failure following cardiac surgery for patients with a high probability of death.

ADULT ECMO FOR A CARDIAC SURGICAL PATIENT IS ASSOCIATED WITH IRREFUTABLE DEATH AND UNJUSTIFIED DEPLETION OF HOSPITAL BLOOD SUPPLY

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Purpose: The use of extracorporeal membrane oxygenator (ECMO) for hemodynamic support in an adult cardiac surgical patient remains unsettled. In this study, we reviewed our experience in adult cardiac surgical patients who had ECMO implantations.

Method: Retrospective chart review was performed in 23 patients (14 males and 9 females with mean age of 54 years, range = 16 to 82 years) with ECMO between Jan 2008 and Dec 2009when 764 adult open heart operations performed. Of these, 19 patients (82 %) had ECMO implanted following an adult cardiac operation; 2 (9%) had IABP insertion and 2 (8%) had no cardiac operations. Of 23 patients, only 8 (35%) had prior cardiac surgery. Data variables were collected through STS- formatted institutional database. Values were expressed as simple distributions and percentages.

Results: The incidence of ECMO use was 3% (23/764). Of 23 patients, 7 patients (30%) had CABG; 6 (26%) heart valve surgery; 2 (8%) CABG plus heart valve surgery; 2 (8%) heart transplant; 1 (4%) CABG plus Bentall; 1 (4%) Extra cardiac Fontan operation. In 9 patients (39%), ECMO was implanted at the end of the operation; 10 had stay in the ICU for 1 to 7 days after the cardiac operation. The 30-day mortality rate was 100% (23/23). The time interval between the ECMO implantation and death averaged at 8 days (range = 0 to 26 days). Death ensued on the day of ECMO termination in 15 patients (65%); and 8 patients (35%) died 1 to 26 days after ECMO termination. The unsustainable massive transfusions included 2,918 units: 803 packed red cell transfusions (34/patient); 814 fresh frozen plasma (35/patient); 983 platelets (43/patient); and 318 cryoprecipitate (14/patient).

Conclusions: The use of ECMO for hemodynamic support in an adult cardiac surgical patient is associated with a prohibitive death rate and unjustified consumption of hospital's blood supply. Collaborative objective clinical guidelines are urgently needed to justify its continued use.

BIVENTRICULAR CIRCULATORY SUPPORT WITH TWO IMPLANTABLE ASSIST DEVICES

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Introduction: Left ventricular assist device (LVAD) implantation in end-stage heart failure patients is routine. Bi-ventricular support systems, however, offer a limited quality of life. We report a new technique using two implantable centrifugal pumps as a biventricular support system.

Patients and Methods: Twelve patients (9 male, 3 female) received two HeartWare HVAD centrifugal pumps (HeartWare Inc., Framingham, MA) – one as LVAD and one as RVAD.

As the low resistance of the pulmonary circulation would lead to an inappropriately high RVAD flow, we narrowed the RVAD outflow graft, thereby increasing the afterload of the pump.

Nine patients were suffering from idiopathic dilative cardiomyopathy, three from end-stage ischemic disease. All but two patients had biventricular decompensation despite inotropic support (Intermacs II). Patients' ages ranged from 29 to 73 years and body mass index from 17 to 26 kg/m².

Results: Perioperative (30-day) survival was 83% and so far 7 of the 10 survivors have been discharged home. No late deaths have occurred up to now. The first of the patients has now been supported for 250 days. No thromboembolic events and no driveline, pocket or wound infections have been detected. Clinical parameters of hemolysis have not been significantly increased compared to those of our LVAD patients with the same pump.

Conclusion: The implantation of two HeartWare pumps is a safe and effective option for patients requiring biventricular support.

The crucial technical aspect allowing the use of the HVAD pump as RVAD is the narrowing of the outflow graft, thus optimizing the flow/pressure relationship.

ANTICOAGULATION MANAGEMENT DURING CENTRIMAG RIGHT VENTRICULAR ASSIST DEVICE SUPPORT AFTER HEARTMATE II IMPLANTATION

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Background: Temporary right ventricular assist device (RVAD) for treatment of RV failure (RVF) requires adjustment of the anticoagulation treatment, especially during the weaning period.

We present our experience with CentriMag (Levitronix, Waltham, Mass.) RVAD support after HeartMate II implantation and describe anticoagulation regimens in patients with and without heparin-induced thrombocytopenia (HIT).

Methods: Of 58 patients who underwent Heart Mate II implantation at our institution between January 2008 and July 2009, 6 needed an RVAD for postoperative RVF. Three patients received unfractionated heparin and 3 were treated with argatroban because of HIT. Coagulation profiles and complications were analyzed in both groups. RVAD flow was defined as high (> 2 L/min) or low (< 2 L/min).

Results: All patients were successfully weaned from the RVAD after a median of 15 (3-33) days of support. The mean aPTT varied between 42 and 62 s during high flow and 46 and 78 s during the low flow phase. After chest closure, no patient suffered bleeding requiring surgery. Postoperatively all patients needed transfusion of packed red blood cells during RVAD support (median 14 (4-34) units). The weaning protocol was uniform in all patients with a stepwise decrease in RVAD flow to <2 L/min for a median of 3.5 days.

Conclusion: CentriMag RVAD support requires an increase of the anticoagulation level compared to that for HeartMate II support only, especially during RVAD weaning. Heparin and argatroban show comparable safety in the prevention of thromboembolic complications without additional risk for bleeding during RVAD support.

RADIOFREQUENT LABELS FOR OPTIMIZATION OF DOR PROCEDURE IN PATIENTS WITH VENTRICULAR TACHYCARDIA

Vladimir Shipulin

Ventricular tachycardia causes lethal outcomes in 50% of the patients with remodeled left ventricle after myocardial infarction.

Methods: Thirty two patients with CAD were enrolled into the study. Diagnosis was based on the data of Echo CG, coronarography and MRI. Electrophysiological study (EPS) and CARTO-XP reconstruction of LV were performed for every patient. In all the patients zones of an electric scar and zones of low electric potential (up to 0.5 mV) were revealed. Poor conduction and double potential able to trigger re-entry were registered by the electrogram. During the EPS study radiofrequent labels were mapped along the problem zones borders. The patients were subjected to Dor procedure with resection of endocardium mapped with radiofrequent labels. CABG was performed in all the patients.

Results: In the early post-operative period EPS showed improvement in all the patients: zones of electric scar could be noticed only in the area of endoventricular patch, zones of low potential disappeared at all, transient zones (from 0.5 to 1.5 mV) took a limited space without ability to manifest re-entry and induce VT.

Conclusions: Radiofrequent labels allow to define precisely a zone for endocardectomy that is an essential for Dor procedure.

DILATED CARDIOMYOPATHY: IS SUTURE ANNULOPLASTY REALLY FORGOTTEN?

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Objective: Patients with end stage dilated cardiomyopathy exhibit extensive remodelling of the left ventricle, annular dilation, and significant mitral and tricuspid regurgitation. These changes increase perioperative morbidity and mortality, and emphasize patient candidacy for heart transplantation. We previously published that Reductive Annuloplasty of Double (mitral and tricuspid) Orifices (RADO) could be successfully applied in selective patients with primary and ischemic dilative cardiomyopathy. However, it was unclear if suture annuloplasty should be completely replaced with ring annuloplasty in such cases.

Methods: We analysed 18 years long experience of our modification of mitral and tricuspid suture annuloplasty applied in patients with end stage dilative cardiomyopathy. Coaptation depth of the mitral valve (tenting area) was analysed as a possible criteria in decision-making process for suture vs. ring annuloplasty. Modified De Vega tricuspid annuloplasty was performed in all patients.

Results: RADO procedure with suture annuloplasty demonstrated lower recurrence of annular dilation and better long-term durability if mitral valve coaptation depth is used as criteria. Mitral valve tenting area lower than 1.1cm could be used as a cut-off point for suture versus ring mitral valve annuloplasty.

Conclusion: RADO procedure with modified suture annuloplasty could be successfully applied in selective patients with dilative cardiomyopathy. Our method should not be recognized as a valve repair, but ventricular repair procedure also.

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MID TERM RESULTS OF SURGICAL VENTRICULAR RESTORATION: LEFT VENTRICULAR SHAPE AND SIZE INFLUENCE ON CARDIAC FUNCTION, CLINICAL STATUS AND SURVIVAL

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Objective: To assess the mid-term results of Surgical Ventricular Restoration for the treatment of Ischemic Dilated Cardiomyopathy.

Methods: 311 patients with Ischemic Dilated Cardiomyopathy and severe Left Ventricular dysfunction underwent Surgical Ventricular Restoration. 209 patients underwent Septal Patch, 65 patients underwent DOR, 12 patients underwent OLCVR, 10 patients underwent Linear Repair, 5 patients underwent Lateral Plication, 6 patients underwent Inferior Wall Plication and 4 patients underwent Double Patch surgery.

Results: Overall mortality was 13.5% (42 patients) amongst which in-hospital mortality was 4.5% (14 patients). At a mean follow-up of 29.64 months, echocardiography showed a significant decrease in LVEDV from 171.29 + 43.70 mL 135.07 + 36.71 mL and LVESV from 129.74 + 40.11 mL to 95.29 + 29.67 mL. The LVEDD improved from 60.88 + 12.95 mm to 56.23 + 7.64 mm and LVESD from 48.85 + 8.16 mm to 44.85 + 8.73 mm. Ejection fraction increased from 23 + 6% to 29 + 6%. NYHA class was improved from 2.94 + 0.63 to 1.90 + 0.70.

Conclusions: Surgical Ventricular Restoration can reduce Left Ventricular Volume; improve Ejection Fraction and Quality of Life in selected group of patients.

MITRAL VALVE FUNCTION AFTER SURGICAL TREATMENT OF ISCHEMIC HEART FAILURE

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Objective: To evaluate the mitral valve (MV) function in patients with ischemic heart disease complicated with left ventricular (LV) dysfunction before and after surgery.

Methods: In this study we included 200 patients with ischemic heart failure who underwent surgical treatment. There were 178 men and 22 - women, with a mean age 56 ± 8, with 3-4 NYHA functional class, and EF less than 35%.

Myocardial revascularization was performed in all patients. Indication for MV surgery was severe mitral regurgitation (MR) grade 3-4 in 32 patients. Mitral valve repair was performed in 28 patients and mitral valve replacement – in 4 patients. Surgical correction of coronary and mitral incompetence combined with left ventricular reconstruction in 76 patients.

Results: Overall hospital mortality was 5.5 %. The mean NYHA functional class decreased from 3.4 ± 0.6 to 2.1 ± 0.7 postoperatively. MV repair combined with myocardial revascularization or LV reconstruction resulted in significant decrease of MR grade from 2.4 ± 0.8 to 1.3 ± 0.7 postoperatively, but it progressed to 1.6 ± 0.7 in 1-year follow up (P = .04). In patients with isolated CABG MR grade increased from 1.4 ± 0.6 to 1.6 ± 0.7 at 12 months after surgery (P = .9). In patients with LV reconstruction combined with coronary revascularization MR grade remained at preoperative levels (1.4 ± 0.6 preoperatively, and 1.2 ± 0.6 in 12 months after surgery, P = .08).

Conclusions: In patients with severe LV dysfunction, coronary artery bypass grafting and LV reconstruction, does not result in significant changes of ischemic MR.

LV RECONSTRUCTIVE SURGERY: PROGNOSTIC VALUE OF MYOCARDIAL VIABILITY RECOGNIZED BY LOW-DOSE DOBUTAMINE ECHOCARDIOGRAPHY

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Background: The present study was undertaken to evaluate the predictive significance of assessment of myocardial viability for patient's perioperative and long-term survival after surgical ventricular restoration (SVR).

Methods: A retrospective review of 139 consecutive pts who underwent SVR during the period since 1999 till 2006. The average NYHA FC prior SVR was 3.4 ± 0.6 LV EF – 32.0 ± 8.8%, LV ESVI – 64.5 ± 27.6 mL/m^2, mean LV EDD – 6.4 ± 0.8cm. Myocardial viability was assessed according to standard low-dose dobutamine stress echocardiography protocol. The univariate logistic regression model with one independent variable was used to predict the preoperative and long-term mortality by means of evaluating preoperative clinical, operative and echocardiography data.

Results: Nine (6.5%) pts died during the first 30 postoperative days, 26 (23.4%) – during long-term follow-up. The survival was assessed using Kaplan-Meyer method. The 6 year survival with perioperative mortality was 62.8 ± 6.5%. Mean LV EF improved to 37.5 ± 7.9% ($P < .001$) and remained stable at late follow-up. Mean LV EDD decreased to 53.7 ± 17.1 mL/m^2 (P = .015), but raised at late follow-up and after 3 years was equal to 57.7 ± 23.1 mL/m^2 (P = .15). Statistically significant factors for prediction of perioperative mortality were duration of the illness (P = .005), NYHA FC IV (P = .04), LV aneurysm located in posterobasal inferior wall (P = .001), rhythm disturbances (P = .03), mitral valve surgery (P = .01), LV EF ≤20% (P = .002), but not signs of myocardial viability (OR1,123 (0.176; 7.337); P = .9). Logistic regression showed that myocardial viability was not a predictive factor for long-term mortality (OR1,548 (0.40; 5.98); P = .5).

Conclusions: Low-dose dobutamine stress echocardiography prognostic value in prediction of perioperative and long-term survival after SVR in doubtful.

MID TERM RESULTS OF MITRAL RING ANNULOPLASTY FOR THE SURGICAL TREATMENT OF FUNCTIONAL MITRAL REGURGITATION IN ISCHEMIC DILATED CARDIOMYOPATHY

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Objective: To assess the mid-term results of GeoForm ring for the treatment of functional mitral regurgitation (FMR).

Methods: 128 patients with FMR and severe Left Ventricular dysfunction underwent GeoForm ring implantation. Eighty-seven

patients (67.6%) were in NYHA class III-IV. Concomitant procedures were CABG (81 pts), AVR and/or CABG+AVR (4 pts), CABG+SVR (38 pts), SVR (4 pts) and one patient had underwent only GeoForm ring implantation.

Results: Overall mortality was 21.9%. Mortality was 26.19% in the patients who underwent CABG + SVR + GeoForm while 7.74% mortality observed in patients who underwent CABG + Geoform only. At a mean follow-up of 29.64 months, MR was absent in 35.42%, mild in 43.75% and moderate in 8.3% patients. Echocardiography showed a significant decrease in LVEDV (preoperative 173.23 + 42 mL to postoperative 135.06 + 28.85 mL), LVESV (preoperative 130.05 + 38.5 mL to postoperative 101.80+25.05 ml), LVEDD (preoperative 59.10 + 6.71 mm to postoperative 53.62 + 6.29 mm), LVESD (preoperative 47.39 + 8.54 mm to postoperative 44.41 + 4.84 mm). Ejection fraction increased from 25.98 ± 7.45% to 32.11 ± 7.06%. NYHA class was I/II in 68.75% postoperatively.

Conclusions: The GeoForm ring is effective in relieving FMR in most of the patients with ischemic dilated cardiomyopathy. The mortality is significantly higher in the patients who require CABG + SVR as a concomitant procedure with Geoform Ring Implantation.

THE "LOCIMAN" SYNDROME: DIAGNOSIS, TREATMENT AND OUTCOMES

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Objective: The failing left ventricle in ischemic cardiomyopathy is characterized by dilation and loss of contractility. In particular coincident post-infarction LV aneurysm and severe ischemic mitral regurgitation lead to a significant pathologic alteration of ventricular geometry and performance. Based on this experience we identified the "Lociman" syndrome, a complex of **L**V dysfunction, **o**bstruction of the **c**oronary arteries, **i**schemic **m**itral regurgitation and LV **an**eurysm, and propose a strategy for its treatment.

Methods: In a prospective study 118 patients who underwent CABG (74%), mitral valve repair (66%), replacement (31%) and LV aneurysmectomy (14%) during 2005-2010 were included. Heart catheterization and echocardiography were performed to assess cardiac hemodynamics, morphology and function.

Results: All patients had NYHA class III or IV symptoms of congestive heart failure. LV end-diastolic pressure, mean pulmonary arterial pressure and LVEF were 22 ± 7.8 mm Hg, 35 ± 11.3 mm Hg and 25 ± 4.8%, respectively. The in-hospital mortality was 11% and survival rate at 2 and 4 years 71% and 56%, respectively. Postoperatively there was a significant improvement of ejection performance (LVEF 25→32%, $P < .001$). Further, the absolute gain of EF was correlated with the extent of surgery (single revascularization or ventricular reconstruction versus combination) ($r = 0.3$, $P < .02$).

Conclusions: In "Lociman" patients the ischemic LV and its pathologic geometry lead to significant impairment of cardiac hemodynamics and function. A combined approach of revascularization and ventricular reconstruction is effective rather than a single procedure and should be the aim if possible. It can be performed with acceptable surgical risk and provides good long-term survival.

26 YEARS OF HEART TRANSPLANTATION PROGRAMME IN IKEM

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The aim of this retrospective analysis was to evaluate our heart transplantation results in the period between the 31th January 1984 and the 28th February 2010.

Methods: Orthotopic HTX (heart transplantation) was performed in all patiens, with bicaval anastomosis technique since 1996. The patients have been registred in our computer database.

Material: 772 HTX in 765 patients were performed in the above mentioned period. six hundred and thirty-four patients (83%) were males, the average recipient´s age was 47.8 ± 11.4 years (from 8 to 74 years). The diagnoses for which HTX was performed were the following: 39.3% coronary heart disease, 49% dilated cardiomyopathy, 5.5% valve disease, 2.6% congenital heart disease, 1% re HTX, 2.6% other diagnoses. Biventricular mechanical assist device (Thoratec) had been implanted before HTX in 39 of these patiens and left mechanical assist device (Heart Mate II) in 11 of them. Immunosuppressive regimen: Prophylaxis with polyclonal antilymphocyte globulin has been performed since 1992. Long-term prophylaxis consists of calcineurin inhibitor and inhibitor of DNA synthesis and corticosteroids. The most frequent combination in recent years has been tacrolimus, mycophenolate mofetil and corticosteroids.

Results: Patients survival was the following: 30 days in 89.6%, 1 year in 78.9%, 5 years in 66.7%, 10 years in 49.3%, 15 years in 31.9%. The longest survival is 25 years .

The most common cause of death: 33.5% - graft failure, 15.1% - infection, 14.5% - malignant tumors. Four hundred and twenty-three patients (55%) were alive on 28th February 2010.

Conclusion: The results of HTX in IKEM are comparable to other worldwide centres and they prove that HTX is a well-established treatment modality which significantly extends life in selected group of patients.

22nd October 2010-Hall 3-Session 1-Pediatric Cardiology

MYOCARDIAL PERFORMANCE INDEX IN THE ASSESSMENT OF CARDIAC FUNCTION IN PATIENTS AFTER SURGICAL CORRECTION OF TETRALOGY OF FALLOT

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Objective: The aim of this study was the assessment of cardiac function after surgical correction for ToF using Doppler-derived myocardial performance index (MPI).

Methods: 20 patients at the mean age of 18.9 ± 19.3 months were operated due to ToF. Eight patients (group 1) went through one-stage procedure, whereas 12 patients (group 2) went through two-stage procedure. All patients underwent echocardiography evaluation with estimation of MPI after a mean period of 23.7 ± 18.8 months (ranged from 4 to 71). As mentioned in the literature, in the healthy population left ventricular MPI is 0.33 ± 0.10 and right ventricular MPI is 0.32 ± 0.11.

Results: Systolic function in both groups was normal. Right ventricular MPI was 0.32 ± 0.06 for the first group whereas 0.37 ± 0.08 for the second ($P = .09$). Left ventricular MPI in the group 1 (0.34 ± 0.08) and in the group 2 (0.42 ± 0.11) was comparable, $P = .14$. Pulmonary valve regurgitation was found trivial in 9 patients with mean right ventricular MPI of 0.34 ± 0.08 and at least moderate regurgitation in 7 patients with MPI of 0.37 ± 0.7, $P = .22$.

Conclusions: Even though the systolic function got normalized, trivial dysfunction of the ventricles were noted. After surgery for ToF one would assume that the right ventricle is more deformed and needs remodeling, but our experience shows that dysfunction of the left ventricle was more significant, especially in the group undergoing two-staged procedure. Pulmonary valve regurgitation seemed not to influence the right ventricle function. This is just a preliminary report and we are only highlighting the problem and possibilities of its assessment.

MULTI SLICE CARDIAC CT IMAGING IN CONGENITAL HEART DISEASES

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Introduction: Preoperative study of the marbid anatomy of the heart is very essential to plan surgical correction strategy, as the already existing conventional Echo cardiogram and catheterisation study some times fails to demonstrate the abnormal cardiovascular anatomy in compare to the present multislice CT. We like to share our experience in pre operative evaluation by using multi slice CT for correction of congenital heart defects.

Materials and Methods: We analyzed 8 cases of various congenital heart defects surgical finding with pre operative conventional Echo, cardiac catheterisation study and multislice CT Scan. Age range from 2 ½ years to 28 years. Tetralogy of Fallot-3 cases, TAPVC-1, PAPVC-2, systemic venous drainage to LA –1, Pulmonary Atrasia with MAPCAS–1.

The surgical findings correlated to the pre operative echo, catheterisation study and multi slice CT imaging.

Results: Multislice CT imaging gives better anatomical description of the defects in compare to Echo and catheterisation study.

Conclusion: Multi slice CT cardiac imaging is an upcoming diagnomic tool for pre operative evaluation of congenital heart diseases and is non invasive and superior in assessing anatomical defect in compare to catheterisation study.

FETAL ECHOCARDIOGRAPHY IN A DEVELOPING COUNTRY: REFERRAL PATTERNS AND IMPACT ON OUTCOMES OF CONGENITAL HEART DISEASE

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Introduction: Limited data exists on the impact of fetal echocardiography on outcomes of congenital heart disease (CHD) in developing countries with resource limitations to treat complex CHD.

Objective: To report on the referral patterns and impact of prenatal diagnosis on outcomes of congenital heart disease in a newly established fetal cardiology program in South India.

Methods: A dedicated fetal cardiology service was started in our centre in January 2008. Prospective data (2008-10) was collected using a formal database; retrospective data (2006-7) was obtained from hospital records.

Results: 862 patients were referred for fetal echocardiography during the study period (200 in initial and 662 in current era). Gestational age at referral was 24.6 ± 5.9 weeks. The most common indication for referral was abnormal screening ultrasound (37.7%). Two hundred and ninety-one fetuses (33.8%) were detected have CHD, of which 140 (48.1%) were simple and 151 (51.9%) were complex CHD. The most common outcome was termination of pregnancy (32.3%); 73.4% of these were performed after 20 weeks. Intrauterine/neonatal deaths occurred in 16.5% cases. Termination rates were higher for complex CHDs (48.3% versus 15%; $P < .0001$) There was a trend towards more directed deliveries and postnatal care in the current era (17% versus 10.2%; $P = .2$). 23 patients (7.9%) are awaiting delivery; 21 (7.2%) were lost to follow-up.

Conclusions: Referral for fetal echocardiography occurred late in pregnancy, usually when CHD was suspected during screening. Prenatal diagnosis prompted perinatal cardiac care in a very small proportion of cases with about half of the affected pregnancies resulting in termination or fetal/neonatal deaths.

ADULTS WITH CONGENITAL HEART DISEASE IS AN EXPANDING AND UNDERESTIMATED POPULATION. CAN WE PREDICT THE FUTURE DEMAND?

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Objective: The aim of this study is to report the change in incidence of cardiac surgery for adults with congenital heart disease over the last 4 decades and to forecast the future demand.

Methods: The clinical data has been retrospectively collected from 631 patients notes who underwent surgical intervention for congenital heart disease at age greater or equal to 16 years old. The age at operation ranged from 16 to 77 years old. We included all reoperations, palliative and repair procedures recorded as primary operations. The Kaplan–Meier method was used to calculate estimates for long-term survival and freedom from reoperation. The Exponentially Weighted Moving Average model was used to predict the future demand and prevalence.

Results: There were 694 procedures performed in 631 patients. There were 11 operations 1970s, 61 in 1980s, 139 in 1990s and 483 from 2000 until now. The 30 day mortality was 2%. The late survival rates in 5, 10 and 20 years were 93.5 ± 1%, 92.5 ± 1.3% and 88.3 ± 2.4% respectively. 56 (8.8%) patients required reoperation. The overall freedom from re operation in 5, 10 and 20 years was 94.3 ± 1%, 90.6 ± 1.5% and 83.8 ± 2.8%. The prevalence and the actual number of adult congenital heart disease patients that will require operation will increase 2.5 folds by 2020 and 3.5 folds by 2030.

Conclusions: Surgical intervention for congenital heart disease in adults is a safe and low-risk treatment when performed in a specialized centre. It is clear that the incidence of this increasingly complex group of patients is expanding but accurate estimates are nearly impossible.

PRELIMINARY RESULTS OF USING STEM CELLS TRANSPLANTATION FOR PEDIATRIC PATIENTS IN CASE OF DILATED CARDIOMYOPATHY

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Introduction: Dilated cardiomyopathy is a serious disorder of the myocardium in pediatric age. Conservative therapy is limited and lethal outcome observed in one third of patients within a year. Bone marrow derived progenitor cell transplantation is becoming a promising method of treatment in adult population and there is ground to believe there are perspectives in pediatric cardiology.

Materials and Methods: There were 14 patient with dilated cardiomyopathy treated at Children's Clinical University Hospital since 2000 year; 7 of them had lethal outcome till year 2008. The death occurred in the period from 7 to 37 months following the diagnosis established. We have started intramyocardial stem cell transplantation in collaboration with Latvian Center of Cardiology, Pauls Stradins Clinical University Hospital and Cell laboratory since May, 2009Th .6 patients had been admitted for the transplantation of bone marrow derived progenitor cells.

Results: 6 months following bone marrow derived progenitor stem cell intramyocardial transplantation we observed increase of ejection fraction and decrease of dilatation echocardiographycally and decrease of the stage of heart insufficiency clinically from class IV to III(NYHA).

Conclusions: The best clinical effect observed in the patient with the worse initial status. We observed no side effects. The results are promising and let us believe that bone marrow derived progenitor stem cell intramyocardial transplantation is a safe method and might be used for the stabilization of the patient to get the time for further treatment.

CONGENITAL HEART SURGERY: SURGICAL PERFORMANCE ACCORDING TO THE ARISTOTLE COMPLEXITY SCORE

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Background: Aristotle score methodology defines surgical performance as the product of complexity score times hospital survival. We analysed how this performance evolves over time and in conformity with cases volume.

Methods: Aristotle basic and comprehensive complexity scores and corresponding basic and comprehensive surgical performances were determined for main (primary) procedures that were carried out from year 2006 to year 2009. Cases volume performance was estimated as surgical performance multiplied by the number of primary procedures.

Results: Basic and comprehensive complexity scores were, for the whole cohort of procedures (n = 1828), 7.74 ± 2.66 and 9.89 ± 3.91, respectively. With an early survival of 97.7% (1784/1828), global basic and comprehensive surgical performances reached 7.55 ± 2.60 and 9.65 ± 3.82, respectively. For each year, number of primary procedures (N), survival (%), basic and comprehensive (compr.) surgical (surg.) performance, basic and comprehensive cases volume performance, were as following:

Year	N	Survival, %	Basic Surg. Performance	Compr. Surg. Performance	Basic Volume Performance	Compr. Volume Performance
2006	407	96.3	7.46 ± 2.48	9.56 ± 3.91	3036	3891
2007	438	97.9	7.43 ± 2.58	9.22 ± 3.94	3254	4038
2008	496	97.7	7.47 ± 2.76	9.11 ± 3.76	3705	4519
2009	487	97.9	7.80 ± 2.54	10.64 ± 3.65	3799	5182
Total	1828	97.7	7.55 ± 2.60	9.65 ± 3.82	13794	17630

Conclusions: Basic and comprehensive surgical performances evolved differently over years. On the contrary both cases volume performances varied similarly: increasing proportionally year to year. It appears that cases volume performance better reflects activity and efficiency of a congenital heart surgery Department.

MID-TERM RESULTS OF THE SCREENING AND TREATMENT OF CONGENITAL HEART DISEASE AT HIGH ALTITUDE: THE TOUCHING HEARTS IN TIBET PROGRAM

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Children living at high altitude in the Tibet Autonomous Region (TAR) have increased congenital heart disease (CHD) prevalence, morbidity and mortality. In 2000, the "Touching Hearts in Tibet" Program formed to screen and treat children with CHD living above 3,000 meters in each of the seven prefectures of Tibet. All program costs are supported by international donations including the costs for international and local medical experts, equipment and materials, and patient care. We will present data on the first 191 treated children. To date, the program has screened more than 14,000 school children for CHD by exam and echo using mobile specialist teams. Children with significant and treatable CHD were triaged to interventional cath in Lhasa (34%), interventional cath in Beijing (28%), or cardiac surgery in Beijing (38%). Total costs to date including education, medical teams, equipment, supplies, patient transportation, and all treatments is 2.6 Million USD. Most children had patent ductus arteriosus, atrial septal defect, or ventricular septal defect. A small percentage of children had pulmonary or aortic valve stenosis, tetralogy of Fallot, or other defects. Children presenting late with CHD had moderate to severe pulmonary hypertension. The small percentage of children with cyanotic CHD likely reflects mortality prior to school enrollment. Mortality has been less than 2%. In 2009, an SEAPC funded new biplane digital pediatric cath lab opened in Lhasa, Tibet. Thus, CHD can be accurately diagnosed and effectively treated in remote high altitude populations via a multidisciplinary and sustainable approach with in-country facilities and experts.

BRINGING THE WEST TO THE EAST: A FRUITFUL COMBINATION TO HELP CHILDREN IN VIETNAM WITH CARDIAC DISEASE

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Objective: Vietnam is one of the fastest growing economies in East Asia, but the country's health care system requires additional support, in particular the areas of pediatrics and cardiology, to meet the needs of its growing population. In response, we have developed a project that will establish a fruitful bilateral relationship between the Geneva Pediatric Cardiac Center, the University Medical Center of Ho Chi Minh City (UMC), and the Carpentier Heart Institute, with the goals of improving and enhancing the level of training for Vietnamese physicians, optimize partner resources, and save children suffering from congenital heart defects. This project will operate under the auspices of the VinaCapital Foundation (VCF). VCF is one of the leading pediatric health care NGOs in Vietnam and has several programs that build medical capacity and bring access to quality health care to poor children suffering from cardiac defects.

Method: The partners assessed the capacity level, infrastructure, and need for additional training and medical equipment (including surgical materials and echocardiograph machines) at UMC and the Heart Institute in 2009. Collaboration with the Geneva Cardiothoracic Center began in January 2010. The assessment and bilateral exchange of training and knowledge is supported by VCF.

Results: Bilateral visits between Switzerland and Vietnam are taking place, the first in January 2010 and the latest scheduled for October 2010. These visits are achieving the project's goals of training cardiac anesthetists and surgeons, donating much-needed operating equipment such as echocardiograph machines and intra-aortic balloon pumps materials, exchanging knowledge through academic collaboration and publication of studies.

Conclusion: Bringing the western medical training and knowledge to the east can be a optimal, bilateral, productive combination of minds and expertise that increases capacity, knowledge, and infrastructure of Vietnamese physicians and hospitals. The relationships between partners will be strengthened and better-optimized if managed by third-party organization such as VCF. This project will help improve early diagnosis of cardiac disease in the rural areas and surgical capacity in the cardiac centers, and ultimately save the lives of thousands of poor children in Vietnam.

DETECTION OF CONGENITAL HEART DISEASE USING 5 MINUTE EXERCISE SCREENING FOR HIGH ALTITUDE, RURAL TIBETAN CHILDREN

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Children living at high altitude in the Tibet Autonomous Region (TAR) have increased congenital heart disease (CHD) prevalence (5%), morbidity and mortality. Since 2000, the "Touching Hearts in Tibet" Program has screened over 12,000 children and treated over 150 CHD patients via interventional cath or surgery in Lhasa or Beijing. However, CHD detection in remote regions faces many logistical challenges. Therefore, we tested the accuracy of a simple 5 minute exercise challenge to identify children with CHD during a rural community screening of 953 children at 14,950 feet. CHD screening included pulse oximetry, cardiac exam, and echocardiography if a murmur

was detected. From this cohort we recruited 30 children without murmur, 25 with murmur and normal heart by echo, and 16 with murmur and CHD (age 6 to 18 years). We measured oximetry and heart rate before and after exercise and noted exercise time if less than 5 minutes. Resting saturation, saturation after exercise, and average saturation decrease were similar between the groups. Inability to exercise for 5 minutes occurred in 3 of 30 children without murmur (10%), 1 of 25 children with murmur and no CHD (4%), and 8 of 16 children with CHD (50%). Inability to exercise was a better predictor of CHD (67% had CHD) than murmur (39% had CHD). While our method does not approach 100% sensitivity or specificity compared to echocardiogram (where available), it provides a useful screening method to detect clinically significant and treatable CHD in children in remote high altitude settings.

FLASH PULMONARY EDEMA FOLLOWING TOF REPAIR – ETIOLOGY AND MANAGEMENT CONSIDERATIONS

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Objective: To study the probable etiological factors and to identify the management considerations in patients with rapid onset pulmonary edema (Flash Pulmonary edema – FPE) following Tetralogy of Fallot repair without identifiable etiological factors, but managed successfully.

Methods: 5 patients developed FPE following TOF repair over the period of 2 years.

The age ranged from 1.5 – 12 years. (2 M, 3 F). 4 of them developed FPE within 2-3 hrs following extubation on the 2nd postoperative day. 1 developed immediately after shifting from theatre which resolved to reappear on the 3rd day following extubation.

All of them had detailed echocardiographic assessment to rule-out residual or recurrent defects. Two underwent cardiac catheterization with a view to rule out major collaterals.

Results: 4 of the patients were managed successfully by reinstituting positive pressure ventilation and by altering ventilation strategy, specifically by increasing positive end expiratory pressure and by judicious use of diuretics, inotropes, steroids and peritoneal dialysis. The pulmonary edema picture cleared dramatically following mechanical ventilation. One patient was placed on ECMO due to worsening gas exchange, from which the patient was weaned succesfully. This patient later succumbed to gram negative sepsis. All of them were severely cyanosed (< 70%) , had failure to thrive (< 3rd percentile) .All except one had good sized branch PA's (z score > -2.0). None of them had major aortopulmonary collaterals. One patient had tiny residual muscular VSD. Two patients had cardiac cath, which showed elevated LV end – diastolic pressure.

Conclusion: Flash pulmonary edema, is a rare event which manifests dramatically within a few hours of extubation In our study we found failure to thrive and severe cyanosis as a risk factor for the development of this condidtion. Most of them can be managed successfully by reinstitution of mechanical ventilation with optimal PEEP , inotropes and diuresis. Long standing hypoxia in growth retarted patients probably causes LV diastolic dysfunction , which is unable to handle the increased pulmonary venous return following correction. Placing a LA line in high risk patients may help identify the condition earlier.

BOVINE PERICARDIUM FOR THE CORRECTION OF CONGENITAL HEART DESEASES, 20 YEARS EXPERIENCE.

Soulé Mauricio, Juárez Alejandro, Téllez Allan, Ortiz Marlo, Ochoa Jorge

The patch of pericardium has been used usually as an alternative as part of the processing for different surgical procedures, among which congenital abnormalities are included.

Objective: The Objective of this study is to assess the use of bovine pericardium as part of the process of surgical treatment of different conegenital heart deseases, in the national Institute of Cardiology "Ignacio Chavez" México.

Methods: We search in the historic file of the Institute to determine the use is revised to the one which was subjected more than 3000 awarded pericardium pieces to the department of Heart Surgery of the Institute Is determined the conegenital heart desease in which was used and the surgical procedure, palliative or corrective of the same one evenas the anatomical position in which was positioned.

Results: Were processed 3269 bovine pericardium pieces and they were destined and used in the department of Heart Surgery in the INC, this pericardium gets ready basically with glutaraldehido, and a system of anticalcification and antimineralisation developed in the Department of Applied Biotechnique, these products developed have the approval of the Health secretariat of México (SSA) and they cover all requested requirements for the NOM. 2179 (67%) were set aside for 1392 surgeryes with different diagnostics between complex congenital heart desease or not, the average years-old of the patients was 8.9 years and the range is from newborn until 68 years.

Of the total out of the 1392 procedures surgical the 49.7 corresponded to septal defects (Atrial septal defect, ventricular septal defect, atrioventricular septal defect), 12% to patients with Fallot, 7% total anomalous pulmonary venous connection.

With 4.8% patients with open sternum, double outlet right ventricle, DORV, Complete Transposition of the Great Arterles and anothers. that represent between the 1 and 2% of the total. The index of calcification is low 1,1% above all found in procedures for pulmonary branch extension.

Conclusions: The patch of bovine pericardium is an useful tool for the repair of congenital heart deseases complex or not, characteristics of the fabric allow the surgeon an easy handling of the patch to be positioned in different anatomical regions without affecting its functionality nor the survival of the patient.

It is a sure alternative and the cost is smaller by contrast with other prosthetic materials' use.

Thanks to technological advances of the medicine and specifically of the heart surgery, procedures with greater degree of complexity have been done, most notably in patients with congenital heart desease.

22nd October Hall 4 Session 1 and 2-Basic Sciences

SPONTANEOUSLY CONTRACTILE THREE-DIMENSIONAL ARTIFICIAL MYOCARDIUM FOR REPAIR OF LARGE MYOCARDIAL DEFECTS

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Objective: Cardiac tissue engineering offers a potential cure for myocardial infarction since cardiomyocytes have limited regenerative capacity. Here, we investigated the applicability of artificially generated three-dimensional Engineered Heart Tissue (EHT) grafts as transmural wall replacement in a heterotopic, volume-loaded heart transplantation model.

Methods: Tissue grafts were generated from collagen(+/-Matrigel)-hydrogels and neonatal rat heart cells, neonatal rat cardiac fibroblasts, or retroviral-eGFP-transduced mesenchymal stem cells (CD45-ve, CD59+ve, CD90+ve) yielding EHTs, Engineered Connective Tissues(ECTs), and Engineered Mesenchymal Tissues (EMTs), respectively. EHTs were cultured in stretched, unstretched, or unloaded conditions. Tissue grafts were evaluated for contractile force by force transducers. Grafts were surgically inserted into large transmural defect-containing heterotopically transplanted rat hearts, over an aortic patch. Grafts before and after implantation were analyzed histologically using confocal microscopy.

Results: Well differentiated muscle bundles formed only in EHTs. Only EHTs contracted spontaneously and rhythmically. EHTs demonstrated Frank-Starling response and positive inotropic response to calcium and isoprenaline. Stretched EHTs developed maximal contractile force (1.68 ± 0.15 mN [stretched, n = 10]; 0.57 ± 0.13 mN [unstretched, n = 9]; 0.06 ± 0.01 mN [unloaded, n = 10]).

Only EHT-grafts reconstituted oriented muscle bundles (actin staining) inside the transmural defects. EMT-grafts did not differentiate into cardiomyocytes after implantation. Graft vascularization was maximum in EHT-grafts (vessels/mm^2: 474 ± 28 [EHT], 87 ± 11 [ECT], 181 ± 33 [EMT]). EHTs were strongly capillarized (vessel diameter of 6 ± 0.1 [EHT], 12 ± 1 [ECT], and 21 ± 1 [EMT] µm).

Conclusions: EHTs developed substantial contractile force, were well vascularized after implantation, and may be utilized to bridge transmural myocardial defects. The study provides first evidence for the applicability of tissue-engineered contractile cardiac grafts in transmural myocardial repair.

THE IMPACT OF AGE ON THE OUTCOME OF CARDIAC CELL THERAPY

Boris Nasseri, Marian Kucucka, Yeong-Hoon Choi, Sun Jung Kim, Sun Kyung Kang, Gustav Steinhoff, Andreas Kurtz, Roland Hetzer, Christof Stamm

Objective: Bone marrow stem cells (BMSC) may undergo age-related changes that influence their regenerative capacity. However, the clinical impact of BMSC ageing on myocardial regeneration is unclear.

Methods: Marrow from 41 patients with heart disease aged 17-83 years was collected and mononuclear cells, stromal cells, and CD133+ cells were isolated. Neonatal cord blood (CB) cells were used for comparison. Proliferative and secretory capacity was studied as well as resistance to hypoxia/reoxygenation. In the clinical study arm, 55 patients (age 14-81 years) with impaired LV function were treated by intramyocardial BMSC injection during CABG surgery or assist device implantation.

Results: While the number of mononuclear cells increased with age, the percentage of CD34+/CD133+ BMSC decreased. The population doubling rate of adherent BMSC was reduced as compared with CB cells and correlated with age (R = 0.73, *P* = .02). In response to hypoxia, BMSC secreted less VEGF, Ang-1, FGF and SDF-1 but more TNFα, IL-10 and IL-12 than CBMSC. A multiple logistic regression model predicted that in patients older than 73 years, overall BMSC potency drops critically below the 70th percentile. Clinically, an inverse correlation between LV contractility gain and age was identified (r = 0.48, *P* = .03). LVEF improved by >10% in 64% of the patients aged < 60 years but only in 28% of those >75 years (*P* = .01).

Conclusion: Cell therapy with autologous BMSC is less effective in elderly patients. The design of clinical studies should take this into account, and strategies to enhance the function of aged BMSC are needed.

HYPOXIC ENVIRONMENT INFLUENCES THE IMMUNOMODULATORY PROPERTIES OF ADIPOSE TISSUE-DERIVED HUMAN MESENCHYMAL STEM CELLS

Boris Nasseri, Yeong-Hoon Choi, Sun Jung Kim, Sun Kyung Kang, Andreas Kurtz, Roland Hetzer, Christof Stamm

Objective: Mesenchymal stem cells (MSC) may be used for local immunosuppression in the context of cardiovascular regeneration, but the ischemic myocardium represents an environment that differs much from healthy tissues and may influence MSC behaviour. We therefore tested the immunosuppressive properties of human mesenchymal stem cells under normoxic and hypoxic conditions.

Methods: Adipose tissue MSC (AT-MSC) were isolated from liposuction aspirate and expanded in vitro. For comparison, cord blood MSC (CB-MSC) and bone marrow MSC (BM-MSC) were used. The cytokine and chemokine secretion profile was studied by cytometric bead array at normoxia (21% O2) and hypoxia (1% O2). A mixed leukocyte reaction assay was performed that measured the proliferation rate of 10E5 human peripheral blood mononuclear cells (PBMC) in response to lipopolysaccharide in the presence or absence of 10E4 AT-MSC. PBMC proliferation was quantified after 5 days and profiling for CD3+, CD4+, and CD8+ cells was done by FACS.

Results: In vitro proliferation of AT-MSC and CB-MSC, but not of BM-MSC was accelerated in hypoxia. The cytokine and chemokine secretion profile (IFNg, TNFa, IL2, IL6,IL8, IL10,IL4, IL5, IP10, MCP, MIG, RANTES) did not differ significantly between CB-MSC and BM-MSC, but in hypoxic AT-MSC an anti-inflammatory balance shift was observed. At normoxia, AT-MSC, BM-MSC and CB-MSC suppressed CD3, CD4, and CD8-dependent PBMC proliferation. Only AT-MSC, however, showed a further suppression of CD3 and CD8-dependent and exacerbation CD4-dependent PBMC proliferation in response to hypoxia.

Conclusion: Hypoxia suppresses the inhibitory effects of AT-MSC on regulatory T-cells and antigen presenting cells, but amplifies the inhibition of T-lymphocytes, particularly cytotoxic T-cells. Therefore, AT-MSC appear especially well-suited for immunosuppression strategies in ischemic myocardium.

INFLUENCE OF BONE-MARROW DERIVED PROGENITOR STEM CELLS ON CARDIAC REMODELLING IN A PLACEBO-CONTROLLED CLINICAL TRIAL INVOLVING PATIENTS WITH CONGESTIVE HEART FAILURE

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Objective of our trial was to assess effects of autologous bone-marrow (BM) derived CD133+ progenitors on cardiac remodelling in patients with congestive heart failure (CHF).

Methods: Fifty CHF patients (24 patients with ischemic dilative cardiomyopathy [ICMP] and 26 patients with idiopathic dilative cardiomyopathy [IDCMP]) were divided into groups by CD133+/placebo transcatheter delivery technique: selectively percutaneously intracoronary or transendocardially.

Results: Single isolated transendocardial delivery of CD133+ at average dosage 2mln resulted in moderate increase of left ventricular (LV) ejection fraction in 3-6 months in ICMP patients compared to placebo group. At that time was observed moderate reduction of perfusion defects in CD133+ "treated" segments with viable myocardium according to single photon emission computed tomography. These positive changes were offset in 1 year follow-up. Other key LV remodelling indexes such as myocardial mass and left atrial volume did not change in 3-6 months follow-up.

In order to evaluate stem cells paracrine effects we performed enzyme-linked immunoelectrodiffusion assay of plasma samples for 11 biological markers before and after elective CD133+ treatment. Paracrine effects exerted transiently in ischemic scarred, but viable myocardium and did not exert in non-ischemic dilated myocardium.

Conclusions: CD133+ progenitors were more efficient, though temporarily, in ICMP patients than in IDCMP patients. This phenomenon is due to more significant expression and up-regulation of stem cell homing factors in scarred ischemic myocardium.

MODULATION OF INFLAMMATION ASSOCIATED WITH CARDIAC ISCHAEMIC INJURY USING A NOVEL ANTI-HUMAN MONOCLONAL ANTIBODY

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Purpose: Myocardial ischaemia and reperfusion results in an intense inflammatory reaction. The C5/C5a complement axis is a key mediator of this inflammation and is a potent chemotactic agent for neutrophil infiltration. Due to this pivotal role it has been previously targeted with molecules and antibodies with conflicting results. In this study a novel approach of using a monoclonal antibody against human C5a receptor was used to inhibit the inflammatory damage.

Materials and Methods: A murine model of myocardial ischaemia was used in a mouse line hC5aR1+/+, in which native C5a receptor has been replaced by its human counterpart. Human C5a receptor antibody (hC5aRAb) was used to target the C5/C5a axis to reduce neutrophil infiltration and therefore local tissue injury. 100 mice were subject to myocardial infarction and were randomized to receiving C5a receptor antibody or an isotype control.

Results: Validity of the model was established and hearts were procured and analysed for infarct size and neutrophil infiltration at day 3 post infarct. Using hC5aRAb resulted in a reduction in infarct size, and a significantly reduced neutrophil infiltrate ($P < .05$). This was confirmed on immunofluorescence analysis. There were no differences in infective complications or ventricular rupture between the two groups.

Conclusions: C5aRAb was shown to effectively modulate the inflammatory pathway in a favourable manner in this model of myocardial ischaemia without change in mortality in this study with short term outcomes. It may prove to be a useful adjunct in modulating the early inflammation seen post transplantation attributed to ischemia reperfusion injury.

ARTIFICIAL NANOEMULSION CARRYING PACLITAXEL DECREASES THE CARDIAC ALLOGRAFT VASCULOPATHY. IN A RABBIT MODEL

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Introduction: Cardiac Allograft Vasculopathy (CAV) is the leading cause of late death after heart transplantation (HT). It has been shown that manoparticle of LDE-paclitaxel concentrates in and decreases atheromatous lesions in rabbits.

Objectives: Determine whether treatment with LDE-paclitaxel reduces the incidence and degree of CAV and analyze biodistribution of LDE in rabbits undergoing HT.

Methods: Cervical heterotopic HT was performed in 21 rabbits fed with regular chow added with 0.5% cholesterol and cyclosporine A for 6 weeks, divided in group: A) 10 rabbits treated with saline intravenously (control) and B) 11 rabbits treated with LDE-paclitaxel. LDE labeled with radioactive cholesteryl ether was counted in hearts and other tissues after lipid extraction. The cross-sectional area of the coronary arteries of both, native and grafts was estimated by measuring the internal elastic lamina and

the lumen area. The percentage of stenosis was calculated from the difference between the area of the vessel lumen and the area of internal elastic lamina. Statistical analysis with ANOVA and *T* test with *P* value ≤ .05 was considered significant.

Results: The uptake of LDE labeled for the transplanted heart was almost fourfold higher than in the native heart (*P* ≤ .0001). Grafts from animals treated with LDE-paclitaxel had an increase of three times of the vascular lumen area (*P* ≤ .031) and reduction of stenosis in 45% (*P* ≤ .0008).

Conclusions: The LDE concentrates on the graft, furthermore treatment with LDE-paclitaxel markedly reduced CAV, which may open a new perspective for longer survival after HT.

IMPLANTATION OF A FUNCTIONAL TISSUE ENGINEERED STENTLESS PULMONARY VALVE USING BONE-MARROW-DERIVED MESENCHYMAL STEM CELLS AND CIRCULATING ENDOTHELIAL PROGENITOR CELLS

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Background: We investigated the functional potential of poly-4-hydroxybutyrate (P4HB) scaffolds by determining the most suitable thickness and ratio of co-cultured progenitor cells for construction of pulmonary leaflets and annular sewing ring in tissue engineered (TE) stentless pulmonary valves (PV).

Methods: Melt-blown fibronectin (FN)-coated P4HB scaffolds (thickness: 100-,220-,440-,660 μM were seeded with different percentages of characterized ovine bone marrow-derived mesenchymal stem cells MSC)and peripheral blood-derived endothelial progenitor cells (EPC) for 21 days in a laminar fluid flow system.

Results: Histology of FN-coated scaffolds (100 and 220, μM) seeded both with 40% MSC and 60% EPC demonstrated enhanced cellularity, extracellular matrix formation, and cellular ingrowth into the interstitial layer of P4HB scaffolds, confirmed by scanning electron microscopy. Both pre-coated and uncoated scaffolds independent of thickness and cell percentage demonstrated primary surface expression of CD31+, vWF+ and VEGF-R2 + cells; α-SMA+ cells were found both on the surface and in the interstitium. Immunoblotting revealed increased expression of α-SMA+ in 100 μM and 220 μM thickness seeded with 40% MSC and 60% EPC. Mechanical testing demonstrated increased tensile strength over strain in 100 μM and 220 μM seeded with 40% MSC and 60% EPC compared with other test groups and uncoated controls (25-60%). Autologous TE stentless PV using 220 μM for PV leaflet covered with 100 μM for annular sewing ring was successfully implanted.. The neo-tissue integrity allowed secure anastomosis with adequate tensile strength. Echocardiography demonstrated normal biventricular function, absence of anastomotic dilatation and aneurysm good coaptation of leaflet coaptation with trivial central regurgitation.

Conclusion: This data suggest the importance of scaffold thickness and ratio of seeded cells in the suturability of TE stentless PV. This also demonstrate the successful creation and implantation of an anatomically functional, autologous TE stentless PV using sequentially seeded progenitor cell sources.

ELECTROSPUN POLYMERIC NANOFIBER REINFORCED PORCINE PULMONARY XENOGRAFT AS A VERSATILE CONDUIT IN CARDIOVASCULAR SURGERY

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In complex congenital heart diseases, absence of pulmonary artery is a well known entity, which is addressed by various ways of reconstructions. Acellular porcine pulmonary artery strengthened by cross-linking may address this issue as a replacement graft of pulmonary artery. Many other complex situations such as 'Truncus Arteriosus repair' may also call for a proper conduit as a replacement to pulmonary artery, where pulmonary artery pressure is systemic or supra systemic. In such cases processed xenograft conduit requires improvisation by reinforcement, otherwise they tend to dilate. So we have coated porcine pulmonary conduit with polymeric nanofibers by electrospinning technology. Various processing parameters in electrospinning technology to achieve fine quality fibers without any beads have been optimized. Various FDA approved biodegradable polymers such as poly – L- Lactic acid (PLA), poly glycolic acid (PGA) and poly caprolactone (PCL) alone and in combination with natural polymers such as Collagen type I, gelatin, elastin, chondroitin sulfate and chitosan were used. These polymeric nanofibers are validated with FTIR to check the presence of free chemical groups after coating and DSC to evaluate the glass transition temperature (Tg) of the scaffold. The tensile property of the grafts has increased significantly after coating the grafts with nanofibers. The cytotoxicity of these polymeric nanofibers was tested by seeding Mesenchymal Stem Cells (MSCs) as well as chick fibroblasts which showed that these polymeric nanofibers were biocompatible. These nanofibrous scaffolds provide high surface to volume ratio which will enhance cell adhesion and proliferation. The 3D nature of the nanofibrous scaffold is thought to enhance the differentiated function of adhered cell. Evaluation of the best polymer with respect to biocompatibility and mechanical properties are in progress, results will be presented.

SPONTANEOUS DIFFERENTIATION OF CHICKEN EMBRYONIC STEM CELLS TOWARDS BEATING CARDIOMYOCYTES

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Embryonic stem cells (ES cells) derived from blastoderm has the unique capacity to proliferate endlessly and maintain pluripotency. These ES cells are considered to be the key essential factors

in understanding the complex mechanism that leads to the processes of development and differentiation. In this study, we have designed an optimal culture system for chicken ES Cells on mitotically inactivated chicken feeder fibroblasts. Chicken ES cells were prepared from blastodermal cells derived from stage X chicken embryo. Consequently we performed a series of experiments to characterize the established colony-forming ES cells with pluripotent markers. Results were positive for alkaline phosphatase assay, Oct4 epitope and confirmed the gene expression of Oct4 and Nanog by RT-PCR analysis validating the maintenance of ES cells in an undifferentiated and pluripotent state. We generated embroid bodies on gelatine scaffold for the in vitro spontaneous differentiation in vitro. Beating cardiomyocytes were observed 48 hours after culture. Beating frequency (105 ± 5 bpm) was comparable to those of primary cardiomyocytes derived from nine day old chicken embryo. We also achieved spontaneous differentiation of ES cells towards neural lineage in the form of neurospheres and epithelial cells. Cardiac specific gene expression (of Nkx2.5 and GATA4) for the ESC derived beating cardiomyocytes was confirmed by RT-PCR. As the ES cells differentiate into cardiomyocytes, they closely recapitulate the developmental pattern of early cardiogenesis. Our study represents that chicken ES cell can give rise to spontaneously beating cardiomyocytes, which might be used as an in vitro model system for understanding the development of the vertebrate heart.

SCREENING FOR MUTATION IN NKX2.5 (EXON 1, 2) AND GATA 4 (EXON3, 4) GENE IN CONGENITAL HEART DISEASE PATIENTS AMONG FLL POPULATION

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The incidence of CHD in India is reported to be 3.9/1000 live birth due to very high birth rate and it accounts for 10% of infant mortality in Indian populations. Nkx2–5 (Csx1) and GATA4 gene are a homeodomain (highly conserved 60-aminoacid) and zinc finger transcription factor maps to chromosome 5q34 and 8p23.1-p22 respectively. Both the genes occupy a crucial position in the hierarchy of cardiac determinants. The objective of present paper was to screen for novel mutation in Exon 1 and Exon 2 of Nkx2.5 gene and Exon 3 and Exon 4 of GATA4 gene using Polymerase Chain Reaction –Restricted-Fragment Length-Polymorphism assay (PCR-RFLP) in sporadic CHD patients among FLL population. We screened for mutation in 50 Blood samples collected from phenotypically characterized cardiac patients after informed consent. The PCR reaction was carried using appropriate primers and digested with respective restriction enzymes. The mean age of studied population was 5.1 ± 6.1years. We found variations of 743A-> G (exon3) and 855T->G Asn285 Lys (exon4)) in 3 and 2 patients respectively. No Nkx2.5 gene mutations have been observed in our populations. Extensive study has to be performed in large number of samples in order to understand the genetic background of Indian population in CHD patients. These studies will aid genetic counselors to provide medical guidance to parents, creating awareness on the impact of CHD on the fetus and the quality of life henceforth.

LQT SYNDROME – SCOPE FOR MOLECULAR STUDY BASED PERSONALIZED MEDICINE

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Irregular heart beats, due to change in the electrical activity of the heart, leads to cardiac arrhythmia. Long QT syndrome is a genetic disorder which is characterized by the QT interval changes on the ECG. The syndrome is caused due to mutations in gene coding for the various ion channels viz. Na^+, K^+, Ca^{2+} channels. Mutations taking place in the genes KvLQT1, HERG and SCN5A lead to the manifestation of LQT1, LQT2 and LQT3 respectively. The cardiac rapid delayed rectifier potassium channel encoded by the HERG gene, is one of the key genes implicated in LQT syndrome. The identification of ion channel gene mutations leading to LQTS represents a very important step in understanding the molecular basis of cardiac repolarization. The information gathered would not only be important for identifying new therapies to treat LQTS, but also in designing personalized therapeutic interventions for patients. Here we present case studies conducted at Frontier Lifeline Hospitals on patients with LQT syndrome and the molecular findings obtained on genetic characterization of the same.

GENETIC VARIATION ON APOLIPOPROTEIN B AND RISK OF CORONARY ARTERY DISEASE AMONG SOUTH INDIANS

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High plasma apolipoprotein B (apoB) and LDL cholesterol concentrations are equally and independently associated with an increased long-term relative risk of coronary heart disease. Apo B is crucial in formation of chylomicron and very low-density lipoprotein, as well as in the binding and clearance of low-density lipoprotein (LDL) by the LDL receptor. Previous studies examining the association of common single-nucleotide polymorphisms (SNPs) in APOB with lipid and lipoprotein levels and risk of coronary artery disease have yielded interesting results.

We have evaluated age and sex matched coronary artery patients (n = 550), for 5 SNPs on exons 26 and 28 of apolipopotein B and compared them with controls (n = 560). The apo B, exons 26 – 28 are the key regions transcribing amino acids involved in binding to LDL receptor. We studied 5 SNPs, namely Exon 26 - rs693, rs676210, rs1801701, Exon 28 - rs1042031, rs1042034 and compared them with clinical characteristics of the subjects. We observed significant risk for CAD for rs1042031, rs676210 and rs1042034 alleles and also significant interaction with LDL cholesterol concentrations among patients. We also

combined the alleles as haplotypes and studied their interactions with lipids and lipoprotein concentrations. There were also haplotypes observed with significant interaction for LDL lipoprotein concentrations. The present study elucidates the associations of apo B genetic variations with LDL levels among South Indians. Further functional studies are needed to confirm roles of Apo B gene variants in CAD among Indians.

Note: Authors DM, DA and MT have contributed equally to the technical part of the work and should be considered equal 2nd authors

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EFFECT OF GREEN TEA ON COPPER INDUCED OXIDATION OF LOW DENSITY LIPOPROTEIN

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Background: Cardiovascular diseases (heart attacks and strokes) are the major cause of death in all affluent societies. Three main groups of risk factors have been recognized: diet related, lifestyle related, and uncontrollable factors. Lifestyle-related risk factors include smoking, inactivity, and stress. The uncontrollable factors include heredity, gender, and age. Cardiovascular risk is greater for men than for premenopausal women. LDL is a well recognized and the most studied risk factor for cardiovascular disease. At the first stage LDL deposit in the lesion sites of the arterial wall and is subjected to modification when protectors such as antioxidants are depleted. Oxidized LDL then induces modification in the lipoproteins, stimulates inflammatory reactions causes monocytes and monocyte derived macrophages to uptake the oxidized LDL and ultimately leads to the formation of lipid-loaden foam cells and atherosclerotic plaques. These plaques protrude from the inner surface of the arteries, narrowing the lumen, and reducing blood flow that leads to coronary heart diseases. Oxidized LDL (Ox-LDL), but not native LDL, may contribute to vascular dysfunction leading to atherogenesis.

Objective: The aim of this study was to investigate copper (Cu++) induced oxidation state of LDL isolated from acute myocardial patients and the protective effect of green tea on the same.

Methodology: The LDL fraction was isolated from the plasma of healthy controls and acute myocardial infarcted patients and oxidation was induced by 5mM $CuSO_4$ with/without Green tea at different concentrations. LDL oxidation was assessed at different time intervals in terms of conjugated dienes and 'thiobarbituric acid reacting substances' (TBARS).

USE OF ISCHEMIC CONDITIONED MEDIA FOR THE DIFFERENTIATION OF HUMAN MESENCHYMAL STEM CELLS TOWARDS PRECURSOR CARDIOMYOCYTES: A NOVEL APPROACH

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Mesenchymal stem cells (MSC) possess multipotency, can be easily expanded in culture, and hence an attractive therapeutic tool for cardiac regeneration. The present study examined the effect of media containing factors derived from ischemic cardiac tissue on the behavior of highly purified and isolated MSC. Human Bone marrow derived MSC were isolated by ficoll density gradient centrifugation and on identification of wholesome cells, cultured in media containing factors derived from ischemic cardiac tissue. Parallel cultures were treated with 5-azacytidine under the same conditions. Uninduced MSC maintained the fibroblast morphology, while the induced cells formed myotubes like structures, expressed sarcomeric Troponin I, alpha myosin heavy chain proteins and were positive for cardiac specific markers (Nkx2.5,human Atrial naturitic peptide, Myosin light chain 2a&2v). Transmission electron microscopic studies revealed differentiated MSC expressed sarcomeric proteins but failed to express gap junctions and intercalated disc as in adult cardiomyocytes. These findings demonstrate that ischemic cardiac tissue induces changes in MSC phenotype that comprise alteration of myocyte structural characteristics and expression of sarcomeric proteins. The proteomic analysis of the ischemic conditioning media was done to reveal the presence of specific proteins expressed in the conditioning media. The differentiated cardiac precursor cells with the help of the factors present in the ischemic conditioning media may be a future modality of potential cellular cardiomyoplasty for ischemic cardiac disease.

EVALUATION OF IN-VIVO REACTIVITY OF INDIGENOUSLY PROCESSED XENOGRAFTS IN HUMAN CLINICAL TRIAL

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Decellularization is a process, which is gaining interest in the clinical field of biological devices to decrease the antigenicity of the xenogenic material which could be safely used with other tissue engineering manipulation. This promising aspect of tissue manipulations followed by non conventional method of cross-linking without using glutaraldehyde addresses the adequacy of mechanical and non cytotoxic properties of the devices made in our laboratory from xenografts for clinical use. They remain bio-degradable in the long run; which is capable of remodeling through cellular means.

The aim of this study was to examine whether a specific role of carbohydrate antigen (α-Gal and T- antigen) in immune response, was present in these xenograft tissues(porcine and bovine) after processing or not. Presence of host inflammatory response on very few surgically explanted such acellular Tissue Engineered (ATE) xenografts (Porcine Pulmonary artery and Bovine Jugular Vein, bovine pericardium) were evaluated by histology. To prove autologous recellularization, vascularity, and non-immunogenic response of the above mentioned devices, certain biological validation procedures were conducted as a predictor of clinical efficacy. This study demonstrates that decellularization of xenografts and further processing of these tissues is suitable to reduce the specific humoral-mediated immune response. The inflammatory stimulus was effectively reduced with increase in autologus recellularization with absence of calcification in ATE xenografts.

Keywords: Immune response; Bioprosthetic Heart valves; Acellular Tissue engineered (ATE) valved conduit; Decellularization; carbohydrate antigen.

THE UNDERSTANDING OF FUNDAMENTALS OF CARDIAC REGENERATION AND ROLE OF IMMUNOMODULATION - A NOVEL APPROACH IN TREATING ISCHEMIC HEART DISEASE

Polisetty Ravishankar, Musa T. Abidov, Irina G. Danilova, S.J. Medvedeva, M.A. Rantsev, I.F. Gette

Background: The last successful demonstration of Cardiac Regeneration was done by Cellular Cardiomyoplasty, which involves infusion of Satellite cells into the Damaged Cardiac tissue. After a decade of research we have finally come to a conclusion that the Cardiac Tissue to a large extent, if not totally, can be regenerated by Immunomodulation.

Methods and Materials: We created Models of Myocardial Infarction by electro-cautery of LAD after a EKOBRIZ anesthesia in about 8 groups of pure-bred rats with 5 in each group. 4 groups were treated with an Immunomodulator, Tamerit at 1mg/kg body weight every 4 hours for the next 2 weeks while the other 4 groups were non-treated. One group from each of Treated and Non-treated rats was sacrificed successively on days 1, 5, 7 and 14 to study the histological, Cytokine and Enzymatic patterns. Flow Cytometry was used to identify Marker cells.

Results and Discussion: The group that was not treated with Tamerit underwent for the first 5-7 days a usual process of total tissue apoptosis characterized by necrotic mass of myocardium at the site of Infarction. This phase, as expected, also saw the elevation of CPKand other markers of MI in blood. On the other hand the group treated with Tamerit had only a sub-epicardial necrosis in the beginning and at the end of 5-7 day period interestingly, young blood vessels appeared with appearance of mesenchymal stem cells and proliferating fibroblasts. The initial 12 - 24 hour period in Tamerit treated rats saw elevation of IL-10 followed by decrease in the same and increase in the activity of IL-12 later on. Flow cytometry and Immunohistochemistry revealed the presence of Cells with expression of endothelial and hematopoetic stem cells markers (CD45, CD90, CD38, CD117) which only proves that Immunomodulation, which involves a process of programmed Macrophage reaction, leads to stem cell migration through peripheral blood to the damaged organ and leads to sub-total to total regeneration of Cardiac Tissue.

A COMPUTATIONAL APPROACH TOWARDS IMPROVING HEMODYNAMICS IN AN END-TO-SIDE ANASTOMOSIS

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Coronary artery bypass grafting (generally referred to as "CABG") has been widely used for patients with severe coronary artery diseases. Despite CABG being an effective surgical technique to revascularize the myocardium, 20-50% of the bypass graft fails due to the formation of intimal hyperplasia. Although the mechanism for the initiation and progression of such diseases are not fully understood, it is well accepted non-uniform hemodynamics play a major role in early bypass graft failure caused. The key locations where intimal hyperplasia is found to develop are the toe, heel, suture line and bed of the anastomotic junction that are believed to be caused due to the abnormal hemodynamics or more specifically abnormal wall shear stress (WSS) distribution. Disturbances of flow may contribute to failure of a bypass. As geometric parameters of an anastomosis are critical, knowledge of factors which affect its efficiency may eliminate some early failures. Hence the proposed work focuses on choosing the appropriate geometrical parameters that may help to improve the hemodynamic environment which in turn would lead to long-term graft patency.

A study of the combination of various parameters that includes the anastomosis angle, the distance of grafting, degree of stenosis and the inflow conditions on blood flow in an end-to-side anastomosis model is investigated. We infer that when there is an equal amount of blood flowing into the host artery and the graft, irrespective of the degree of stenosis, a larger distance of grafting (d = 3D) and a more acute anastomosis angle (45o) are found to result in low spatial WSSG along the floor of the artery. However for a severely stenosed LAD artery when the flow in the host and graft are unequal (7/8th of the total flow enters the graft while 1/8th goes into the constricted LAD), a smaller distance of grafting and a larger acute angle results in a lesser spatial WSSG variation where as for the 75% occluded LAD artery, the results remain as like that seen for equal flows. The computed results thus show that appropriate choice of the geometrical parameters must be made taking into account the degree of stenosis. These findings may be of help to cardiac surgeons while performing a bypass surgery that may result in minimizing the risk of intimal hyperplasia in the anastomosis region.

23rd October 2010 Hall 2 Interesting Case Presentation

23 October 2010

DESENDING NECROTIZING MEDIASTINITIS

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Objective: Descending necrotizing mediastinitis (DNM), one of the most virulent forms of mediastinitis, occurs as a rare complication of oropharyngeal or dental infections. This report showed a single surgeon experience in this issue.

Methods: Between 1996 and 2009, 14 patients with DNM were treated. All patients except two were referred from otolaryngology ward. Diagnosis was based on clinical exam, chest X-ray, radiography of soft tissue neck and sequential cervicothoracic CT scan. Endo classification base on extension of infection on CT scan were used for classification of localized DNM (Type 1) versus diffuse DNM (type2A and 2B). When CT scan evaluation showed localized DNM (type 1). Unilateral or bilateral transcervical mediastinal drainage alone were performed. A more aggressive approach, that was, including transthoracic mediastinal drainage plus pericardiactomy and cervicostomy were employed in the diffuse type.

Results: Six patients had bilateral and one had unilateral cervicostomy. One patient with diffuse type 2A had only managed with left open collar wound after elective tracheostomy and throidectomy for thyroid cancer. Right thoracotomy and unilateral cervicostomy was done in one patient. Clamshell thoracotomy plus unilateral versus bilateral cervicostomy were done in five patients. Anterior pericardiactomy was done in two and esophagectomy in one. There was no mortality in this series but some patients had long stay at hospital for more than 2 months. A patient had subacute TB mediastinitis was presented with multimedistinal and TB abscess was diagnosed after transthoracic approach.

Conclusion: Mediastinal drainage is an essential procedure in the treatment of the patients with DNM. However, the surgical management is controversial. Although some investigators advocate aggressive surgical management, others advocate computed tomography or ultrasound guided needle aspirations. Close follow up and sequential CT scan after cervicostomy is recommended to reclassification and further management.

PRIMARY CARDIAC LYMPHOMA CAUSING RIGHT ATRIAL OCCLUSION

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Background and Aim: Primary cardiac lymphomas (PCL) are extremely rare, of which the Diffuse Large B Cell Lymphoma (DLBCL) is a highly aggressive subtype. We report a case that presented with chronic right heart insufficiency secondary to a DLBCL.

Case Report: A 77-year old female was hospitalized for position-dependent vertigo of 3 days duration, with a history of atypical chest pain and dyspnoea. Transthoracic echocardiography revealed a 12 cm mass occluding the right atrium, infiltrating the inter-atrial septum, the roof of the left atrium, and the aortic root. There was moderate tricuspid valve obstruction with severe insufficiency, and gross annular dilatation. Emergency surgery was undertaken for unstable hemodynamics. A large, lobulated tumour occluded the right atrium and the orifice of the superior vena cava, rendering the tissues friable. Tricuspid annuloplasty was undertaken using a 32 mm biodegradable ring (Bioring SA®, Switzerland), along with anterior and posterior commissuroplasty. She succumbed to multi-organ failure after 48 hours despite maximal inotropic support. Pathologic analysis confirmed a DLBCL, with a proliferation rate of 100%.

Conclusion: The uniqueness of this report includes the size of this rare cardiac tumour, which we believe is one of the largest described in the literature, its aggressive growth rate, and the relatively mild symptomatology until the late stage. Although surgical therapy may represent the only alternative in large, occlusive PCL, it may be technically challenging and provide an unfavourable prognosis. Therefore, despite its rarity, PCL should be considered as a differential diagnosis in elderly patients presenting with right heart insufficiency.

CASE REPORTS OF TWO PATIENTS WITH ACUTE PULMONARY EMBOLISM UNDERGOING TRENDELENBURG OPERATION PROCEDURES

Stefan Saenger

Objective: Pulmonary embolism is a life- threatening common disease, which carries still a high mortality rate. Right heart failure due to pulmonary hypertension caused by acute obstruction or occlusion of the pulmonary arteries is defined as major risk for death in these patients. Thrombolysis, catheter guided thrombectomy and surgical embolectomy (Trendelenburg procedure) are well-established therapies in the management of acute pulmonary embolism (APE). We present two patients with massive APE, operated on recently in our department.

Methods: Two patients (both male, 60 and 50 years old) were operated on APE. Medical history was free from thrombotic events in both patients. The CT scan showed massive APE (figure), with thrombi also in the right atrium and right ventricle in both patients (video slides). Both patients had impaired right ventricular function (video slides) and high pulmonary artery pressure. Coronary angiogram was done in both patients, and no coronary artery disease was found.

Results: Both patients underwent pulmonary embolectomy (Trendelenburg procedure) using the heart- lung machine. The embolectomy was performed on beating heart. After embolectomy, the right ventricular function improved significantly (video slide). A cava filter device was implanted in the vena cava inferior in both patients. The postoperative course was uneventful, with both patients receiving Warfarin therapy from day one postoperatively.

Conclusions: Trendelenburg procedures can be performed successfully in patients with massive APE. It will be matter of discussion, if thrombolysis, which is commonly used in patients with APE, was successful in our two patients with big and part of them organized thrombi.

CASE REPORT: ACUTE THROMBOSIS OF A MECHANICAL MITRAL VALVE PROSTHESIS IN A 45 YEAR OLD WOMAN WITH MISSED ABORTION AFTER 4 WEEKS OF PREGNANCY

Objective: Mechanical valve prostheses, requiring life-long anticoagulation with warfarin, are the devices of choice for valve replacement in young patients. However, female patients in the 5th decade of life, who are still fertile, are facing severe problems if they become pregnant in the presence of a mechanical valve prosthesis.

Methods: A 45 year old woman was admitted to the emergency room, showing severe dyspnea, hypotension (70/40 mmHg) and tachycardia (heart rate 130 pm). Medical history: the patient was operated on in 2005 for severe mitral valve stenosis (rheumatic disease), and MVR with a mechanical prosthesis (Carbomedics 27 mm) was performed. On admission, echocardiography and angiography showed a prosthesis virtually blocked by thrombus. She had had a missed abortion after 4 weeks of pregnancy and warfarin anticoagulation therapy had been switched to i.v. heparin infusion only one week previously. Shortly after admission, the patient became hemodynamically unstable requiring high dosages of catecholamines, intubation and resuscitation.

Results: She underwent emergency operation (redo mitral valve replacement with a mechanical prosthesis, Carbomedics 29 mm). The postoperative course was complicated by respiratory failure requiring tracheotomy, general signs of infection without clear focus and perioperative stroke. The patient was discharged home after 67 days, fully recovered.

Discussion: We will discuss pregnancy and anticoagulation in patients with mechanical heart valve prosthesis, the modus operandi (redo operation, thrombolysis) in acute device thrombosis as well as the postoperative anticoagulation management, infection control (missed abortion) and complications (stroke).

UNDIAGNOSED ACUTE CORONARY HEART DISEASE CONCEALED BY ACUTE TYPE B DISSECTION

Jack A.T.C. Parker, A. Hoffman, R. Autschbach

Introduction: In patients that are admitted to the emergency room with chest pain, it is the generally accepted procedure to first perform the non-invasive diagnostics to rule out an acute myocardial infarction, followed by computer-tomographic (CT) imaging of the thoracic aorta to exclude aortic dissection.

History: A 32 year old man with arterial hypertension was admitted with acute chest pain after physical exercise. After excluding an acute myocardial infarction, we diagnosed a Type B aortic dissection by CT and conservative treatment was initiated according to guidelines. Suddenly the patient developed an acute cardiogenic shock. We performed successful emergency surgery.

Treatment: We performed a median sternotomy and found no Type A dissection. Instead, both coronary ostia were severely

calcified and stenotic. Operative treatment consisted of aortic arch replacement and stenting the descending aorta with a hybridprosthesis as well as venous coronary bypasses to the left descending- and right coronary arteries.

Complications: Our concept was based on the absence of coronary artery disease and the presence of a retrograde Type A dissection. Notwithstanding this misconception, the procedure-related median sternotomy fortunately allowed us to determine the additional diagnosis and install appropriate operative treatment.

Conclusion: We cannot but underline the possibility of the coexistence of coronary heart disease in young patients with aortic dissection, also where acute myocardial infarction has been ruled out. We therefore advise a 64-row cardio-CT to complete preliminary diagnostic imaging. This procedure can eliminate similar diagnostic errors and aids in forming a strategy for aortic dissection surgery without wasting time.

INTERESTING CASE PRESENTATIONS: TAKO-TSUBO LIKE SYNDROME AFTER CORONARY ARTERY BYPASS SURGERY

Ibrahim M. Yassin, MD, Salah S. Atta, MD, Sayed Z.M. Abu Elsaud, Mohamad Attiya, MD

Recently described Takotsubo syndrome is characterized by acute reversible left ventricular dysfunction with apical ballooning in the absence of coronary artery disease, and with chest pain and electrocardiographic changes mimicking acute anterior myocardial infarction, but with minimal release of myocardial enzymes. To our knowledge, We have not found any reports to date of Takotsubo syndrome after coronary artery bypass grafting surgery, but only one case was reported in the early postoperative period after valve surgery. We describe Takotsubo like syndrome that developed after elective coronary artery bypass surgery in a 55-year-old woman. On inotropic therapy, left ventricular function gradually improved with an ejection fraction returning to 45% as preoperative. Takotsubo like cardiomyopathy should be considered as a possible complication of the coronary artery bypass grafting surgery.

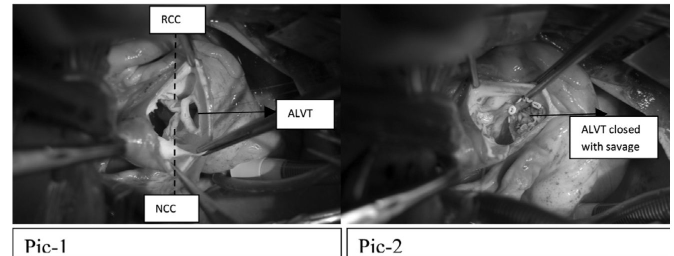
AN UNUSUAL SITE OF AORTA-LEFT VENTRICULAR TUNNEL-A CASE REPORT

Girish Gowda S.L., P.S. Seetharama Bhat, Arul Furtado, Murfad Peer

Introduction: Aorta-left ventricular tunnel (ALVT) is a rare congenital cardiac anomaly (0.001% of all congenital heart disease). Commonly ALVT arises superior to the right coronary sinus. In this case, the site of origin of ALVT was superior to commissure between right coronary sinus and non coronary sinus. This has not been reported in the literature and to our knowledge this is the first.

Case Report: A 16 year old girl presented with signs and symptoms of severe AR. ECHO findings were inconclusive, hence CT and cardiac catheterization was done and diagnosis of ALVT was made. Peroperatively, aortic leaflet and sinuses appeared normal. ALVT was seen arising superior to commissure between right coronary sinus and non coronary sinus (pic-1), Tunnel opening in the aorta was (1 x 1.5) cm size. The LV opening of the tunnel was below right coronary cusp and 5 mm anterior to anterior mitral leaflet. The septal portion of tunnel had aneurysm in to RVOT. The tunnel was closed with two patch technique using PTFE patch (pic-2). Intraoperative TEE showed mild AR. Patient discharged uneventfully and fine at six month follow-up.

Conclusion: The ALVT arising superior to commissure between right coronary sinus and non coronary sinus is not reported in the literature and to our knowledge this is the first. Hence this case is presented.



Pic-1 Pic-2

AN INSTERESTING OF CORONARY AV FISTULA

A. Shivan Raj

A 24 yrs old Mr Rajendran admitted in our ward with compliant of difficulty in breathing since childhood with NYHA class II. History of exertional palpitation for six months & orthoponea on and off. No history of paroxysmal nocturnal dyspnoea, cyanosis, pedal oedema, oliguria or syncope. No H/o Rheumatic. Fever during childhood. Vital were normal. Cardiovascular system s1s2 heard, continuous murmur 3rd LSB, respiratory system clear and other system were normal. Pulmonary function test showed mild restriction. Chest X-ray showed mild cardiomegaly. Echo revealed coronary Arteriovenous fistula, Left anterior descending grossly dilated with multiple turbulence seen. Coronary angiogram showed coronary arteriovenous fistula of right coronary artery & Left anterior descending draining into right ventricle. Patient was completely evaluated and electively posted for surgery.

Under general anesthesia median sternotomy, single large left coronary artery, communicating artery arising from Left anterior descending and right coronary artery, one transverse along right ventricular outflow tract and another parallel to Left anterior descending and both unite into single branch, drains into right ventricle. Right atrium opened, drainage site identified, found difficult to close hence right ventricle opened and the draining site closed with pledgetted 4-0 prolene. Post op Echocardiography showed ostium of left coronary artery dilated, ostium of right coronary artery not visualized and normal left ventricular function. Post op period uneventful. Sutured were removed and patient was discharged on 10th post-op day. The patient is regularly followed-up. This case is presented due to its rarity and an interesting case of coronary arteriovenous fistula.

EMERGENCY SURGICAL INTERVENTION AFTER UNSUCCESSFULLY PTA AND STENTING OF AORTIC COARCTATION

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We describe a case of young adult with coarctation of the aorta treated unsuccessfully by PTA and stent implantation with the result of stent migration into the aortic arch, which let to urgent

operative intervention. We performed in one step the evacuation of the foreign body from the aortic arch as well as the treatment of the aortic coarctation by extra-anatomic vascular graft interposition between the ascending and descending thoracic aorta. We discuss the necessity of emergency surgical intervention in this case.

SUCCESSFUL SURGERY FOR TWO VALVE PROSTHETIC ENDOCARDITIS JOINED WITH MEDIASTINITIS IN A CHILD

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Objective: Active prosthetic endocarditis represents most challenging disease especially when two valves are involved and when mediastinitis is present.

Methods: Six years old boy with valvar and subvalvar aortic stenosis was treated by modified Konno aortoventriculoplasty using a bileaflet mechanical valve for aortic valve replacement, and with pulmonary artery replacement using a homograft. Eleven years later mediastinitis was detected by ECHO and CT scan. At the same time infective endocarditis at the prosthetic valve (with a paravalvar abscess) and at the homograft valve was detected. Staphylococcus aureus was found in two blood samples. The surgery was done in two steps. First, sternum was opened and mediastinum was irrigated with a povidone solution. Two days later surgery for infective endocarditis was done using a cardiopulmonary bypass. Prosthetic valve, dacron patch, conduit and all the stiches were withdrawn. Bentall procedure was performed. Aortic root was replaced with aortic homograft and the conduit was replaced with a second homograft.

Results: The postoperative course required intravenous antibiotics for 2 months, and transient irrigation of the mediastinum with a povidone solution. Staphylococcus aureus was found in tissue samples taken from the surgical field. The patient recovered well and could be discharged from hospital 70 days after the surgery. We decided to continue peroral antibiotic treatment for 6 months.

Conclusion: Prosthetic endocarditis can be successfully treated even in presence of mediastinitis. The most important is a long lasting antibiotic treatment and radical removal of all foreing material and all infected tissue. Supported by MZOFNM2005.

23rd October 2010 Hall 3 Data Base and Score

PROSPECTIVE RISK STRATIFICATION IN ADULT CARDIAC SURGICAL CASES USING THE EUROSCORE MODEL IN NORTH INDIAN POPULATION

B.S. Pillai, R.R. Bhuyan, R.M. Kumar, I.S. Virdi

Objective: Prospective risk stratification of five hundred adult cardiac patients using the euroSCORE system and also to obtain both additive and logistical score values and independently asses predictive accuracy of each of them.

Methods: Prospective study from February 2008 to April 2009. Five hundred consecutive adult patients undergoing coronary bypass, valve surgery, surgeries for mechanical complications of myocardial infarction and surgeries on the thoracic aorta with the exclusion of congenital cardiac surgery

All relevant data were prospectively entered into a max adult cardiac surgical datasheet and reviewed in order to analyze the various risk factor variables. At the termination of the study, the euroSCORE system was analyzed with respect to its predictive value in an urban Indian population.

Results: Additive model is more predictive for the low and the medium risk group of patients while logistic model which has been proposed to predict mortality for the high risk group of patients was not found to be proportionate for the Indian population valvular heart diseases.

Conclusion: In the high risk and the vary high risk group of Indian patients there is a statistically significant difference in the mortalty prediction by both the standard and the logistic model . In the remaining groups , the prediction is more accurate . For further analysis, multicentric randomized trials would be necessary.

EVOLUTION OF THE MAX CARDIAC SURGICAL DATABASE PROJECT – ACHIEVEMENTS AND THE ROAD AHEAD

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Objective: Aim of the Database is to improve quality of care for cardiac patients by allowing comparison of clinical performance with national and international standards.

Methods: Data is collected at our centre, on a continuous basis at various levels of pre operative analysis and risk stratification, at intra operative level with input of surgical, perfusion and anesthesia details, the post operative data of morbidity by various standards, the outcome and readmissions rate in an electronic fashion.

Results: The agreed dataset is finalized based on the STS dataset revised in 2003. The ongoing analysis of the data base is the basis of the comparative study of beating heart and on pump cabg, risk analysis and usefulness of preoperative IABP in high risk CABG, comparative analysis of mitral valve surgery (repair versus replacement), valve surgeries in LV dysfunction and PAH.

Conclusion: While there is a definite area of need for monitoring quality of care and hospital performance, there has been no consensus on a nationally accepted database that can allow monitoring the performance of cardiac surgery centers that focuses also on outcomes other than mortality, and done in such a way that surgical staff are not just passive objects of the evaluation. The developed dataset aims to aid both prospective clinical decision making pathways and retrospective outcome analysis.

THE LOGISTIC CARDIAC SURGERY SCORE: A NEW SEVERITY SCORING SYSTEM FOR OUTCOME PREDICTION IN INTENSIVE CARE UNIT PATIENTS AFTER OPEN HEART SURGERY

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Objective: The purpose of this study was to develop a logistic intensive care scoring system for assessment of organ dysfunction and survival in patients after open heart surgery.

Methods: This prospective study consisted of all consecutive adult patients undergoing cardiac surgery between January 2007 and December 2008. The Cardiac Surgery Score (CASUS) was calculated daily until discharge. Derived variables (Mean- and Max-scores) were also considered for the logistic and the additive model. Performance was assessed with the Hosmer-Lemeshow goodness-of-fit test and receiver operating characteristic (ROC) curves.

Results: A total of 2801 patients with a mean age of 66.4 ± 10.7 years were admitted to the ICU after cardiac surgery. The operations performed were 1473 (52.5%) isolated coronary artery bypass grafting, 601 (21.5%) isolated valve surgery, 377 (13.5%) combined CABG with valve surgery, 181 (6.5%) aortic surgery, 24 (0.8%) transplantation with heart-, and heart-lung-transplantations and 145 (5.2%) other procedures. The ICU mortality rate was 5.2% (n = 147). The mean stay on the ICU was 4.3 ± 6.8 days. The ROC curves of the logistic Mean-CASUS and the Max-CASUS were excellent with a value of 0.99 and 0.98 respectively.

Conclusion: The Logistic Cardiac Surgery Score is a simple and reliable scoring system. Its semiautomatic calculation takes less than one minute per day and patient. Thus, it may serve as an Expert System for diagnosing organ failure and predicting mortality in ICU cardiac surgical patients.

SERIAL EVALUATION OF THE LOGISTIC ORGAN DYSFUNCTION SCORE (LODS) IN PATIENTS UNDERGOING CARDIAC SURGERY.

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Objective: The purpose of this study was to evaluate the usefulness of repeated measurements of the LODS in terms of survival in cardiac surgery patients.

Methods: This prospective study consisted of all consecutive adult patients undergoing cardiac surgery between January 2007 and December 2008. The LODS was calculated daily until discharge. Performance was assessed with the Hosmer-Lemeshow (HL) goodness-of-fit test and receiver operating characteristic (ROC) curves for the first 7 ICU days.

Results: A total of 2801 patients with a mean age of 66.4 ± 10.7 years were admitted to the ICU after cardiac surgery. The operations performed were 1473 (52.5%) isolated coronary artery bypass grafting (CABG), 601 (21.5%) isolated valve surgery, 377 (13.5%) combined CABG with valve surgery, 181 (6.5%) aortic surgery, 24 (0.8%) transplantation with heart-, and heart-lung-transplantations and 145 (5.2%) other procedures. The ICU mortality rate was 5.2 % (n = 147). The mean stay on the ICU was 4.3 ± 6.8 days. Calibration for the LODS was excellent for all calculated days. The initial LODS had an Area under the ROC curve (AUC) of 0.81. The AUC was best on ICU day 3 with a value of 0.93, and declined to 0.85 on ICU day 7.

Conclusion: Although the LODS was not validated for cardiac surgical patients it showed in our study an excellent calibration and discrimination, with a mean Area under the ROC curve of 0.87. Therefore we would recommend further evaluation of the score in other ICUs for cardiac surgical patients.

EVALUATION OF SEQUENTIAL ORGAN FAILURE ASSESSMENT (SOFA) SUBSCORES IN 2801 CARDIAC SURGERY PATIENTS

Background: We aimed to validate the SOFA subscores (initial-, mean- and maximum SOFA) for cardiac surgery patients and to find out which subscore is more reliable in risk stratification for this patient category.

Methods: We included prospectively all adult cardiac surgery patients between January 1st 2007 and December 31st 2008 with an ICU-stay for at least 24 hours. We documented the Initial-SOFA (on operative day) value, Max-SOFA (highest SOFA value during the ICU stay) and Mean-SOFA (sum of daily SOFA divided by number of ICU day). Endpoint was hospital mortality. Collected data were evaluated with calibration and discrimination analytic tests, with comparison of areas under receiver-operating-characteristic (ROC) curves. Probability of mortality was calculated for the three subscores and its mean values were compared to each other.

Results: 2801 patients were included, 29.6 % (n = 830) were females. Mean age was 66.9 ± 10.7 years. Hospital mortality was 6.2%. ICU-stay mean was 4.3 ± 6.8 days. Mean-SOFA had the best discrimination with the largest area under ROC curve (0.91) and was significantly better than the other two subscores ($P < .001$). It had the highest percentage of correctly predicted prognosis with an overall correct classification of 96.3%, an odds ratio of 2.19 and a reliable calibration. The Initial-SOFA calibrated very well but not the Max-SOFA.

Conclusion: Mean-SOFA is the most reliable SOFA subscore for risk stratification in cardiac surgery patients. Therefore, we recommend daily calculation of the SOFA score and its Mean-SOFA subscore during ICU stay. However, Initial-SOFA is very important as reference value upon ICU admission.

THE "2ND ITALIAN CABG PROJECT" - SHORT-TERM OUTCOMES IN PATIENTS WITH CORONARY ARTERY BYPASS GRAFT SURGERY

Objectives: In early 2008, a new national prospective study on the short-term outcomes of coronary artery bypass graft (CABG) procedures was launched in Italy. The aim was to describe short-term results on patients undergoing a CABG procedure and improve methodologies for comparative outcomes evaluation.

Methods: Only 26 Italian Cardiac Surgery Centers participated in this new study. For each patient undergoing a CABG, Centers were requested to provide some specific data (type of procedure, haemodynamic condition, co-morbidities, recent myocardial

infarction and unstable angina, ventricular function, emergency condition, vital status at 30 days). Representativeness was tested by comparing characteristics of the enrolled population with information derived from national hospital discharge records. A multiple logistic regression analysis was used to perform indirect standardization; mortality rate of the entire population was used as reference standard. Comparison with the “CABG model” built on 34000 patients in 2002-2004 was also performed.

Results: The analysis of 7436 “isolated CABG” showed a 30-day mortality of about 2%. This enrolled population seemed to be representative of the national population of CABG patients. Using the new estimate model, 2 of the 26 participating Centers showed significantly better risk-adjusted mortality rates than the national and 2 others showed significantly worse rates. The application of the “CABG model” yielded similar results.

Conclusions: This analysis shows the high-quality level of the Italian Cardiac Surgery and confirms a good applicability of the “CABG model” to the Italian CABG population.

IMPACT OF AGE ON THE PERFORMANCE OF AN EMPIRICALLY DERIVED RISK STRATIFICATION MODEL FOR PATIENTS UNDERGOING CORONARY SURGERY: SHOULD RISK ASSESSMENT MODELLING FOR ELDERLY PATIENTS BE IMPROVED?

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Objective: To evaluate the performance of the risk assessment model derived from the “Italian CABG Outcome Project” (ItCABG) in different age classes.

Methods: ItCABG model was applied to the Italian CABG population (34310 procedures from 2002 to 2004) stratified by age. Four age classes were considered: <=59; 60-69; 70-79; >=80. The performance of the model in predicting the 30-day mortality was formally assessed for calibration (Hosmer-Lemeshow test – χH-L) and discrimination (ROC area) in each age class. Differences were appropriately tested.

Results: ItCABG model was tested on the whole population showing a better performance than the EuroSCORE model. When population was stratified by age (n = 8354, 12335, 11900 and 1721, respectively), ItCABG model revealed a good discrimination power in the first three classes but not in the elderly patients (ROC Areas = 0.82, 0.77, 0.76 and 0.64, respectively). Though differences in discrimination power between the three youngest classes were not significant, the ROC Area for the elderly patients resulted significantly lower compared to the other classes. The model calibration was good in patients aged <79, but poor in the elderly patients (χH-L= 18.12, P = .05).

Conclusion: ItCABG model showed a very good performance in the youngest age classes but a poor performance when predicting early mortality in patients aged >=80. As age of patients undergoing CABG interventions is increasing, other elderly distinctive risk factors need to be assessed to improve risk stratification in this subset of patients.

Risk stratification models are known to be generally poorly performing on. Age is one of the main risk factor used to identify high risk patients this subpopulation.

POSTERS

Adult Coronary

SIMPLE TECHNIQUE USING METHYLENE BLUE TO AVOID TWISTING OF THE RADIAL ARTERY DURING CORONARY ARTERY BYPASS GRAFTING

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Objectives: RA is widely used during CABG. Twisting of the arterial grafts during anastomosis is uncommon; however it has been reported in the literature. Our objective in this study is to report a technique, where the use of methylene blue to the posterior wall of the RA during harvesting, can facilitate the anastomosis and potentially eliminate the risk of twisting of the radial graft during grafting.

Methods: Between Jan 2001-Feb 2005, 3265 patients have been treated with On or OP-CAB using the composite Y-graft RA anastomosed to pedicled LIMA. We used the harmonic scalpel 5-mm curved shears to harvest the RA with its pedicle.

Results: No patient had graft failure in the early or medium term follow-up at 6-12 months. No early or late complications were evident at the harvested non dominant forearm. Doppler examination of the ulnar artery showed no postoperative problems of the blood supply to the hand. No neurological damage or paresthesia has been reported in this group of patients.

Conclusions: The use of the harmonic scalpel together with the use of methylene blue can give an optimal harvesting result. With attention to these details, the surgeon eliminates unnecessary movements during positioning and grafting. This takes less time in the operative room with less complications post operatively and with a long term patent radial arterial graft.

ASSESSMENT OF PROTECTVE EFFECTS OF WARM TERMINAL BLOOD CARDIOPLEGIA ON MYOCARDIAL PROTECTION IN CABG

Mohammad Sadegh Pour Abbasi, MD, Nader Givtaj, MD, Shahyad Salehi, MD

A significant metabolic derangement occurs in the ischaemic-reperfused heart of patients undergoing coronary artery bypass surgery using cold blood cardioplegia . It has been reported that up to one forth of deaths after coronary artery bypass grafting surgery may be caused by Reperfusion injury especially in patients with higher NYHA classes. There are evidences that in adult cardiac operations, a warm cardioplegic reperfusate (hot shot) before removing the aortic cross-clamp improves postbypass myocardial function and metabolic recovery . We randomly assigned 41 consecutive patients undergoing primary, elective CABG into two groups; TWBC Group who received Terminal Warm Blood Cardioplegia just before removing of Aortic cross clamp (n = 24) and second group (Control) did not received TWBC (n = 17). Among patients in CONTROL group 41% (95% CL: 19-62%) received at least one inotrope, but only 17% (95% CL: 0 - 35%) of patients in TWBC group did so (P = .085). Also in respect to EF there was superiority in TWBC group only in patients with low pre operative EF. There was higher rate of spontaneous beating in TWBC group (21 of 24 or 88%) versus Control group (12 of 17 or 70%; $P < .1$).

Conclusion: it seems prudent to routinely use Terminal Warm Blood Cardioplegia in patients undergoing coronary bypass graft especially in those with reduced ventricular function.

Key Words: Cardioplegia,CABG,Myocardial Protection

BOVINE PERICARDIAL PATCH REPAIR OF POST MYOCARDIAL INFARCTION VENTRICULAR SEPTAL RUPTURE

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Introduction: Post Myocardial infarction ventricular septal rupture is a surgical emergency with very high mortality. We present our results of closure with the use of bovine pericardial patch and fibrin glue.

Methods: Between March 2005 and January 2010 we performed ventricular septal rupture double patch repair using Dacron and bovine pericardial patch with the use of fibrin glue between the two patches with or without associated coronary artery bypass grafting (CABG) in 13 patients. CABG was performed in 3 of these patients and LV aneurysm repair in one patient. All the patients were followed after 1 week, 1 month and three monthly interval afterwards discharge. The functional class, residual shunt and survival are reported.

Results: There were three operative deaths. The mean duration of stay in intensive care and hospital were 13.3 ± 10.3 days and 18.4 ± 10.8 days. After mean follow-up of 54.4 ± 19.8 months (range 5 to 63months), the survivors all were in NYHA functional class II on regular medications. None of the patients had any residual shunt lesion.

Conclusion: The double patch repair with use of bovine pericardium along with use of fibrin glue is a technique for septal rupture repair with acceptable results.

CAN RADIAL ARTERY BE USED AS A BYPASS GRAFT FOR CABG AFTER DISTAL RADIUS FRACTURE?

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Objective: To evaluate the suitability of radial artery as a graft for CABG after distal radius fractures.

Methods: We included in the study 145 patients with distal radius fractures and compared them to a control group of 40 age- and gender-matched subjects without history of fractures. The comparison included echographic blood flow measurements.

Results: 20% of the patients with history of fracture had reduced flow, while only 4% of the control group had such disorders.

Conclusions: Distal radius fractures significantly influence the flow of radial artery and its suitability as a graft. However, the high percentage of arteries that maintain normal flow allows intraoperative investigation for suitability in case of grafts' shortage.

COMPARISON OF SERUM CHONDROITIN SULFATE BETWEEN ON-AND OFF-PUMP CABG PROCEDURES

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Objective: Chondroitin sulfate (CS) is a glycosaminoglycan found in extracellular matrix (ECM), cardiac valves and connective tissue. Herein, we aim to determine the serum values of CS in bypass heart-operated patients performing a comparison between on- and off pump operated subjects.

Methods: We included in this prospective study 40 patients who were selectively submitted to CABG; 10 of the patients were operated without the application of extracorporeal circulation (off-pump).

Results: The serum chondroitin sulfate values were significantly enhanced in all participants. In addition, patients operated on cardiopulmonary bypass had markedly higher values than the off-pump operated patients.

Conclusions: Chondroitin sulfate seems to be a systemic inflammation marker, with direct correlation to the inflammatory response produced by the heart-lung machine. A study with a broader sample of patients will provide safer results on the issue.

COMPARISON OF INFLOW OCCLUSION ON BEATING HEART (IOBH) WITH CARDIOPULMONARY BYPASS (CPB) FOR SAME SURGICAL INDICATIONS IN TERMS OF HOSPITAL STAY, OPERATION, INTENSIVE CARE UNIT STAY AND POSTOPERATIVE INTUBATION TIME

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Objective: Removal of an intracardiac foreign body from right heart could be performed with both cardiopulmonary bypass and inflow occlusion on beating heart techniques. In this study, we compared both techniques in terms of hospital stay, operation, intensive care unit stay and postoperative intubation time.

Methods: In our study, with the use of CPB technique, right atrial thrombus was removed in 4 cases, whereas right ventricular thrombus was removed in 2 cases, and right ventricular pacemaker leads were removed in 2 cases. Again, with the use of IOBH technique, right atrial thrombus was removed in 2 cases, whereas right atrial pacemaker lead was removed in 1 case, right ventricular pacemaker leads were removed in 3 cases and one Swan-Ganz catheter was removed from right atrium. Both groups were compared in terms of hospital stay, operation, intensive care unit stay and postoperative intubation time.

Results: Mean operation time did not differ between both groups, significantly. But hospital stay, intensive care unit stay and intubation time were significantly shorter in inflow occlusion on beating heart group.

Discussion: Postoperative intubation time and intensive care unit stay may be prolonged due to systemic inflammatory response triggered by cardiopulmonary bypass. Inflow occlusion on beating heart technique could be safely performed by experienced teams on convenient patients in order to avoid adverse effects of CPB.

RECENT ADVANCES IN ADULT CARDIAC SURGERY: EARLY RESULTS OF SKELETONIZED VERSUS PEDICLED RADIAL ARTERY IN REVASCULARIZATION OF CORONARY PATIENTS

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Objective: The radial artery (RA) is increasingly used for myocardial revascularization because of its presumed advantageous long-term patency rates. The vessel can be harvested as a pedicle or skeletonized.We prospectively compared the skeletonization technique with the usual commonly used pedicle preparation using scissors and clips.

Methods: Randomized selection of 50 patients (group A) underwent vascularization using skeletonized radial artery and another 50 patients (group B) underwent vascularization using pedicled radial artery. The RA was treated with papaverine to prevent spasm of the vessel during and after harvesting. These patients were operated upon in the period from October 2005 to October 2009 in Ain Shams University Hospitals (ASUH), Egypt and Saud Al- Babtain Cardiac Centre (SBCC), KSA. Patients with carpal tunnel syndrome, arterial obstructive disease, pathologic Allen test or Doppler examination (small RA diameter, or visible calcification are not candidates for radial harvesting). Radial artery harvesting was avoided in patients with renal dysfunction on dialysis. Operative data and early results and graft patency after approximate of one year were compared in both groups.

Results: Preoperative parameters were comparable in both groups. Harvesting the RA as a skeletonized vessel took more time as compared with pedicle preparation (group A versus B group 39.1 ± 3.5 minutes versus 22.4 ± 3.9 minutes ($P < .001$). The length of the RA after skeletonization with scissors and clips was 19.8 ± 1.3 cm in contrast with 18.1 ± 0.9 cm ($P < .01$) after dissection as a pedicle. The number of hemostatic titanium clips was similarly higher in group A as opposed to group B, 53.7 ± 6.2 versus 39.7 ± 6.2 ($P < .01$). Mean blood flow through the graft after establishing the proximal anastomosis was similar in both groups (48.3 ± 20.1 mL/min versus 51.8 ± 22.3 mL/min, respectively). There was no hospital mortality in both groups, incidence of peri-operative myocardial infarction (2% both), length of ICU stay (2.1 ± 1.4 versus 2.2 ± 1.6 days). Patients of the B group required significantly more frequent re-thoracotomy due to bleeding within the early postoperative course 8% versus 0% ($P < 0.01$). Major complications were observed in

one (2%) in group A and 2 (4%) in group B (P = not significant [NS]). None were related to the radial artery graft. Angiography after a mean follow up of (13.0 ± 1.4 monthes) was obtained in 40 patients of group A and 35 patients in group B and revealed that the stenosis free graft patency rate of group A (37 of 40, 92.5%) was superior to that of group B (30 of 35, 85.72%) with $P < .01$.

Conclusions: Skeletonization using scissors and clips is more time consuming and technically more difficult, but yield significantly longer grafts increasing the possibility for more sequential anastomoses. It is safe and contributes to reducing the incidence of early graft stenosis.

EFFECT OF DIABETES MELLITUS ON MORBIDITY AND MORTALITY AMONG PATIENTS UNDERGOING ISOLATED ON-PUMP CABG

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Introduction: Diabetes mellitus is an important risk factor for coronary artery disease. It plays a significant role in mortality and morbidity seen after CABG operations. In this study, we compared diabetic and non-diabetic patients undergoing isolated on-pump CABG operation.

Materials and Methods: Between January 2002 and December 2009, 1657 patients underwent isolated CABG in our clinic. Among these patients, 35.7% (n: 591)(Group I) were diabetic, whereas 64.3% (n: 1066)(Group II) were non-diabetic. Categorical data were evaluated with Chi-Square and Fisher's exact test. Intensive care unit stay and hospital stay periods were analyzed with Mann-Whitney U test.

Results: Female gender, hypertension, preoperative renal disorder (creatinine ≥ 2 mg/dl), peripheral arterial disease, ascending aortic calcification and low ejection fraction (<30%, ≥30-50%) were significantly higher among diabetic patients ($P < .05$). CPB and cross-clamping time, operation time, prolonged inotropic support, IABP use, prolonged intubation time, postoperative renal disorder, postoperative need for dialysis, postoperative atrial fibrillation, reoperation for hemorrhage and blood transfusion were significantly increased in patients with diabetes ($P < .05$). Hospital and ICU stay were longer in these patients ($P < .05$). Again, postoperative mortality rate was significantly higher ($P < .05$). Hyperlipidemia, hypertension, chronic obstructive pulmonary disease, preoperative renal disorder (creatinine ≥ 2 mg/dl), low ejection fraction (<30%, ≥30-50%), CPB and cross-clamping time, operation time, prolonged inotropic support, IABP use, prolonged intubation time, postoperative renal disorder, postoperative need for dialysis, postoperative atrial fibrillation, reoperation for hemorrhage and massive blood transfusion increased mortality rates significantly in patients with diabetes ($P < .05$) (Table 1).

Conclusions: Our study demonstrated that postoperative mortality and morbidity rates were higher among diabetics undergoing isolated on-pump CABG.

Table 1. Preoperative, Intraoperative, and Postoperative Data for Diabetic and Non-diabetic Patients

	Prevalence % (n)		
	Diabetic Patients (n = 91)	Non-Diabetic Patients (n = 1066)	P
Mean age (yrs)	59.56±10.45	58.54±10.86	n/s
Sex (male)	70.7 (418)	82.4 (878)	.000
Smoking	49.9 (295)	61.9 (660)	.000
Diabetes	73.7 (42)	34.3 (549)	.000
Hyperlipidemia	43.3 (256)	46.1 (491)	n/s
Hypertension	49.7 (294)	44.1 (470)	.015
COPD	5.1 (30)	4.1 (44)	n/s
LMCAD	6.3 (37)	5.5 (59)	n/s
Renal failure or creatinine ≥2mg/dl	2.4 (14)	0.7 (7)	.004
Peripheral vascular disease	6.1 (36)	3.8 (40)	.021
Preoperative AF	2 (12)	1 (11)	n/s
Previous PTCA	5.9 (35)	5.1 (54)	n/s
Previous stroke or TIA	1.2 (7)	0.6 (6)	n/s
Aort calcification	4.4 (35)	2.6 (28)	.038
Ejection fraction (%)			.000
<30	9.9 (58)	4.2 (45)	
≥ 30-50	54 (317)	35.1 (372)	
>50	36.1 (212)	60.6 (642)	
Urgent and emergent operations	1.1 (7)	0.7 (8)	n/s
CPB time			.000
< 3 hour	90.9 (537)	98.4 (1049)	
>3 hour	9.1 (54)	1.6 (17)	
Cross-clamp time			.000
< 1 hour	88 (520)	95.5 (1018)	
>1 hour	12 (71)	4.5 (48)	
Duration of surgery			.000
<3 hour	32.8 (194)	45.3 (483)	
≥ 3-4 hour	50.4 (298)	50.1 (534)	
>4 hour	16.8 (991)	4.6 (49)	
Prolonged intrope use	26.4 (156)	9.5 (101)	.000
Intraaortic balloon support	16.1 (95)	3.7 (39)	.000
Prolonged ventilatory support	6.9 (41)	1.6 (17)	.000
Postoperative renal failure	7.1 (42)	1.4 (15)	.000
Postoperative dialysis	2.7 (16)	0.8 (8)	.002
Postoperative atrial fibrillation	27.1 (160)	10.5 (112)	.000
Hemorrage-related reexploration	2.7 (16)	2.4 (26)	n/s
High blood transfusion requirement ≥3 unite	6.9 (41)	4.5 (48)	.024
Mean ICU length of stay (days)	3.07±4.58	2.45±2.03	.000
Mean hospital length of stay (days)	6.75±2.25	6.18±1.86	.000
Postoperative mortality	8.1 (48)	1.4 (15)	.000

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

EFFECT OF ADVANCED AGE ON MORBIDITY AND MORTALITY AMONG PATIENTS UNDERGOING ISOLATED CABG

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Objective: The frequency of CABG operations increases with the prolonged life expectancy. In this study, we investigated the effect of advanced age on morbidity and mortality among patients undergoing isolated CABG

Methods: Between January 2002 and December 2009, 1657 patients underwent isolated CABG in our clinic. These patients were divided into Group I (<70 years of age)(n:1401, 84.6%) and Group II (≥70 years of age) (n:256, 15.4%). Non-categorical data were evaluated with *t* test and categorical data were with Chi-square and Fisher's exact test. Intensive care unit stay and hospital stay periods were analyzed with Mann-Whitney *U* test.

Results: Hypertension, chronic obstructive pulmonary disorder, previous PTCA, left main coronary artery stenosis, calcification of ascending aorta and low ejection fraction (<30%, 30-50%) were significantly more frequent in Group II ($P < .05$). Cardiopulmonary bypass time, prolonged use of inotropes and use of intraaortic balloon pump were again more frequent in Group II. Incidence of postoperative renal failure, need for dialysis, incidence of atrial fibrillation, amount of blood transfusion needed, ICU and hospital stay were significantly higher in Group II ($P < .05$). Diabetes mellitus, postoperative renal failure, prolonged use of inotropes and use of intraaortic balloon pump, postoperative prolonged intubation period, postoperative atrial fibrillation, postoperative revision and bleeding were factors increasing mortality in both groups significantly ($P < .05$).

Conclusion: Isolated coronary artery bypass operations could be performed with reasonable mortality and morbidity rates on patients of advanced age.

Table 1. Preoperative, Intraoperative, and Postoperative Data for patients >70 Years of Age and <70 Years of Age

	Prevalence % (n)		
	≥70 years of age (n = 256)	<70 years of age (n = 1401)	*P*
Sex (male)	67.6 (173)	80.2 (1123)	.000
Smoking	48.4 (124)	59.3 (831)	.001
Diabetes	35.2 (90)	35.8 (501)	n/s
Hyperlipidemia	41 (105)	45.8 (642)	n/s
Hypertension	58.6 (150)	43.8 (614)	.000
COPD	8.6 (22)	3.7 (52)	.001
LMCAD	9.8 (25)	5.1 (71)	.004
Renal failure or creatinine ≥2mg/dl	2.3 (6)	1.1 (15)	n/s
Peripheral vascular disease	5.1 (13)	4.5 (63)	n/s
Preoperative AF	2.7 (7)	1.1 (16)	n/s
Preoperative PTCA	3.1 (8)	5.8 (81)	.050
Previous stroke or TIA	1.2 (3)	0.7 (10)	n/s
Aort calcification	6.6 (17)	2.6 (37)	.002
Ejection fraction (%)			.000
<30	9.5 (24)	5.7 (79)	
≥ 30-50	62.3 (157)	38.2 (532)	
>50	28.2 (71)	56.2 (783)	
Urgent and emergent operations	1.2 (3)	0.9 (12)	n/s
CPB time			.018
< 3 hour	93% (238)	96.2% (1348)	
>3 hour	7% (18)	3.8% (53)	
Crossclamp time			n/s
< 1 hour	91% (223)	93.1% (1305)	
> 1 hour	9% (23)	6.9% (96)	
Duration of surgery			n/s
<3 hour	47.3% (121)	39.7% (556)	
≥ 3-4 hour	40.6% (104)	52% (728)	
>4 hour	12.1% (31)	8.4% (117)	
Prolonged intrope use	23.4 (60)	14.1 (197)	.000
Intraaortic balloon support	11.3 (29)	7.5 (105)	.029
Prolonged ventilatory support	4.7 (12)	3.3 (46)	n/s
Postoperative renal failure	9 (23)	2.4 (34)	.000
Postoperative dialysis	3.1 (8)	1.1 (16)	.023
Postoperative atrial fibrillation	21.9 (56)	15.4 (216)	.008
Hemorrage-related reexploration	3.5 (9)	2.4 (33)	n/s
High blood transfusion requirement ≥3 unite	9 (23)	4.7 (66)	.006
ICU lenght of stay (days)	2.98 ± 3.05	2.62 ± 3.22	.000
Total hospital length of stay (days)	6.70 ± 2.58	6.33 ± 1.90	.003
Postoperative mortality	5.9 (15)	3.4 (48)	n/s

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

EFFECT OF HYPERTENSION ON MORTALITY AND MORBIDITY AMONG PEOPLE UNDERGOING ISOLATED ON-PUMP CORONARY ARTERY BYPASS GRAFTING

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Introduction: Hypertension is a significant risk factor for coronary artery disease. In this study, we aimed to investigate the effect of hypertension on mortality and morbidity among people undergoing isolated on-pump coronary artery bypass grafting

Methods: Between January 2002 and December 2009, 1657 patients underwent isolated CABG in our clinic. Seven hundred and sixty-four (46.1%) patients were hypertensive. Hypertensive patients were named as Group I and non-hypertensive patients were named as Group II. Non-categorical data were evaluated with *t* test and categorical data were evaluated with Chi-Square and Fisher's exact test. Intensive care unit stay, hospital stay and follow-up periods were analyzed with Mann-Whitney *U* test.

Results: Diabetes, preoperative renal insufficiency, preoperative atrial fibrillation, calcification of ascending aorta and low ejection fraction (<30%, ≥30-50%) were more common among hypertensive patients ($P < .05$). Prolonged cardiopulmonary bypass time (>3 h), prolonged cross-clamping time (>1 h), prolonged operation time (>4 h), prolonged inotropic support, prolonged ventilatory support, postoperative renal insufficiency, need for hemodialysis, postoperative atrial fibrillation, reoperation for bleeding and massive blood transfusion (>3 units) were more common among hypertensive patients ($P < .05$). Intensive care unit stay, hospital stay were longer and mortality rate was higher among hypertensives ($P < .05$). Female gender, diabetes, hyperlipidemia, chronic obstructive lung disease, preoperative renal insufficiency, calcification of the ascending aorta, preoperative low ejection fraction, emergency operation, prolonged cardiopulmonary bypass time (>3 h), prolonged cross-clamping time (>1 h), prolonged operation time (>4 h), prolonged inotropic support, use of intraaortic balloon pump, prolonged ventilatory support, postoperative renal insufficiency, need for hemodialysis, postoperative atrial fibrillation, reoperation for bleeding and massive blood transfusion (>3 units) were factors affecting the mortality rate significantly ($P < .05$).

Conclusions: Hypertension is an important risk factor affecting mortality and morbidity among patients undergoing isolated on-pump coronary artery bypass.

Table 1. Preoperative, intraoperative ve postoperative data for patients with hypertension and without hypertension

	Prevalence % (n)		
	Patients with hypertension (n = 764)	Patients without hypertension (n = 893)	*P*
Sex (male)	68.2 (521)	86.8 (775)	.000
Smoking	46.5 (355)	67.2 (600)	.000
Diabetes	38.5 (294)	33.3 (297)	.015
Hyperlipidemia	41.1 (314)	48.5 (443)	.002
COPD	5.1 (39)	3.9 (35)	n/s
LMCAD	5.9 (45)	5.7 (51)	n/s
Renal failure or creatinine ≥2mg/dl	(15)	0.7 (6)	.017
Peripheral vascular disease	5.5 (42)	3.8 (34)	n/s
Preoperative AF	2.2 (17)	0.7 (6)	.006
Previous stroke or TIA	1.2(9)	0.4 (4)	n/s
Previous PTCA	5.9(45)	4.9 (44)	n/s
Aorta calcification	5.1 (39)	1.7 (15)	.000
Urgent and emergent operation	0.7 (5)	1.1 (10)	n/s
Ejection fraction (%)			.000
<30	6.5 (49)	6.1 (54)	
30-50	49.5 (375)	35.4 (314)	
>50	44.1 (334)	58.6 (520)	
CPB time			.004
< 3 hour	94.2 (720)	97 (866)	
>3 hour	5.8 (44)	3 (27)	
Cross-clamp time			.000
< 1 hour	0.2 (689)	95.1 (849)	
> 1 hour	9.8 (75)	4.9 (44)	
Duration of surgery			< .05
<3 saat	9.4 (301)	42.1 (376)	
≥ 3-4 saat	49 (374)	51.3 (458)	
>4 saat	11.6 (89)	6.6 (59)	
Prolonged inotrope use	18.7 (143)	12.8 (114)	.001
Intraaortic balloon support	9.3 (71)	7.1 (63)	n/s
Postoperative atrial fibrillation	20.2 (154)	132 (118)	.000
Prolonged ventilatory support	4.7 (36)	2.5 (22)	.009
Postoperative renal disease	5.6 (43)	1.6 (14)	.000
Postoperative dialysis	2.9 (22)	0.2 (21)	.000
Hemorrage-related reexploration	3.5 (27)	1.7 (15)	.013
High blood transfusion requirement ≥3 unite	6.9 (53)	4 (36)	.006
Mean ICU length of stay (days)	2.93 ± 4.36	2.45 ± 1.61	.000
Mean hospital length of stay (days)	6.47 ± 1.80	6.32 ± 2.19	.008
Postoperative mortality	5.4 (41)	2.5 (22)	.002

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

EFFECT OF PREOPERATIVE LOW EJECTION FRACTION ON POSTOPERATIVE MORBIDITY AND MORTALITY AMONG PATIENTS UNDERGOING ISOLATED ON-PUMP CABG

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Introduction: Coronary artery bypass grafting is a therapeutic approach for patients with coronary artery disease with low ejection fraction (EF). The aim of this study is to investigate the effect of preoperative low ejection fraction on postoperative morbidity and mortality among patients undergoing isolated on-pump CABG.

Methods: Between January 2002 and December 2009, 1657 patients underwent isolated CABG in our clinic. Patients were divided into 2 groups: Group I (EF < 30%) and Group II (EF ≥ 30%). Non-categorical data were evaluated with *t* test and categorical data were evaluated with Chi-Square and Fisher's exact test. Intensive care unit stay and hospital stay periods were analyzed with Mann-Whitney *U* test.

Results: Diabetes, calcification of ascending aorta were more common in Group I ($P = .000$). Male gender, smoking, hyperlipidemia, hypertension, chronic obstructivelung disease, left main stenosis, preoperative atrial fibrillation, preoperative stroke or transient ischemic attack and emergency operation were more common in Group I, but this difference was statistically insignificant. Prolonged cardiopulmonary bypass time (>3 h), prolonged cross-clamping time (>1 h), prolonged operation time (>4 h), prolonged postoperative inotropic support and IABP use, postoperative atrial fibrillation, postoperative renal insufficiency were more common in Group I ($P < .05$). Moreover, among patients with low ejection fraction, cardiopulmonary bypass time, prolonged inotropic support, IABP use, prolonged ventilatory support, postoperative renal insufficiency, postoperative atrial fibrillation, amount of blood transfusion were factors affecting mortality and were more common and higher, respectively ($P < .05$).

Conclusions: Coronary artery bypass grafting could be performed on patients with low ejection fraction with reasonable mortality and morbidity rates.

Table 1. Preoperative, Intraoperative, and Postoperative Data for Patients without and with Preoperative Low Ejection Fraction

	Prevalence % (n)		
	Patients with EF<%30 (n = 103)	Patients with EF>%30 (n = 1554)	*P*
Sex (male)	82.5 (85)	77.9 (1211)	n/s
Smoking	61.2 (63)	57.4 (892)	n/s
Diabetes	56.3 (58)	34.3 (533)	.000
Hyperlipidemia	51.5 (53)	44.7 (694)	n/s
Hypertension	47.6 (49)	46 (715)	n/s
COPD	7.8 (8)	4.2 (66)	n/s
LMCAD	9.7 (10)	5.5 (86)	n/s
Renal failure or creatinine ≥2mg/dl	1(1)	1.3 (20)	n/s
Periferal vascular disease	1 (1)	4.8 (75)	.043
Preoperative AF	1.9 (2)	1.4 (21)	n/s
Previous stroke or TIA	1.9 (2)	0.7 (11)	n/s
Previous PTCA	3.9 (4)	5.5 (85)	n/s
Aort calcification	7.8 (8)	3 (46)	.016
Urgent and emergent operation	1.9 (2)	0.8 (13)	n/s
CPB time			.000
< 3 hour	79.6 (82)	96.8 (1504)	
>3 hour	20.4 (21)	3.2 (50)	
Cross-clamp time			.000
< 1 hour	76.7 (79)	93.9 (1459)	
> 1 hour	23.3 (34)	6.1 (95)	
Duration of surgery			.000
<3 hour	31.1 (32)	41.5 (645)	
≥ 3-4 hour	46.6 (48)	50.5 (784)	
>4 hour	22.3 (23)	8 (125)	
Prolonged inotrope use	47.6 (49)	13.4 (208)	.000
IABP use	28.2 (29)	6.8 (105)	.000
Postoperative renal disease	8.7 (9)	3.1 (48)	.007
Hemodialysis	1.9 (2)	1.4 (22)	n/s
Prolonged ventilatory support	6.8 (7)	3.3 (51)	n/s
Postoperative atrial fibrillation	41.7 (43)	14.7 (229)	.000
Hemorrage-related reexploration	2.9 (3)	2.5 (39)	n/s
High blood transfusion requirement ≥3 unite	7.8 (8)	5.2 (81)	n/s
Mean ICU length of stay (days)	3.14 ± 1.40	2.64 ± 3.28	.000
Mean hospital length of stay (days)	7.18 ± 1.63	6.34 ± 2.03	.000
Postoperative mortality	12.6 (13)	3.2 (50)	.000

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

FACTORS AFFECTING NEED FOR INTRAAORTIC BALLOON PUMP AFTER ISOLATED ON-PUMP CORONARY ARTERY BYPASS AND THEIR RESULTS

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Introduction: Intraaortic balloon pump (IABP) is the first step mechanical support device used in perioperative heart failure in coronary bypass operations. In this study, we investigated the factors affecting IABP use in patients undergoing isolated on-pump coronary artery bypass operations.

Materials and Methods: Between January 2002 and December 2009, 1657 patients underwent isolated on-pump CABG in our clinic. These patients were divided into Group I (with IABP) and Group II (without IABP). Non-categorical data were evaluated with *t* test and categorical data were with Chi-square and Fisher's exact test. Intensive care unit (ICU) stay and hospital stay periods were analyzed with Mann-Whitney *U* test.

Results: Smoking, diabetes, hyperlipidemia, chronic obstructive pulmonary disease, preoperative renal disorder (serum creatinine ≥2 mg/dl), preoperative atrial fibrillation, calcification of ascending aorta, emergency operation, low ejection fraction (<30%, 30-50%) were more common in Group I ($P < 0.05$). Prolonged cardiopulmonary bypass time (>3 h), prolonged cross-clamping time (>1 h), prolonged operation time (>4h), prolonged use of inotropes, postoperative renal failure, postoperative need for hemodialysis, postoperative prolonged intubation period, postoperative reoperation for bleeding were more common and amount of blood transfusion needed was higher in Group I ($P = .000$). ICU stay, hospital stay and mortality rate were significantly higher in Group I ($P = .000$).

Conclusions: The mortality rate was higher in patients with mandatory IABP use due to cardiac problems. Moreover, ICU stay and hospital stay were longer in these patients.

Table 1. Preoperative, Intraoperative, and Postoperative Data for Patients Requiring and Non requiring Postoperative IABP

	Prevalence % (n)		
	Patients requiring IABP (n = 134)	Patients non requiring IABP (n = 1523)	*P*
Age (yrs)	61.22 ± 10.06	58.70 ± 10.76	n/s
Sex (male)	73.1 (98)	78.7 (1198)	n/s
Smoking	65.7 (88)	56.9 (867)	.030
Diabetes	70.9 (95)	35.6 (496)	.000
Hyperlipidemia	67.2 (90)	43.1 (657)	.000
Hypertension	53 (71)	45.5 (693)	n/s
COPD	10.4 (14)	3.9 (60)	.002
LMCAD	6.7 (9)	5.7 (87)	n/s
Renal failure or creatinine ≥2mg/dl	4.5 (6)	1 (15)	.005
Peripheral vascular disease	3.7 (5)	4.7 (71)	n/s
Preoperative AF	3.7 (5)	1.2 (18)	.033
Previous stroke or TIA	-	0.9 (13)	n/s
Previous PTCA	5.2 (7)	5.4 (82)	n/s
Aort calcification	7.5 (10)	2.9 (44)	.009
Ejection fraction(%)			.000
<30	21.8 (29)	4.9 (74)	
≥ 30-50	72.9 (97)	39.1 (592)	
>50	5.3 (7)	56 (847)	
Urgent and emergent operations	5.3 (7)	0.5 (8)	.000
CPB time			.000
< 3 hour	56 (75)	99.2 (1511)	
>3 hour	44 (59)	0.8 (12)	
Cross-clamp time			.000
< 1 hour	61.2 (82)	95.6 (1456)	
> 1 hour	38.8 (52)	4.4 (67)	
Duration of surgery .000			
<3 hour	2.2 (3)	44.3 (647)	
≥ 3-4 hour	20.9 (28)	52.8 (804)	
>4 hour	76.9 (103)	3 (45)	
Prolonged intrope use	100 (134)	8.1 (123)	.000
Prolonged ventilatory support	29.9 (40)	1.2 (18)	.000
Postoperative renal disease	18.7 (25)	2.1 (32)	.000
Postoperative dialysis	8.2 (11)	0.9 (13)	.000
Postoperative atrial fibrillation	65.7 (88)	12.1 (184)	.000
Hemorrage-related reexploration	13.4 (18)	1.6 (24)	.000
High blood transfusion requirement ≥3 unite	27.6 (37)	3.4 (52)	.000
ICU lenght of stay (days)	2.52±3.05	4.44±4.11	.000
Mean hospital length of stay (days)	8.88± 5.37	6.24±1.52	.000
Postoperative mortality	35.8 (48)	1 (15)	.000

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

FACTORS AFFECTING THE INCIDENCE OF ATRIAL FIBRILLATION AFTER ISOLATED ON-PUMP CORONARY ARTERY BYPASS AND EFFECT OF ATRIAL FIBRILLATION ON POSTOPERATIVE MORBIDITY AND MORTALITY

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Introduction: Atrial fibrillation (AF) is one of most common complications seen after coronary artery bypass surgery. We aimed to investigate the factors affecting the incidence of atrial fibrillation after isolated on-pump coronary artery bypass and effect of atrial fibrillation on postoperative morbidity and mortality

Methods: Between January 2002 and December 2009, 1657 patients underwent isolated CABG in our clinic. Postoperative atrial fibrillation was seen in 16.4% (272 cases). Patients were divided into 2 groups as Group I (with AF) and Group II (without AF). Non-categorical data were evaluated with *t* test and categorical data were evaluated with Chi-Square and Fisher's exact test. Intensive care unit stay, hospital stay and follow-up periods were analyzed with Mann-Whitney *U* test.

Results: Mean age was higher in Group I. Diabetes, hyperlipidemia, hypertension, chronic obstructive lung disease, preoperative renal insufficiency, calcification of ascending aorta, low ejection fraction (<30%, ≥30-50%), preoperative atrial fibrillation were more common in Group I ($P < .05$). Emergency operation, prolonged cardiopulmonary bypass time (>3 h), prolonged cross-clamping time (>1 h), prolonged operation time (>4 h), prolonged inotropic support, use of intraaortic balloon pump, prolonged ventilatory support, postoperative renal insufficiency, need for hemodialysis, reoperation for bleeding and massive blood transfusion (>3 units) were more common in Group I ($P = .000$). Intensive care unit stay, hospital stay were longer and mortality rate was higher in Group I ($P = .000$).

Diabetes, hyperlipidemia, chronic obstructive lung disease, preoperative renal insufficiency, peripheral arterial disease, calcification of the ascending aorta, prolonged cardiopulmonary bypass time (>3 h), prolonged cross-clamping time ((>1 h), prolonged operation time (>4 h), prolonged inotropic support, use of intraaortic balloon pump, prolonged ventilatory support, postoperative renal insufficiency, need for hemodialysis, reoperation for bleeding and massive blood transfusion (>3 units) were factors affecting the mortality rate significantly in Group I ($P < .05$).

Conclusions: Postoperative atrial fibrillation is a significant factor affecting mortality and morbidity. Specific antiarrhythmic therapy and antithrombotic prophylaxis are necessary for reducing its incidence and complications.

Table 1. Preoperative, Intraoperative, and Postoperative Data for Patients with Atrial Fibrillation without Atrial fibrillation

	Prevalence % (n)		
	Patients with AF (n = 272)	Patients without AF (n = 1385)	*P*
Mean age (yrs)	61.42 ± 9.92	58.41 ± 10.81	.000
Sex (male)	77.6 (211)	78.3 (1085)	n/s
Smoking	58.1 (158)	57.5 (797)	n/s
Diabetes	58.8 (160)	31.1 (431)	.000
Hyperlipidemia	50.4 (137)	44 (610)	.032
Hypertension	56.6 (154)	44 (610)	.000
COPD	9.9 (27)	3.4 (47)	.000
LMCAD	7.7 (21)	5.4 (75)	n/s
Renal failure or creatinine ≥2mg/dl	2.6 (7)	1 (14)	.044
Peripheral vascular disease	6.6 (18)	4.2 (58)	n/s
Preoperative AF	4.8 (13)	0.7 (10)	.000
Previous PTCA	7.4 (20)	5 (69)	n/s
Previous stroke or TIA	1.1 (3)	0.7 (10)	n/s
Aort calcification	5.9 (16)	2.7 (38)	.010
Ejection fraction (%)			.000
<30	15.9 (43)	4.4 (60)	
≥ 30-50	36.7 (505)	68.1 (184)	
>50	58.9 (811)	15.9 (43)	
Urgent and emergent operations	2.9 (8)	0.5 (7)	.001
CPB time			.000
< 3 hour	79.8 (217)	98.8 (1369)	
>3 hour	20.2 (55)	1.2 (16)	
Cross-clamp time			.000
< 1 hour	73.9 (201)	96.5 (1337)	
>1 hour	26.1 (71)	3.5 (48)	
Duration of surgery			.000
<3 hour	18.4 (50)	45.3 (627)	
≥ 3-4 hour	43.8 (119)	51.5 (713)	
>4 hour	37.9 (103)	3.2 (45)	
Prolonged intrope use	50 (136)	8.7 (121)	.000
Intraaortic balloon support	32.4 (88)	3.3 (46)	.000
Prolonged ventilatory support	15.4 (42)	1.2 (16)	.000
Postoperative renal failure	11.4 (31)	1.9 (26)	.000
Postoperative dialysis	5.1 (14)	0.7 (10)	.000
Hemorrage-related reexploration	6.3 (17)	1.8 (25)	.000
High blood transfusion requirement ≥3 unite	12.9 (35)	3.9 (54)	.000
Mean ICU length of stay (days)	4.08 ± 6.95	2.40 ± 1.51	.000
Mean hospital length of stay (days)	7.44 ± 2.20	6.22 ± 1.94	.000
Postoperative mortality	20.2 (55)	8 (0.6)	.000

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

IMPACT OF TIGHT GLYCEMIC CONTROL ON PERIOPERATIVE OUTCOMES IN DIABETIC PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION WITH DRUG-ELUTING STENTS

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Background: Patients with diabetes mellitus (DM) account for approximately 25% of nearly 3 million coronary revascularization procedures performed each year in the world and experience worse outcomes compared with nondiabetic patients. This can be explained by higher risk profile in DM patients. Procedure-related and in-hospital outcomes can largely be improved.

Objective: This study sought to determine whether tight glycemic control with a glycemic monitoing system (CGMS) in diabetic patients undergoing percutaneous coronary intervention (PCI) with drug-eluting stents (DES) would improve pe-rioperative outcomes.

Methods: Fifty two diabetic patients undergoing stenting were prospectively ran-domized to tight glycemic control with CGMS or standard control of plasma glu-cose after PCI. In both groups were studied fasting plasma glucose, impaired fast-ing glucose, glyceted hemoglobin A1c, glycemic control in perioperative period.

Results: Hyperglycemia was registered in 92.3% of patients with CGMS and in 65,3% of patients with standard plasma glucose control after PCI (P = .025). Patients with tight glycemic control had lower incidence of periprocedural complica-tions (eg, death, myocardial infarction, ventricular arrhythmias) - 1.28% versus 11.5%, P < .002.

Conclusion: Hyperglycemia is specific factor associated with increased risk of ad-verse outcomes after PCI. Tight glycemic control in diabetic patients after PCI improves perioperative outcomes and long-term follow-up results.

INDICATORS OF RENAL FAILURE DEVELOPING AFTER ISOLATED ON-PUMP CABG

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Introduction: Renal failure developing after on-pump CABG may progress with increased morbidity and mortality. We investigated the risk predictors of renal failure after isolated on-pump CABG.

Materials and Methods: Between January 2002 and December 2009, 1657 patients underwent isolated on-pump CABG operation. Mean age of the patients was 58.9 ± 10.7 with 361 females and 1296 males. Non-categorical data were evaluated with *t* test and categorical data were with Chi-square and Fisher's exact test. Intensive care unit stay and hospital stay periods were analyzed with Mann-Whitney *U* test.

Results: Fifty seven patients (3.4%) developed renal failure, postoperatively. Among these, incidences of preoperative diabetes, hypertension, chronic obstructive pulmonary disease, preoperative renal disorder (creatinine ≥ 2 mg/dl), atrial fibrillation, ascending aortic calcification and low ejection fraction (<30%, ≥30-50%) were significantly higher (P < .05). Postoperative renal failure patients were older.

CPB and cross-clamping time, operation time, prolonged inotropic support, IABP use, prolonged intubation time, reoperation for hemorrhage and blood transfusion were significantly increased in patients developing renal insufficiency postoperatively (P < .05). Hospital and ICU stay were longer in these patients (P < .05). Again, postoperative mortality rate was significantly higher (Table 1) (P < .05).

Discussion: Preoperative predictors of postoperative renal insufficiency in patients undergoing isolated on-pump CABG should be put forward in detail preoperatively.

Table 1. Preoperative, Intraoperative, and Postoperative Data for Postoperative Renal Failure Patients and No Renal Failure Patients

	Prevalence % (n)		
	Patients with Renal Failure (n = 57)	Patients without Renal Failure (n = 1600)	*P*
Mean age (yrs)	66.21 ± 10.50	58.64 ± 10.64	.000
Sex (male)	63.2 (36)	78.8 (1260)	.006
Smoking	47.4 (27)	58 (928)	n/s
Diabetes	73.7 (42)	34.3 (549)	.000
Hyperlipidemia	45.6 (26)	45.1 (721)	n/s
Hypertension	75.4 (43)	45.1 (721)	.000
COPD	12.3 (7)	4.2 (67)	.012
LMCAD	8.8 (5)	5.7 (91)	n/s
Renal failure or creatinine ≥2mg/dl	17.5 (10)	0.7 (11)	.000
Peripheral vascular disease	7 (4)	4.5 (72)	n/s
Preoperative AF	5.3 (3)	1.3 (20)	.042
Previous stroke or TIA	-	0.8 (13)	n/s
Aort calcification	10.5 (6)	3 (48)	.009
Ejection fraction (%)			.000
<30	16.1 (9)	5.9 (94)	
30-50	69.6 (39)	40.9 (650)	
>50	14.3 (8)	53.2 (846)	
Urgent and emergent operations	3.2 (2)	0.8 (13)	n/s
CPB time			.000
< 3 hour	57.9 (33)	97.1 (1553)	
>3 hour	42.1 (24)	2.9 (47)	
Crossclamp time			.000
< 1 hour	63.2 (36)	93.9 (1502)	
> 1 hour	36.8 (21)	6.1 (98)	
Duration of surgery			.000
<3 hour	14 (8)	41.8 (669)	
≥ 3-4 hour	29.8 (7)	50.9 (815)	
>4 hour	56.1 (32)	7.3 (116)	
Prolonged intrope use	68.4 (39)	13.6 (218)	.000
Intraaortic balloon support	43.9 (25)	6.8 (109)	.000
Prolonged ventilatory support	38.6 (22)	2.3 (36)	.000
Postoperative atrial fibrillation	54.4 (31)	15.1 (241)	.000
Hemorrage-related reexploration	15.8 (9)	2.1 (33)	.000
High blood transfusion requirement ≥3 unite	28.1 (16)	4.6 (73)	.000
Mean ICU length of stay (days)	8.09 ± 14.13	2.48 ± 1.58	.000
Total hospital length of stay (days)	10.41 ± 6.03	6.31 ± 1.73	.000
Postoperative mortality	47.4 (27)	2.3 (36)	.000

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

INVASIVE-NONINVASIVE SEQUENTIAL VENTILATION FOR EXTUBATION FAILURE AFTER CORONARY ARTERY BYPASS SURGERY

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Objective: To assess the validity of noninvasive positive-pressure ventilation (NPPV) in correcting impediments to weaning from mechanical ventilation in those patients who failed to be extubated after coronary artery bypass surgery.

Methods: 360 patients who underwent coronary artery bypass surgery were chosen for this study during December 2005 to February 2010. Those patients were divided into NPPV group with NPPV treatment (N group, n = 21) and control group (C group, n = 339). The baseline clinical parameters, postoperative complications, and clinical outcomes in the two groups were respectively recorded. Arterial pressure, heart rate, respiratory rate, arterial pH value, arterial oxygen saturation, pulmonary arterial pressure, oxygenation index and alveolar-arterial oxygen tension difference were measured at preoperative, 8 and 0 h before NPPV, and 8, 16, 24 and 48 h after ventilation.

Results: Elder age, current smoking, low oxygenation index, low endogenous creatinine clearance rate, with 3 vessels involved and associated valvular disease may be risk factors of extubation failure. The percentages of more than 3 grafts, large blood transfusion, and cardiopulmonary bypass in N group were much higher than those in C group ($P \geq .05$). NPPV improved respiratory rate, arterial oxygen saturation, heart rate, pulmonary arterial pressure, oxygenation index, alveolar-arterial oxygen tension difference and had obvious effect on cardiogenic pulmonary edema, atelectasis and acute lung injury. Two patients had pneumonia, and one of them received reintubating. The total efficiency was 95.3% for NPPV.

Conclusion: In appropriate candidates, NPPV exerts favorable effects on lung function and early extubation, and prevents reintubation.

IS MULTI SLICE CT ANGIOGRAPHY ADEQUATE AS THE SOLE DIAGNOSTIC CRITERIA TO PROCEED FOR CABG ?

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Objectives: Rapid advances in multislice computed tomography (MSCT) have facilitated increasingly accurate noninvasive coronary imaging. The present study was designed to assess the accuracy of the 64 slice MSCT scanner with conventional coronary angiography (CCA) and to conclude whether or not MSCT angiography alone could give sufficient and accurate information to proceed with coronary artery bypass grafting (CABG).

Methods: 50 stable patients with proven severe CAD on CCA for elective CABG underwent MSCT prior to CABG. The MSCT images were compared with CCA and the accuracy, sensitivity and specificity of detecting significant stenosis cross checked.

Results: An excellent correlation was found between the two modalities. Comparing the maximal percent diameter luminal stenosis by MSCT versus CCA , the Spearman correlation coefficient between the two modalities was 0.99 ($P < .0001$). Bland-Altman analysis demonstrated a mean difference in percent stenosis of 0.6 ± 2.3% (95% confidence interval 5.1% to –3.9%). 93.4% of the observations were within ± 1.96 standard deviation. Anomalous and intramural coronary arteries were easily picked up by MSCT. **Conclusions:** MSCT is a valuable tool for the cardiac surgeon . It helps in precise planning of the CABG especially off-pump CABG and in prejudging the length of the conduit required. On the basis of our findings we recommend MSCT as a sole criteria for proceeding for CABG without CCA in selected cases.

MEAN DURATIONS OF INFLOW OCCLUSION ON BEATING HEART

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Objective: Inflow occlusion on beating heart (IOBH) was a technique that was used more commonly in cardiac surgery prior to cardiopulmonary bypass (CPB) era. Nowadays, this technique is seldomly preferred in some congenital malformations, cardiac injury and extraction of intracardiac thrombus or foreign body. In this study, we investigated mean duration of inflow occlusion among our cases.

Methods: Seven patients were operated on using IOBH technique. Right atrial thrombus was removed in 2 cases, whereas right atrial pacemaker lead was removed in 1 case, right ventricular pacemaker leads were removed in 3 cases and one Swan-Ganz catheter was removed from right atrium. After median sternotomy both venae cave were snared with nylon tapes. Two purse-string sutures were placed on right atrium. Right atriotomy was made between the these sutures. In cases where the prolongation of the procedure more than 45 seconds was necessary, the atriotomy was closed by suspending the sutures and placing a side-biting clamp and loosening the snares, thus permitting the normal flow. After a period of 3 minutes for normal inflow the procedure was repeated.

Results: Mean duration of inflow occlusion was 100 ± 32 (60-150) seconds. None of the patients developed complication during postoperative period.

Discussion: Cardiac and neurological complications may be seen due to systemic and cerebral malperfusion, particularly in occlusions of more than 3 minutes on beating heart. If the continuous occlusion time was kept short and occlusions were performed in short periods, it is a safe procedure.

MIDTERM CLINICAL OUTCOME AFTER OFF-PUMP AND ON-PUMP CORONARY ARTERY SURGERY AMONG PATIENTS WITH COMPROMISED LEFT VENTRICULAR FUNCTION

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Objective: It is well documented that off-pump cardiopulmonary bypass reduces both early mortality and morbidity in patients

in patients with left ventricular dysfunction. There are few reports regarding midterm outcome among these patients . The aim of this study is to find out midterm survival in patients with LV dysfunction who undergo off-pump (OPCAB) and to compare them with those who underwent conventional bypass (CCAB).

Methods: Two hundred and three patients with ejection fraction less than 0.35 who underwent isolated CABG were reviewed retrospectively. Ninety-eight patients underwent OPCAB, while the rest 105 underwent CCAB. Patients were followed up to find out their midterm outcome .

Results: 97% of patients were followed up completely. Late mortality was 6.7%vs 9% among OPCAB and CCAB patients respectively (*P* = .62). One-, three-, five-, and seven-year survivals were 97%, 88.5%, 82%,and 82% for OPCAB and 97.5%, 91%, 91% and 76% for the on-pump group respectively (*P* = .55). Freedom from angina was 71% and 66% (*P* = .48) respectively, while freedom from heart failure symptoms was 63% and 74% (*P* = .39). Hospitalization due to cardiac causes was significantly higher among OPCAB group 16% versus 4.9%; *P* = .02. Similarly, more patients had cardiac catheterization and angioplasty but the difference between both groups was not significant .

Conclusions: The use of off-pump and on-pump coronary artery bypass grafting among patients with impaired left ventricular function resulted in equivalent midterm outcome.

OFF-PUMP SURGERY: A SAFE METHOD FOR CORONARY ARTERY BYPASS GRAFTING. A COMPARATIVE STUDY

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Objective: Determine the effectiveness of each technique of revascularization (On-pump, Off-pump and On-pump with beating heart technique), comparing outcomes, clinical characteristics, morbidity, and mortality of each group.

Methods: This is a retrospective, case-control study. A total of 1056 patients who underwent CABG using different techniques of circulatory assistance from January 2003 to January 2010 were studied. The patients where divided in three groups: Group A CABG without extracorporeal circulation, Group B CABG with On-pump beating heart, Group C patients operated with aortic clamping.

Results: Group A: n=214, Group B: n = 295, Group C: n = 547, there were no statistically significant differences among the groups. Bleeding was present in 3.73%, 5.42% and 5.48% for each group (*P* = .065). Mediastinitis occurred in 2.33%, 5.08%, and 5.11%, respectively (*P* = .623). Non-fatal MI in 7.94%, 3.38%, and 5.48% for each group (*P* = .015). Arrythmias in 4.67%, 4.67% and 5.66% (*P* = .387). Strokes occurred in 1.40%, 1.01% and 1.27% (*P* = .608). Mortality in 5.14%, 5.08% and 8.22% (*P* = .237). ICU hospital stay in each group was 4.2 days (SD = 5.5), 4.7 days (SD = 5.5), 5.7 (SD = 9.7) respectively (*P* = .230).

Conclusions: Off-pump CABG is a safe method with similar rate of complications and mortality compared with the other groups.

OUR CORONARY ARTERY BYPASS STRATEGY IN A YOUNG CASE WITH A COILING RIGHT CORONARY ARTERY

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Objective: Coiling of an artery is a rare entity which is mostly specific to the internal carotid arteries.

Materials and Methods: Our case was a 40-year-old male. He was suffering from chest pain for 3 weeks. Investigations revealed coronary artery disease requiring surgery he was admitted to our clinic.

Results: His coronary angiography revealed a coiling right coronary artery proximal to the crux area which was confirmed by different projections. No other significant stenosis but 95% stenotic lesion in left anterior descending (LAD) artery was identified. Transthoracic echocardiography was normal. Beating-heart coronary artery bypass (CABG) procedure was planned. Left internal mammarian artery free graft was used for this single-vessel CABG. The coiling right coronary artery with no stenotic lesion was considered as normal and no additional procedure was planned.

Conclusion: Coiling of an artery is usually identified coincidentally after some injuries or diagnostic procedures since it is asymptomatic particularly in coronary arteries. Conservative approach is recommended in literature review when there are no associated stenotic lesions as we confirm with this case.

PRE AND POST OPERATIVE EVALUATION OF CORONARY ARTERY AND ARTERIAL GRAFTS USING MD-CT IN CABG PATIENTS

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Background: MD-CT is widely used to diagnose coronary artery disease and graft evaluation in CABG patients. We also consider about graft selection of CABG using MD-CT preoperatively.

Methods: 1) Comparison of pre-operative CT-CAG and conventional CAG, 2) pre-operative evaluation of pedicle arterial grafts (ITAs and RGEA) using MD-CT, 3) evaluation of post-operative graft flow and anastomosis using MD-CT, were analyzed.

Results: 1) Overestimation and difficulty of MD-CT was noticed in specific cases. 2) Preoperative graft selection was able to perform using MD-CT without spasm and complication of catherterization. 3) Graft patency and anastomosis were evaluated clearly, but flow competition was not able to evaluate.

Conclusion: Evaluation using MD-CT was less invasive and satisfactory. It is very useful especially for preoperative graft selection and postoperative graft evaluation. It is important to use optimal image processing for each target.

REDUCTION OF STERNAL WOUND INFECTIONS IN DIABETIC PATIENTS UNDERGOING BILATERAL INTERNAL THORACIC ARTERY GRAFTING: DOES THE TECHNIQUE OF HARVEST MATTER?

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Objective: Bilateral internal thoracic artery (BITA) bypass grafts have advantages over single internal thoracic artery (SITA) bypass

grafts. However, the perceived higher sternal complications seen in diabetics have made many surgeons hesitant to use BITA grafting in CABG in diabetic population. We compared sternal complications in diabetics undergoing off-pump CABG (OPCAB) between BITA or SITA graft groups by using a modified pedicled technique of ITA harvesting.

Methods: A total of 1115 diabetic patients underwent elective primary OPCAB between August 2004 and June 2010 using SITA (n = 942) and BITA (n = 173). The ITA was harvested using low intensity electrocautery and pedicle technique in all patients. In BITA group at least one ITA bifurcation was spared to the chest wall and pericardiaco-phrenic artery was also preserved.

Results: There was no difference in preoperative variables between the two groups. The observed rates of sternal wound complications in SITA and BITA groups were the following: (a).superficial sternal infections- 16 patients (1.69%) in SITA, 2 patients (1.15%) in BITA (P = .76); (b) deep sternal infections- 4 patients (0.42%) in SITA, 1 patient (0.57%) in BITA (P = .67) and (c) sternal dehiscence- 3 patients (0.31%) in SITA, none in BITA group, three hospital deaths in SITA group (0.31%) and none in BITA group.

Conclusions: Our study shows that modification of pedicled ITA harvesting technique with sparing at least one bifurcation of ITA to the chest wall and preservation of pericardiaco-phrenic artery branch in BITA grafting did not associate with an increased incidence of sternal wound complications in diabetics undergoing OPCAB.

STROKE PREDICTORS IN ON-PUMP CORONARY ARTERY BYPASS GRAFT SURGERY

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Background: Stroke is one of the most devastating complications observed following on-pump coronay artery bypass graft (CABG) surgery. In this study, we evaluated the incidence of pre- and peri-operative risk factors being effective in the development of stroke in the patients who underwent on-pump CABG surgery.

Methods: 1657 patients underwent isolated on-pump CABG surgery in our clinic between January 2002 and December 2009. Mean patient age was 58.90 ± 10.72 years (range, 24 to 85 years). 21.7% of patients were female and 78.3% were male. Predictors of stroke were determined by *t* test in noncategorical data and by Chi-Square and Fisher's Exact test analysis in categorical data. Periods of intensive care stay and hospitalization were analysed by Mann-Whitney test.

Results: Average stroke incidence was 0.9% (16 patients). Stroke predictors were hypertension, hyperlipidemia, diabetes, chronic obstructive pulmonary disease, prior stroke or transient ischemic attack (TIA), low left ventricular ejection fraction, calcified ascending aorta, preoperative atrial fibrillation, postoperative prolonged intropic support, cross-clamp period, duration of operation, prolonged ventilatory support and hemorrhage-related reexploration ($P < .05$). Duration of stay in intensive care unit and hospital stay were remarkably longer and statistically significant in patients with stroke when compared to that of patients without stroke ($P < .05$).

Conclusions: Stroke is a devastating complication of on-pump coronary artery bypass surgery. Preoperative risk factors and surgical procedures are the most important factors in development of stroke. Incidence of stroke increases hospitalization period remarkably.

Table 1. Preoperative, Intraoperative, and Postoperative Data for postoperative Stroke patients and N Stroke Patients

	Prevalence % (n)		
	Patients with Stroke (n = 16)	Patients without Stroke (n = 1641)	*P*
Age (yrs)	62.31 ± 8.18	58.87 ±1 0.74	n/s
Sex (male)	87.5 (14)	78.1 (1282)	n/s
Smoking	75 (12)	57.46 (943)	n/s
Diabetes	75 (12)	35.2 (579)	.001
Hyperlipidemia	87.5 (14)	47.1 (773)	.001
Hypertension	81.2 (13)	45.7 (751)	.004
COPD	18.7 (3)	4.3 (71)	.031
LMCAD	6.2 (1)	5.7 (95)	n/s
Renal failure or creatinine ≥2mg/dl	–	1.2 (21)	n/s
Peripheral vascular disease	–	4.6 (76)	n/s
Preoperative AF	18.7 (3)	1.2 (20)	.001
Previous stroke or TIA	18.7 (3)	0.6 (10)	.000
Aort calcification	68.7 (11)	2.6 (43)	.000
Ejection fraction(%)			.000
<30	31.2 (5)	5.9 (98)	
≥ 30-50	68.7 (11)	41.3 (678)	
>50	–	52 (854)	
Urgent and emergent operations	–	0.9 (15)	n/s
CPB time			n/s
< 3 hour	87.5 (14)	95.7 (1572)	
>3 hour	12.5 (2)	4.2 (69)	
Cross-clamp time			.001
< 1 hour	62.5 (10)	93.1 (1528)	
> 1 hour	37.5 (6)	6.8 (113)	
Duration of surgery			.000
<3 hour	12.5 (2)	41.1 (675)	
≥ 3-4 hour	50 (8)	50.2 (824)	
>4 hour	37.5 (6)	8.6 (142)	
Prolonged intrope use	56.2 (9)	15.1 (248)	.000
Intraaortic balloon support	12.5 (2)	8.0 (132)	n/s
Prolonged ventilatory support	18.7 (3)	3.3 (55)	.016
Postoperative renal disease	12.5 (2)	3.3 (55)	n/s
Postoperative dialysis	6.2 (1)	1.4 (23)	n/s
Postoperative atrial fibrillation	31.2 (5)	16.2 (267)	n/s
Hemorrage-related reexploration	12.5 (2)	2.4 (40)	.034
High blood transfusion requirement ≥3 unite	12.5 (2)	5.2 (86)	n/s
ICU length of stay (days)	13.19 ± 24.51	2.57 ± 1.93	.000
Mean hospital length of stay (days)	14.29 ± 6.74	6.31 ± 1.79	.000

AF: Atrial fibrillation, CPB: Cardiopulmonary bypass, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LMCAD: Left main coronary artery disease, TIA: Transient ischemic attack

TEMPORARY EPICARDIAL PACING WIRES ARE NECESSARY IN OFF-PUMP CABG?

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Background: In many centers epicardial pacing wires (PWs) are routinely inserted for the management of temporary rhythm disturbances despite infrequent but significant complications (arrhythmias, bleeding, tamponade, infection and others). It has been suggested that Off-Pump CABG (OPCAB) may be associated with reduced requirement and use of PWs and as a consequence its routine insertion can be avoided.

Methods: Fifty-seven patients underwent OPCAB were prospectively studied with regards to PWs insertion. Demographic data of patients, pre-operative rhythm, type of PWs, indications for use, delay in removal and relevant complications were recorded.

Results: 57 patients with mean age of 62.4 (41-78) underwent OPCAB with mean Logistic Euro-SCORE of 3.34 (0.88-21.21) and mean hospital stay of 6.3 days (4-16). Fifty-four patients recieved single chamber (ventricular) PWs and 3 had dual chamber PW. Fifty-six patients had PWs insertion prophylactically after completion of procedure and one patient required PWs intra-operatively for sinus bradycardia. In none of the patients apart from one (pre-operative bradycardia of 45/min) the PWs were used. In 29 patients there was at least 24 hours delay in removal (mainly due to atrial fibrillation) resulting in prolonged hospitalization. There were no complications related to PWs removal except one where the wire was snapped and the tip was left behind.

Conclusion: This study clearly suggests that routine insertion of PWs is unnecessary in OPCAB. Although limited by sample size and luck of randomization but after careful assessment of the results and outcomes, routine insertion of PWs in OPCAB has been stopped in our practice.

THE BENEFICIAL ROLE OF MAGNESIUM FOR THE PREVENTION OF ATRIAL FIBRILLATION AFTER BYPASS HEART SURGERY

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Objective: To assess the beneficial role of magnesium after bypass heart surgery.

Methods: We included in the study 200 patients submitted to selective bypass heart surgery and performed an analysis including all factors contributing to the genesis of atrial fibrillation after heart surgery.

Results: We concluded that patients with high-normal postoperative levels of magnesium (immediate postoperative levels) had a significantly lower incidence of postoperative atrial fibrillation (17.4% versus 29.5%) compared to the rest of the patients.

Conclusions: The maintenance of high-normal levels of magnesium after bypass heart surgery is beneficial for the patients.

USE OF CLOPIDOGREL POST CORONARY BYPASS SURGERY AS A SECONDARY PREVENT

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Background: Platelet aggregation and thrombus formation play a critical role in the initiation and development of key complications of acute coronary syndromes. This group of patients represent a significant group undergoing coronary bypass surgery. There is evidence that Clopidogrel can contribute to reduction of cardiovascular events post CABG in patients with recent Non ST elevation acute coronary syndromes.

Objectives: To examine whether all patients who had coronary bypass grafts after Non ST elevation acute coronary syndrome had clopidogrel prescribed for 12 months. In addition, to inform the general practioner of the rationale for this, to promote good secondary care in these patients.

Methods: A retrospective review of case notes and interrogation of the local cardiac database was performed to recruit patients who had coronary bypass grafting after Non ST elevation acute coronary syndrome.

Results: Results from 109 patients were analysed. Clopidogrel was not prescribed appropriately in 34% of patients. Only 17% of general practioners were informed of the diagnosis of NSTEMI and 14% were informed of the rationale behind the clopidogrel prescription.

Conclusions: Secondary prevention is a vital issue post coronary artery surgery, particularly in those with recent Non ST elevation acute coronary syndromes. A shortfall was found between the expected standard and actual prescription of Clopidogrel. This highlights an essential issue facing the discharge process in any Cardiothoracic Unit dealing with this group of patients.

USE OF RESTERALIZED INTRA AORTIC BALLOON PUMP IN CARDIAC SURGERY

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Introduction: use of intra aortic balloon pump in poor left ventricle function preoperatively as well as post operatively has a proven lifesaving effect.But the financial limitation some time justify the use of resteralized IABP to save life.

Objective: to study the results of restaralized IABP use.

Place of Study: National institute of cardiovascular diseases Pakistan.

Material and Methods: it is a retrospective study in which all those patients from march 2005 to march 2010 in which resteralized IABP was used were included in study.Reason for use,complications during insertion and post insertion ,morbidity and mortality was studied.

Results: Total 125 (n = 125) restaralized IABP were used out of which 25 were two time restaralized and used.75 IABP were inserted percutaneously while 50 were inserted by open method. In 18 patients it was ineffective and gave no augumentation. Complication related to IABP occurred in 5 patients.

Conclusion: restaralized IABP can be used in cardiac surgery patients in case of unavalibility of new IABP as a acceptable alternate option.

Adult Heart Failure

BIVENTRICULAR CIRCULATORY SUPPORT WITH TWO IMPLANTABLE ASSIST DEVICES

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Introduction: Left ventricular assist device (LVAD) implantation in end-stage heart failure patients is routine. Bi-ventricular support systems, however, offer a limited quality of life. We report a new technique using two implantable centrifugal pumps as a biventricular support system.

Patients and Methods: Twelve patients (9 male, 3 female) received two HeartWare HVAD centrifugal pumps (HeartWare Inc., Framingham, MA) – one as LVAD and one as RVAD.

As the low resistance of the pulmonary circulation would lead to an inappropriately high RVAD flow, we narrowed the RVAD outflow graft, thereby increasing the afterload of the pump.

Nine patients were suffering from idiopathic dilative cardiomyopathy, three from end-stage ischemic disease. All but two patients had biventricular decompensation despite inotropic support (Intermacs II). Patients' ages ranged from 29 to 73 years and body mass index from 17 to 26 kg/m².

Results: Perioperative (30-day) survival was 83% and so far 7 of the 10 survivors have been discharged home. No late deaths have occurred up to now. The first of the patients has now been supported for 250 days. No thromboembolic events and no driveline, pocket or wound infections have been detected. Clinical parameters of hemolysis have not been significantly increased compared to those of our LVAD patients with the same pump.

Conclusion: The implantation of two HeartWare pumps is a safe and effective option for patients requiring biventricular support.

The crucial technical aspect allowing the use of the HVAD pump as RVAD is the narrowing of the outflow graft, thus optimizing the flow/pressure relationship.

CARDIAC RETRANSPLANTATION: OUR EXPERIENCE

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Background: Despite advances in cardiac transplantation, graft failure remains a major cause of mortality. The cardiac retransplantation is a valid alternative for these patients; the lack of donors, ethical considerations and increased risk limit its use. In international series cardiac retransplantation mortality is higher than that of the original procedure. To our knowledge, there are available only reports of cases in South America.

Objective: To establish the characteristics and prognosis of patients undergoing cardiac retransplantation.

Method: A cohort study of cardiac retransplantation with a mean follow up of 39 months (±SD). Seven patients (4 men and 3 women) were allografted; 3 due to graft vascular disease, 2 due to acute rejection, 1 due to hyper acute rejection and 1 due to chronic rejection. The entire population was evaluated for: immediate mortality (<24 hours), early (1 day - 6 months) and late (> 6 months); time between transplantation; clinical condition prior to retransplantation (outpatient, inpatient, intensive care unit) and presence of major infections.

Results: The immediate complications were the leading cause of mortality [42% (3/7)], two cases of hyper acute rejection and the other by hypovolemic shock. One patient had a late death (14%) due to community acquired pneumonia. None died early. All patients allografted for graft vascular disease remained alive. 43% (3/7) had been hospitalized at the time of retransplantation, 28% (2/7) in intensive care unit and two outpatients. The average time between transplants was 27 months (1 day to 64 months). Five patients (71%) were allografted after a year; 100% (3/3) of the living are members of this group. The infection rate was 14% (1/7).

Conclusions: The cardiac retransplantation remains the only ultimate alternative in patients with rejection and graft vascular disease not susceptible to other therapies. However, mortality and complications are considerable. Our study confirms previously reported findings indicating that acute rejection, pre-clinical status and time between transplantation (<6months) are bad prognostic factors associated with mortality; while the retransplantated due to graft vascular disease after 6 months of the original transplant have better survival.

HEMOLYSIS RATE AFTER BIVENTRICULAR CENTRIFUGAL VENTRICULAR ASSIST DEVICE IMPLANTATION: PRELIMINARY DATA OF CLINICAL STUDY

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Background: With the use of two small implantable centrifugal pumps for support of both failing ventricles a new therapy option for the treatment of biventricular heart failure is now available in the clinical setting. However, little is known about the hemolysis rate in the case of concomitant implantation of this two continuous flow pumps. We present a preliminary study comparing the hemolysis rate between HeartWare (HeartWare Inc.) left ventricular assist device (LVAD) and biventricular assist device (biVAD) recipients.

Methods: A total of 10 patients who received a HeartWare ventricular assist device as LVAD (n = 5) and biVAD (n = 5) support at our institution between September 2009 and January 2010 were examined. Markers of hemolysis (lactate dehydrogenase (LDH), total bilirubin and free plasma hemoglobin (fHB) levels) were analyzed after 1 week and 1 month of support.

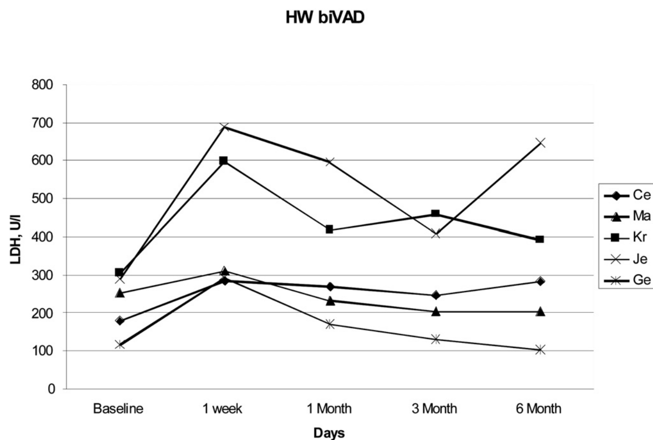
Results: Preoperative levels of hemoglobin, LDH and bilirubin were similar in both groups. There were no differences in LDH, total bilirubin or fHB levels after 1 and 4 weeks of support between LVAD and BVAD recipients (see table 1). Postoperativ course of LDH level of biVAD recipients after 3 and 6 month of support are shown at figure 1.

Conclusion: Concomitant use of two implantable centrifugal pumps is not related to an increase in hemolysis in the early postoperative period.

Table 1.

Groups	LVAD, n = 5		BVAD, n = 5	
Parameters	POD 7	POD 30	POD 7	POD 30
LDH , U/l	283 (265-357)	218 (166-405)	379 (286-688)	269 (233-418)
fHB, mg/dl	5.8 (3.7-7.1)	7.3 (6.6-8.8)	5.6 (4.4-7.7)	4.5 (4-8.4)
Bilirubin tot., mg/dl	1 (0.7-6)	0.7 (0.3-1.3)	1.8 (0.7-1.9)	0.5 (0.4-1.1)

Figure 1.



IS BRIDGE TO RECOVERY MORE LIKELY WITH PULSATILE LVADS THAN WITH NON-PULSATILE-FLOW SYSTEMS?

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Introduction: Weaning from left ventricular assist devices (LVADs) in patients with idiopathic dilated cardiomyopathy (IDCM) is a clinical option. With the broad application of continuous-flow pumps a decrease in numbers of LVAD explantations has been was observed. We investigated this phenomenon and its possible causes.

Methods: Between July 1992 and December 2009, 387 patients (age range: 0.,1 to 82 years) with IDCM underwent LVAD implantation at our institution. The patients were divided into two groups depending on whether they were regarding if weaned from LVAD (Group A) or not (Group B). Univariate and multivariate analyses were done regarding age, pulsatile-flow device, implanted device type, left ventricular enddiastolic diameter (LVEDD) and year of LVAD implantation.

Results: In 34 patients (Group A) LVAD removal was performed with long-term stable cardiac function. Younger patients (OR: 1.036, 95% CI: 1.016-1.057) with a pulsatile-flow LVAD (OR: 2.719, 95% CI: 1.182-6.254) had the highest chance of myocardial recovery. Shorter time from diagnosis of heart failure to LVAD implantation showed a trend towards higher probability for LVAD explantation.

Conclusion: In former times, when only pulsatile LVADs were available, in our institution LV recovery was seen at our institution significantly more often. The type of LVAD implanted could be important for patients with dilative cardiomyopathy and potential for myocardial recovery. Young age and pulsatile-flow LVADs were factors influencing the probability of myocardial recovery. Further studies should investigate whether if pulsatility itself or the degree of left ventricular (LV) unloading plays a role in terms of myocardial recovery.

MECHANICAL CIRCULATORY ASSIST IN PATIENTS WITH INFLAMMATORY HEART DISEASE

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Objective: Patients with acute or fulminant myocarditis are believed to have a higher potential for recovery of heart function than patients with non-inflammatory heart failure. We studied whether this notion is also true for patients requiring implantation of a ventricular assist device (VAD).

Methods: Between 1990 and 2008, 52 patients aged 0.3-68 years (median 24 years) underwent VAD implantation for proven inflammatory heart disease (defined based on typical antigen, antibody, and nucleic acid markers, histology, and clinical history). Thirty-two required biventricular support and 20 received an LVAD. The outcome was compared with that of VAD patients with non-inflammatory heart failure (n = 1241).

Results: Overall, 30-day mortality was 32%: 45% for patients presenting in cardiogenic shock and 12% for patients without multi-organ failure. Kaplan-Meier estimated survival was 57 ± 7% at 3 months and 46 ± 12 at 1 year. Male gender and need for BVAD were associated with higher mortality. Thirteen patients underwent heart transplantation after a mean interval of 153 days. In 12 patients (23%) heart function recovered so that the device could be explanted after 10-160 days (median 30 days), and the likelihood of recovery was higher in LVAD patients. In non-myocarditis VAD patients, the likelihood of recovery and device explantation was 6.8%, but the time-related chance-for-recovery curves differed only slightly ($P = .09$).

Conclusion: Once inflammatory heart disease requires VAD implantation, the likelihood of myocardial recovery is only slightly higher than for patients with other types of heart failure. Especially in biventricular failure, early heart transplantation should be planned.

MECHANICAL CIRCULATORY SUPPORT WITH THE HEARTMATE II LEFT VENTRICULAR ASSIST DEVICE

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Background: Continuous-flow left ventricular assist devices (LVADs) provide effective hemodynamic support both as bridge to transplantation (BTT) and as permanent therapy (PT) in elderly

patients. Typical complications such as right ventricular failure, thromboembolic events and driveline infections together with technical device dysfunction can diminish long-term success of this therapy.

Methods: In a retrospective single-center study we evaluated all patients with end-stage heart failure who underwent implantation of a Heartmate II LVAD, a miniaturized implantable axial flow pump, during the period 7/2006 to 6/2010. Postoperative complication rates and outcome parameters were calculated.

Results: During the study period a Heartmate II was implanted in 105 patients (66% intended as BTT, 34% as PT, patient age 20–71, mean 52.4 ± 9.9 years). The cumulative support time was 68.8 years (average 302 days, median 210 days). Ten patients presented with postoperative right ventricular failure (9.5%), and 8 temporary RVADs had to be implanted (7.6%). Eight patients experienced 11 cerebral events (6 strokes, 1 transitory ischemic attack, 4 cases of intracranial bleeding). One device failure occurred.

After 1 year of support, freedom from thromboembolic events was 78%. Six-month and 1-year survival rates were 83.9% and 79.6%.

Comment: LVAD therapy is a reliable treatment modality for patients with terminal heart failure. With recent LVAD models, circulatory support can be established by means of a standardized, barely traumatic operation and with high quality of life for the patient.

OPTIMAL BODY SURFACE AREA FOR INCOR LEFT VENTRICULAR ASSIST DEVICE IMPLANTATION

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Objectives: It has been reported that the impact of left ventricular assist device (LVAD) or total artificial heart on end-organ function is worse in patients with smaller body surface area (BSA). We investigated optimal range of BSA for which the INCOR LVAD can provide its best performance.

Methods: One hundred and eighty patients who received a BerlinHeart INCOR LVAD between June 2002 and March 2010 (181 implantations) in our center were studied. Median BSA of patients at hospital admission was 2.00 m^2 (range: 1.56 – 2.47 m^2, interquartile range: 1.86 – 2.12 m^2). One-year survival during mechanical circulatory support (MCS) was 46.0%. We determined a cut-point of BSA that minimizes *P*-value of log-rank test for Kaplan-Meier survival during MCS in the two groups divided by the cut-point.

Results: BSA of 1.916 m^2 for the cut-point minimized *P*-value of the log-rank test and was determined to be the lower limit of optimal BSA for INCOR LVAD implantation. One-year survival during MCS in patients with BSA>=1.916 m^2 (n = 121) was 57.7% and that with BSA<1.916 m^2 (n = 60) was 21.8% ($P < .0001$). Causes of death during MCS in patients with BSA<1.916 m^2 were stroke (35.6%), infection (31.1%), multiple organ failure (13.3%) and others (20.0%).

Conclusions: Anatomically it was possible to implant an INCOR LVAD in patients with BSA of 1.56 – 2.47 m^2; however, the INCOR LVAD functionally targets patients with BSA>=1.92 m^2.

ROTARY PUMP THROMBUS RESOLUTION UNDER INTRAVENOUS THERAPY WITH TIROFIBAN – A REVERSIBLE GLYCOPROTEIN IIB/IIIA RECEPTOR INHIBITOR

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Background: Left ventricular assist device (LVAD) thrombosis remains a most dangerous and challenging complication despite greatly improved pump design. Several intraarterial and intravenous thrombolysis options have been described. However, the risk of bleeding if pump replacement becomes necessary has seriously limited their clinical use.

Methods: Between February 2008 and June 2010 four patients with different LVADs (two with centrifugal and two with axial flow devices; two with confirmed heparin induced thrombocytopenia) were treated with tirofiban i.v. for suspected LVAD thrombus occurring in median on the 43rd day of support (range 34-478 days). In 2 cases a 0.4 mcg/kg/min bolus of tirofiban was given, followed by 0.1 mcg/kg/min continuous infusion for 24 hours. In the other 2 cases we used only 0.1 mcg/kg/min continuous infusion of tirofiban, for 36 and 93 hours respectively.

Results: In all cases we observed improvement of LVAD function with normalization of hemolysis markers within 24 hours after initiation of tirofiban therapy. In two patients repeated thrombotic pump occlusion occurred 9 and 15 days after successful tirofiban therapy and necessitated pump replacement. No patient presented any signs of either thromboembolic or bleeding complications.

Conclusion: Tirofiban provides a safe and feasible treatment option for early and delayed pump thrombosis without increase of bleeding risk if pump replacement is required. Because of the high success rate tirofiban may be used as first line thrombolytic agent in the case of LVAD thrombosis.

SIMPLE IMPLANTATION OF A TEMPORARY RIGHT VENTRICULAR DEVICE FOR RIGHT VENTRICULAR FAILURE AFTER LEFT VENTRICULAR DEVICE IMPLANTATION VIA A LEFT LATERAL THORACOTOMY

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Clinical Question: The choice of technique for temporary right ventricular assist device (RVAD) implantation for right ventricular (RV) failure following left ventricular assist device (LVAD) insertion via left lateral thoracotomy in patients who have undergone previous multiple cardiac operations remains difficult.

Background: Temporary RV support in the case of RV failure after LVAD implantation is a well established surgical therapeutic option. However, there are serious limitations of RV support following the insertion of an LVAD through lateral thoracotomy in patients who have undergone previous multiple cardiac operations.

Case Summary: We describe a modified surgical approach for implantation of an RVAD via left lateral thoracotomy, with venous cannulation of a femoral vein and transpericardial outflow cannulation of the main pulmonary artery by Seldinger technique under echocardiographic monitoring. The RVAD flow was maintained at 5 l/min. The patient was successfully weaned from the RVAD after 10 days of support.

Conclusions: Insertion of an RVAD using the approach described provides excellent hemodynamic support. This approach is a valuable option in the case of RV failure after LVAD insertion via lateral thoracotomy, especially if a repeat median sternotomy is associated with high surgical risk.

SIMULTANEOUS AORTIC VALVE REPLACEMENT IN LEFT VENTRICULAR ASSIST DEVICE RECIPIENTS: SINGLE-CENTER EXPERIENCE

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Background: Aortic valve regurgitation or presence of mechanical aortic valve is a contraindication for isolated left ventricular assist device (LVAD) support. However, LVAD implantation with concomitant aortic valve replacement (AVR) by a biological prosthesis may be performed in this situation. We report our recent experience.

Methods: Between 1.01.2008 and 1.06.2010 191 patients were supported with a long-term LVAD in our institution. In 8, simultaneous aortic valve procedure (3 re-replacement with biovalve, 5 primary replacement) was performed. Patients were divided into 2 groups according to INTERMACS level: Group 1 (n = 3) consisted of patients with level 1-2, Group 2 (n = 5) with level 3+ (no prior aortic valve procedures). Preoperative and intraoperative data were analyzed.

Results: All patients were men and median age was 58 years (range 32-67 years). In group 1 all patients had status post AVR. Two patients from group 1 died on 22nd and 45th day of support due to multiorgan failure because of sepsis; the 3rd patient is still in the ICU after 4 months of support. In all patients postoperative RVAD support was necessary, with successful RVAD weaning in 2 patients after 10 and 30 days of support.

In Group 2 four out of five patients survived to discharge.

Conclusion: Simultaneous aortic valve replacement is not associated with an increased surgical risk when semielective operation is performed before onset of cardiogenic shock. In patients with cardiogenic shock, however, simultaneous aortic valve procedure may be related to negative clinical outcome. In this situation other procedure (eg, patch closure or remaining of mechanical valve in situ) may be an valuable option.

STABILITY OF UNLOADING-PROMOTED CARDIAC IMPROVEMENT BEFORE ASSIST DEVICE REMOVAL IN PATIENTS WITH DILATED CARDIOMYOPATHY PREDICTS POST-WEANING TRANSPLANT-FREE OUTCOME

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Background: Unloading-promoted reversal of heart failure (HF) allows long-term transplant-free outcome after ventricular assist device (VAD) removal. However, because few patients with dilated cardiomyopathy (DCM) were weaned from VADs, and most only recently, the reliability of criteria used to predict long-term weaning success is barely known. After 15 years of weaning experience we assessed this issue.

Methods: In the 40 DCM patients who were weaned from bridge-to-transplant designed VADs since 1995, we analyzed the time course of "off pump" echocardioraphic parameters obtained during the time interval between maximum cardiac recovery and VAD removal and assessed their value for the prediction of later transplant-free cardiac stability.

Results: Post-weaning 5-year freedom from HF recurrence reached 67%. Only 5 patients (12.5%) died due to HF recurrence or weaning-related complications. Definite cut-off values for certain parameters such as left ventricular enddiastolic diameter (LVEDD) and relative wall thickness (RWT), ejection fraction (LVEF) and systolic wall motion velocity (Sm), used in different combinations and taking into account their stability during the interval between maximum cardiac recovery and VAD removal, allowed formulation of weaning criteria with high predictability for post-weaning stability, also in patients with incomplete cardiac recovery. Thus, for pre-explantation LVEF ≥45% at LEDD ≤55mm the predictive value for cardiac stability lasting ≥5 years reached 94% if LVEF and LVEDD showed less than 10% or no alteration compared to best off-pump values. Stable pre-explantation LV systolic wall motion velocity of ≥8cm/s (basal posterior wall) in patients with LVEDD <60 mm showed 88% predictive value for ≥5 year post-weaning stability. On the contrary, LVEF alteration of >10% of best value before VAD removal showed 88% predictive value for HF recurrences during the first 3 post-weaning years in patients with 45 to 50% LVEF at time of VAD explantation.

Conclusions: The time course of LV size, geometry and wall motion velocity changes after maximum cardiac improvement until the time of VAD removal is predictive for post-weaning stability of unloading-induced cardiac recovery and can facilitate weaning decisions in DCM patients.

TEMPORARY RIGHT VENTRICULAR SUPPORT IN LEFT VETRICULAR ASSIST DEVICE RECIPIENTS

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Objective: Right ventricular failure remains a major early postoperative complication after left ventricular assist device (LVAD) placement despite several attempts to identify patients at risk. We describe our experience with temporary right ventricular assist

device (RVAD) support with CentriMag (Levitronix, Waltham, Mass.) after LVAD placement.

Methods: Between 2009 and 2010, 23 consecutive adult patients (3 women) with evidence of moderate to severe biventricular failure after implantation of an axial or centrifugal flow LVAD received a temporary CentriMag RVAD at our institution. The age range was 31-64 years and patients were suffering from ischemic dilated cardiomyopathy (48%), idiopathic dilated cardiomyopathy (39%) and valvular cardiomyopathy (13%). In 19 patients the RVAD was inserted in the operation room (primary placement). In the other 4 patients CentriMag was implanted within 48 hours after ICU arrival (secondary placement).

Results: Sixty-nine percent of patients were successfully weaned from temporary RVAD support (including all secondarily supported patients) after an average time of 16 days (range: 3-33 days). RVAD removal was performed by minimally invasive technique without repeat sternotomy in 8 patients. Three (13%) primarily supported patients required permanent support with an implantable centrifugal RVAD (HeartWare Inc., Miramar, Fla). Three (13%) patients died on RVAD support. One patient is receiving ongoing support. Overall 14 (60%) patients were discharged home.

Conclusions: Implantation of an LVAD in patients with risk for RV failure is a feasible and effective therapy option if RV function is closely monitored. Once RV failure is identified, immediate RVAD implantation improves outcome.

Adult Valvular

11-YEAR EXPERIENCE WITH KEMCOR PORCINE BIOPROSTHESES IN MITRAL POSITION FOR INFECTIVE ENDOCARDITIS

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Objective: Bioprostheses bring crucial improvement into mitral valve surgery for infective endocarditis. The aim of the study is to determine our experience with KemCor diepoxy-preserved porcine bioprosthesis.

Methods: From 1999 till 2010, this valve implanted in mitral position in 72 pts (26 males; mean age 48.7 ± 8.3 year, range 18-73). Streptococcal infection were 53.8%. Preoperatively, pts were in NYHA classes III (71.3%) and IV (16.7%).

Results: Early mortality 2.7% (2 patients). Follow-up completed in 44 pts (62.8% of all). The mean follow-up was 65.3 ± 11.7 months (max 11 years). During follow-up, 85% of pts were in NYHA class I or II, with a well functioning valve. Late follow-up echocardiography in all survivors showed mean pressure gradient of 4.2 ± 1.2 mm Hg, effective orifice area of 3.2 ± 0.4 cm^2 for all valve sizes with positive LV remodeling. Late mortality 6.8% (44-year-old man died 4 months after the reoperation due to recurrent fungal endocarditis; two women aged 60 and 64 died for acute heart failure. Freedom from valve-related events at 11 year was 92.3% for thromboembolism, 90.6% for thrombosis, 85.4% for anticoagulant-related hemorrhage, 93.2% for endocarditis and 93.6% for structural valve deterioration. Freedom from reoperation 86.2%.

Conclusions: Results of the KemCor bioprosthetic valve are incouraging, during the first eleven years after clinical introduction of the device, but more follow-up needed.

AORTIC VALVE REPLACEMENT FOR AORIC STENOSIS IN PATIENTS WITH LEFT VENTRICLE SYSTOLIC DYSFUNCTION: IMMEDIATE RESULTS

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Objective: The authors presented immediate clinical and hemodynamic results of aortic valve replacement (AVR) in patients with aortic stenosis and left ventricle (LV) systolic dysfunction.

Methods: Since May 2002 till September 2008, 41 patients with aortic stenosis, low LV ejection fraction (EF ≤ 50%) and absence of coronary disease underwent AVR. Patients were divided into 2 groups: Group 1 (22 patients with moderate LV dysfunction, EF = 40 - 50%, mean 45%), and Group 2 (19 patients with severe LV dysfunction, EF ≤ 40%, mean 35%).

Results: Overall hospital mortality was 4.9% (2 cases), 0% in Group 1, and 10.5% in Group 2. Causes of death were acute coronary insufficiency and multiorgan failure. Analysis of hospital mortality revealed no significant difference between two groups (P = NS). Aortic cross-clamp time >160 min. appeared to be independent predictor of hospital mortality ($P < .001$).

Conclusions: Our study shows that AVR can be safely performed in patients with aortic stenosis and left ventricle systolic dysfunction with acceptable hospital mortality. Systolic LV dysfunction is no contraindication for AVR.

CLOPIDOGREL „PLAVIX" AS AN ALTERNATIVE THERAPY AFTER BIOLOGICAL AORTIC VALVE REPLACEMENT (BAVR)

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Objective: After aortic valve replacement using a tissue valve patients are treated with Coumadin for three months. If sinus rhythm is evident, therapy is changed to 100 mg of aspirin a day after that. These are the STS, ACC/AHA and ESC guidelines. Clopidogrel "Plavix" is well known in cardiology after coronary artery stenting and also in peripheral vascular surgery.

Methods: In our 2-years retrospective analysis 115 patients were treated with Clopidogrel "Plavix" after biological aortic valve replacement (BAVR). The therapy started on the fifth day after surgery and ended after three months. In our group we had also patients with combined surgery like valve replacement plus CABG or carotid surgery. All patients underwent echocardiography before dismission and after three months.

Results: In our study group we could not detect any signs of thrombembolic complications or neurological disorders. We found regular function of the valve prosthesis in all cases. One patient had to be re-operated cause of endocarditis of the prosthesis and

died after prolonged ventilation problems. In the control group (277 patients) we found two cases of intracerebral haemorrhagia, which caused to death. Both of them were older than eighty years.

Conclusion: In the last years the clinical use of tissue valves has increased because of longer durability. Many post-operative regimes have been described. Clopidogrel "Plavix" 75 mg/day is an excellent alternative therapy after biological aortic valve replacement. We all know the compliance of elder patients after cardiac surgery. So we have also an easy treatment for this group of patients.

COMPLICATED ENDOCARDITIS REQUIRING TEMPORARY CIRCULATORY SUPPORT AFTER SURGICAL CORRECTION – INCIDENCE AND OUTCOME

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Objective: Aim of this study was to analyze the outcome of a subgroup of patients suffering endocarditis who required circulatory support after surgical correction.

Methods: Between 10/1994 an 09/2009 a total number of 1195 patients were treated for acute primary endocarditis at our institution. Patients were operated due to aortic valve endocarditis (n = 503), mitral valve endocarditis (n = 319), double valve endocarditis (n = 246) and combined lesions (n = 127). Amongst these patients 43 (3.6%), thirty of them male required temporary left ventricular support after surgical correction of the valvular lesion. They form the study population. Mean age was 64 years (41-83) and logistic Euroscore risk for mortality 35%. 28 patients (65%) received isolated valve replacement (aortic 20, mitral 8) and 15 received double valve surgery.

Results: For temporary support intraaortic balloon pump (IABP) was applied in 30, IABP and extracorporal membrane oxygenation (ECMO) in 5, ECMO in 7 and left ventricular assist device (LVAD) in 1. Overall in-hospital mortality rate was as follows: In patients requiring IABP 53%, in patients on IABP and ECMO 80%; in patients on ECMO 86% and the one patient on LVAD died. On the contrary a total of 16 patients were discharged alive.

Conclusions: Requirement for temporary left ventricular support after surgical correction for endocarditis is associated with a high mortality. The young age of these patients, however, justifies continuous efforts to safe some of their lives.

CUTTING COSTS IN CARDIAC SURGERY: THE FUTILITY OF ROUTINE HISTOLOGICAL ANALYSIS OF RESECTED AORTIC VALVES

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Objective: Degenerative aortic stenosis is the leading indication for aortic valve replacement (AVR) in the UK. Many surgeons routinely send resected valves for histological analysis. The estimated cost of analysis is £120 ($175). The purpose of this study was to determine whether this costly investigation actually affects subsequent patient management.

Methods: Our hospital database identified all patients who underwent an AVR over a 12-month period. A retrospective case-note review was performed. Patient demographics, operation performed, histological reports and further management following such reports were analysed.

Results: 134 consecutive patients were identified. The resected aortic valves were sent for histological analysis in 67 cases (50%). There was marked variability in practice between consultants: some sending all resected valves, with others sending as few as 5%. Histology showed that 91% of valves displayed calcific degeneration. A further 6% showed fibrosis +/- degeneration. In no instance was it evident that the patient management changed as a result of this examination.

Conclusions: The decision to send a valve specimen for histological analysis remains that of the operative surgeon, and may be simply habitual. This practice is variable in our department, and it appears to add nothing to patient management. 7200 AVR's were performed in the UK in 2008. If our local practice is similar to other units, (around 50% of resected valves are analysed), then approximately 3600 pointless analyses are occurring nationwide. Unilateral abandonment would save the NHS approximately £432000 ($622000) per annum. We suggest exercising restraint in requesting this investigation in the context of aortic valve surgery.

EFFECT OF AORTIC VALVE REPLACEMENTS ON LEFT VENTRICULAR END-SYSTOLIC DIAMETER PERFORMED ON PATIENTS WITH AORTIC INSUFFICIENCY IN WHOM LEFT VENTRICULAR FUNCTIONS WERE SEVERELY IMPAIRED

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Objective: Preoperative left ventricular diameters are one of the most important factors affecting the long-term survival in patients with severe aortic regurgitation and impaired left ventricular functions.

Materials and Methods: In this study, 29 patients with aortic regurgitation and severely impaired left ventricular function that underwent aortic valve replacement between April 2001 and May 2003 were investigated. All of the patients were male with a mean age of 35.36 ± 9.68 (20-53).

Inclusion criteria of these patients were; diagnosis of severe aortic regurgitation during preoperative period, LVESD >50 mm, LVEDD > 70 mm and an ejection fraction (EF) < 40%. Mean LVESD of the patients was 65.8 mm and EF was 34%. Preoperative and postoperative (1st, 12th, 36th and 60th months) echocardiographic examinations were recorded evaluating the long term cardiac functions.

Results: In evaluation of the mean LVESD values of the patients, statistically significant difference was found among follow-up periods ($P = .002$ $P < .05$). To assess between what follow-up periods this difference was, Bonferroni method was used. It indicated that mean preoperative values were significantly higher than that of 12th and 36th months ($P < .05$)

Discussion: Aortic valve replacement performed on patients with severely impaired left ventricular functions and AR reduces the left ventricular diameters significantly.

ENDOCARDITIS IN INTRAVENOUS DRUG USERS. HOSPITAL AND MID-TERM RESULTS

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Objective: Infective endocarditis of intravenous drug users is a serious complication and is being seen with increasing frequency.

Methods: The study consists of 32 cases of i.v. drug users with infective endocarditis operated between June 2000 and June 2009. The mean age was 27 ± 4.7 (range 19-40) years.

Results: Sites of endocardial involvement were the tricuspid valve in 23 patients, mitral valve in 7 patients, and aortic valve in 5 patients. Isolated right-sided involvement occurred in 68.8% of cases, isolated left-sided in 28.1%, and bilateral involvement in 3.1%. Tricuspid valve was repaired in 13 patients and replaced in 10. Mitral valve was repaired in 4 patients and replaced in 3. Aortic valve was replaced in all cases (3 homografts, 2 artificial valves). The 30-day mortality was 6.5% (2/31). According to national registry there were 4 deaths during the study period - 2, 4, 18 and 19 months after the surgery. Two were related to the infective endocarditis. Seven patients underwent reoperations: 4 due to reinfection (all tricuspid valves – 3 replacements, 1 repair with ring), 2 due to failure of repair (1 mitral, 1 tricuspid valves), 1 due to failure of bioprosthesis in tricuspid position. Regular follow-up underwent only 50% of patients.

Conclusions: Surgical treatment of infective endocarditis in i.v. drug users is very effective. However high percentage of patients returns to drug taking and have low adherence for regular follow-up. That is why a risk of recurrence of endocarditis is high. We therefore strongly recommend avoiding any prosthetic material.

IMPACT OF AGE AND VALVE SIZE ON HEMODYNAMIC PERFORMANCE AND DURABILITY OF THE MITROFLOW PERICARDIAL VALVE

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Background: The study aimed to determine transvalvular gradients (TVG) of the Mitroflow (MF) pericardial valve over time in relation to labeled valve size and age at operation.

Method: In 121 patients 189 measurements of TVGs from serial echocardiographic studies of the MF valve sizes 19 to 25 mm were retrieved from the database (1986-2007, n = 1513) and evaluated. The mean age of the patients was 73 years. Kaplan-Meier method was used to calculate the actuarial freedom from events and the Cox multivariate regression analysis to identify independent determinants of outcomes.

Results: At 1 year the mean TVG (mmHg)/effective orifice area (EOA) (cm^2) for valve sizes 19 mm, 21 mm and 23 mm were: 9.4 mmHg/1.4 cm^2, 7.1 mmHg/1.6 cm^2, and 4.7 mmHg/1.85 cm^2, respectively. The TVG in patients >65 years at 5 and 10 years for valve sizes 19 to 23 mm was 12 to 5 and 18 to 8 mmHg and then remained stable at 15 and 20 years, respectively. Patients <65 years showed an increase in TVG to 40 to 19 mmHg after 10 years for valve sizes 21 and 23 mm. Patient-prosthesis mismatch was found in two patients with valve sizes 19 and 21 mm with an indexed EOA of 0.8/cm^2/m^2. The 20-year durability in patients >70, >65 and <60 years was 84%, 72% and 62%, respectively.

Conclusion: The excellent hemodynamics and long-term durability of the MF support its continued clinical use, in particular in younger patients with a desire to avoid anticoagulation.

LIMITED RIGHT POSTEROLATERAL THORACOTOMY FOR MITRAL VALVE REPLACEMENT AND ATRIAL SEPTAL DEFECT CLOSURE

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Since its introduction median sternotomy remains the standard approach for open heart surgery providing excellent exposure of the heart. However sternal wound infection and mediastinitis are serious complications. In addition keloid or hypertrophied scar is unsightly and provokes dissatisfaction especially in young females.

Various alternative approaches like partial sternotomy, right anterolateral thoracotomy and bilateral submammary incisions have their advantages and disadvantages. However none of these approaches have found universal acceptance to become the preferred approach.

We studied the feasibility of limited right posterolateral thoracotomy for mitral valve replacements and closure of atrial septal defects. This approach has been used by many surgeons for the closure of atrial septal defects but has not been tried for mitral valve replacements. We operated upon a total of 25 patients, out of which 13 underwent mitral valve replacement and 12 had closure of atrial septal defect using this approach. Standard aortic and bicaval cannulation was performed and aortic root cardioplegia was used after cross clamping the aorta. No patient required femoral bypass or sternotomy. There was no morbidity or mortality in this study. The operative instruments used were the standard equipment used in open heart surgery.

On statistical analysis operative time was more in the thoracotomy group but bypass time, aortic cross clamp time, ventilation time, ICU stay and blood loss were reduced in the thoracotomy group. Immediate post operative pain was more with this approach and there was temporary restriction of the movement of right shoulder. However the patient satisfaction and acceptance of the scar was much better.

MITRAL VALVE REPLACEMENT IN PATIENTS WITH SYSTOLIC LEFT VENTRICLE DYSFUNCTION: EARLY RESULTS AND LEFT VENTRICLE REMODELING

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Objective: The authors presented immediate results of mitral valve replacement (MVR) for mitral stenosis (MS) in patients with left ventricle systolic dysfunction (LV SD).

Methods: Since January 2000 till October 2008, in Novosibirsk Federal State Research Institute of Circulation Pathology 38 patients with low (<= 50%) LV ejection fraction underwent MVR for MS. There were no coronary artery disease. Those patients formed (n = 38). The control group (II group, n = 49) consisted of patients with normal ejection fraction (EF) undergone MVR for MS. Mean EF in I group was 47%, in II group it was 62%. Mean NYHA functional class was 3.07 ± 0.5 и 3.02 ± 0.2 in Group I and Group II.

Results: Hospital mortality in I group was 2.6% (1 patient, died of multiorgan failure), in control group – 2.0% (1 patient, LV posterior wall rupture). There were higher incidence of in-hospital heart failure in I group (24.3% and 8.3% correspondingly, P = 0.04). Echocardiography shown post-operative LV EF improvement in both groups: 57.6±10.7% in Group I, and 64.2 ± 7.7% in Group II ($P < 0.05$).

Conclusions: Our experience of MS surgery in patients with low EF LV showed that in spite of higher incidence of heart failure early after operation, there were no significant difference in hospital mortality and postoperative heart chambers remodeling in patients with LV SD compared to the control group. Thereby LV SD is no contraindication for MVR in patients with mitral stenosis.

RARE COMPLICATION OF BIOPROSTHETIC AORTIC VALVE REPLACEMENT

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Bioprosthetic aortic valves are used for replacement in elderly patients and when long-term anticoagulation is not desirable. In this report, we describe an unusual complication of severe structural valve deterioration of CE Perimount bioprosthesis (Edwards Lifesciences, Irvine, CA, U.S.A.) presenting as a ‘missing leaflet’ during a re-operation for non-infective severe prosthetic aortic valvular regurgitation. Leaflet detachment from the valve stent post has been described in the disclaimer of the product information for heart valve therapy by the company, however, such a phenomenon, in a non-infective situation has not been reported in the medical literature.

THROMBOEMBOLIC EVENT RATE ASSESSMENT AFTER “CARDIAMED” MECHANIC VALVE PROSTHESES IN PATIENTS NON-COMPLIANT TO ANTICOAGULATION REGIMEN

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Objective: We analyzed occurrence of “Cardiamed” mechanical valve thromboses and valve-related thromboembolism in patients non-compliant to blood-thinner therapy in multicenter trial (7 high-volume cardiac surgery hospitals in Russia).

Methods: Patients, received “Cardiamed” prosthetic valve (420 patients, 209 aortic (AVR) and 211 mitral (MVR) implantations) in 2003-2004, underwent follow-up examinations in 2006-2009. Mean age was 52.2 + 10.2, 47.4% women. Mean pre-operative NYHA functional class was 3.0 + 0.5 for AVR, and 3.2 + 0.5 for MVR. Follow-up completed in 99.05% of cases, the longest follow-up period was 5.46 years, with volume of 1503 patient-years, (749 for AVR and 754 in MVR patients).

Results: We found suboptimal INR levels in 68.5% of AVR patients, and in 80% of MVR. INR was higher than recommended in 17% AVR, and 10% of MVR patients, Overall 5-year survival rate was 88 ± 3.6%/Freedom from valve-related mortality was 97.0 ± 2.4%, for MVR, and 96.6 ± 2.5% for AVR. Linearized valve-related event rates were the following: 0.79 for valve thrombosis (no thromboses in aortic position detected), thromboembolic events, including TIA – 2.54% for AVR and 0.79 for MVR; hemorrhage – 0.13%.

Conclusion: Prosthetic valve thrombosis and thromboembolic event rates after “Cardiamed” mechanical valve implantation in mitral and aortic position are low, so valve replacement with this type of prostheses is quite safe even in patients non-compliant to anticoagulation therapy.

MISC

ROLE OF TGFβR2 IN AORTIC ROOT DILATATION IN LOEYS-DIETZ (MARFAN’S TYPE II) SYNDROME

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Loeys Dietz Syndrome, is an autosomal dominant connective tissue disorder characterized by arterial tortuosity & aneurysms, hyperteleorism, bifid uvula and cleft palate. It is caused by heterozygous mutations in the genes encoding *TGFBR1* or *TGFBR2*. Dilatation of the aorta at the sinuses of Valsalva is a consistent feature and patients are at a high risk of fatal aortic dissection.

Normal levels of TGFβ signaling are essential for vascular integrity. Endothelial deletion of *TGFBR2* disrupts signaling leading to failure of recruitment and differentiation of vSMCs. Furthermore, the *Tgfbr2* null mouse shows premature lethality at E10.5. To understand the role of Tgfβ signaling at the endothelial level in the

stability of the aortic wall and aortic valve maturation, the Tgfbr2 gene in endothelial cells was inactivated from E14.5 in mouse embryos. This time point was chosen because at E14.5, septation in the heart is complete and the aorta whose wall is just being stabilized receives the entire systemic blood flow. The aortic valves are in the phase of remodeling and stratification. Embryos were harvested at E17.5.The endothelial specific Tgfbr2 knockout embryos showed reduction in pSmad2, disorganization of elastic fibres, spatial disassociation of vascular smooth muscle cells and reduction in collagen in the aortic wall. The aortic leaflet showed disturbance in the VICs and ECM. This data suggests mutation of endothelial *Tgfbr2* at E14.5 results in reduced TGFβ signaling at first, which destabilizes the aortic wall effecting its functional matrix & integrity and causes chaos in the ECM of the aortic leaflets.

KHAT (QAT) WITHDRAWAL SYMPTOMS POST CARDIAC SURGERY

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Khat (Qat) is a natural stimulant recreational drug used in different parts of the world. Khat is used to induce alertness, hyperactivity and euphoria and as well as many other psychological and physical effects. The drug is most commonly used in Eastern Africa and the Arabian Peninsula but is recently becoming more common in the Western World. We report a 46 years old male who consumed Khat regularly. He underwent Aortic Valve and Ascending Aorta Replacement. His post operative period was complicated by agitation and confusion that was getting worse with time. A multidisciplinary approach was taken and a series of investigations were performed to try and identify the cause. Eventually, Khat was re-administrated which re-solved the symptoms and brought the patient back to his pre-operative state. Special attention should therefore be considered for patients consuming Khat and undergoing surgical interventions, whether a weaning programme or replacement therapy might be indicated. Khat is becoming a very common recreational drug in Africa and the Middle East. Although it is not commonly used in the western world it is likely that, in the future, it will become more common as a result of immigration. A patient presenting with Khat withdrawal symptoms after an operation can be mistaken for symptoms of post-operative complications and therefore have unnecessary investigations being performed. This of course is uneconomical and time consuming. Hence, an understanding of the inducing effects, withdrawal symptoms and management of a patient who takes this drug can be beneficial to health team member.

A RARE PRESENTATION OF CAVERNOUS HEMANGIOMA OF LEFT VENTRICLE

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A twenty two-year-old Mr Shanmugam was admitted for complained of grade II exertional dyspnoea for six months, associated with mild chest discomfort. Physical examination, Electrocardiogram was normal and chest radiograph showed mild cardiomegaly. The patient's systemic history failed to disclose significant past or familial illnesses. Cardiovascular examination revealed normal heart sounds & ejection systolic murmur in left sterna border. Echocardiography showed mass in the left ventricular cavity with mild LV dysfunction. The patient underwent both pre-op & post-op angiogram, were contributory. He was completely evaluated and electively posted for surgery. On table revealed diffuse mass lesion involving anterior lateral wall of LV cavity, since the mass is embedded with in the myocardium small part of mass was excised and sent for biopsy. The HPE report came as cavernous hemangioma of left ventricle. He is following-up periodically. This case is presented due to rarity of presentation.

Primary tumors of the heart are rare and often diagnosed postmortem because of a mostly asymptomatic clinical course. The frequency of primary cardiac tumors seen at autopsy is 0.02%. Hemangiomas of the heart are extremely rare, accounting for only 2% to 3% of all benign primary cardiac tumors. Hemangiomas can present at all ages, though the diagnosis is preferentially made during the 5th decade of life. Although cardiac hemangiomas are often asymptomatic, the main symptoms include dysponea, palpitation, atypical chest pain, and arrhythmia. Echocardiography represents the diagnostic imaging modality of choice to appropriately screen for cardiac tumors. CT, MRI & Coronary angiography is complementary to each other in the diagnostic workup. Surgical resection is the treatment of choice.

AN UNUSUAL CASE OF RECURRENT EXTRUSION OF PACEMAKER

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An unusual case of recurrent extrusion of a pacemaker implant is presented. The patient was managed with explantation of the device and putting the patient on orciprenaline. Patient's symptoms were well controlled till last follow up.

AN UNUSUAL FOREIGN BODY SUPERIOR MEDIASTINUM: A CASE REPORT

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Objective: In the current era of terrorism and accidents, many missile and bullet foreign bodies in the mediastinum have been reported. But foreign body following just fall on a needle box has not been reported so far. We present this case of an unusual foreign body – Embroidery needle in the superior mediastinum.

Methods: 27 years old women admitted with history of pain right upper chest and arm of 3 months duration, aggravated by work and relieved by rest. No history of fever, cough, dyspnoea, dysphagia, dysphonia, and neurological or vascular catastrophe.

Past history revealed accidental fall on a pencil box containing embroidery needles, 3 years ago, at her home. Chest X-ray

and fluoroscopy at that time revealed two needles; one at the left parasternal subcutaneous plane was removed under local anesthesia and advised to seek cardio thoracic surgeon opinion for the removal of a second needle at the superior mediastinum. She defaulted, as she was asymptomatic thereafter.

Recent trivial injury chest made her to seek medical attention.

Physical examination was nil relevant except for the previous surgical scar. Flexible bronchoscope and Echocardiography showed normal study. Following Confirmation with Chest X-ray and Computed tomography chest scan, a rusted needle of 2 cm length between trachea, esophagus and superior vena cava was removed through right thoracotomy.

Results: Postoperatively she recovered well, with X-rays showing no collection or air leak, with clear lung fields and no evidence of wound infection.

Conclusions: Our case can be considered rare in terms of the longer asymptomatic period and the travel/migration of the needle from anterior to posterior chest without injuring any vital structures.

AORTO ENTERIC FISTULA: A RARE CAUSE FOR MASSIVE HAEMETEMESIS

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Background: Aorto enteric fistula one of the rare cause for massive haemetemesis, usually seen with previous abdominal aortic surgery. We like to present a case of infra renal Abdominal Aortic Aneurysm [AAA] which ruptured into duodenum and presented as acute abdomen with massive haemetemesis.

Methods & Materials: *Clinical Profiles:* 62 years old manual labour presented to EMD at PSG super specialty hospital with the symptoms of sudden onset of abdominal pain, massive bouts of haemetemesis, profuse sweating and hypotension. He underwent peptic ulcer surgery for bleeding duodenal ulcer 25 years back and treated for low back pain with NSAID prior to admission. Further workup revealed pulsatile periumbilical mass with hypovolemic shock, Nastogastric tube aspirate revealed fresh blood, his Hb% - 6 gm%.

Abdominal aortogram revealed infra renal fusiform saccular AAA with enteric fistula, upper GI Scopy done on table to rule out concurrent peptic ulcer disease which revealed blood clot in the afferent loop of previous gastro jejunostomy, no active peptic ulcer disease.

Management: Emergency thoraco laprotomy - adhesion released thoracic aorta controlled, AAA dissected from IIIrd part of duodenum perforation in the posterior wall of IIIrd part of duodenum repaired with omental patch and conventional AAA repair was done.

Result: Post operative recovery uneventful jejunostomy feeding started on 3rd POD, haemodynamically stable, discharged on 14th POD.

Conclusions: Aorto enteric fistula is the rare cause for haememesis, it requires high index of suspicion especially with the history of pre existing Acid peptic illness emergency surgery is inevitable endo vascular aneurismal repair may not be suitable because of the bowel perforation. Pre operative upper GI scopy, is must to rule out concurrent peptic ulcer bleed.

GASTROTHORAX VERSES TENSION PNEUMOTHORAX: A WORD OF CAUTION

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Background: Post Traumatic Gastro thorax [Stomach Herniation in to the Left Hemithorax], presenting with respiratory distress need to be differentiated from Tension pneumothorax and should timely intervened appropriately. We like to present post traumatic gastrothorax with gastric volvulus and gangrene of the stomach in a young girl.

Methods & Materials: *Clinical Profile:* At PSG super specialty hospital 17 years old girl presented with progressive dyspnoea, Tachypnoea and hypotension following a blunt thoraco abdominal injury. On admission she was in near cardio respiratory arrest, reduced air entry in Left Hemithorax with gross mediastinal shift to right, CXR revealed large air space in the Left Hemithorax, emergency intubation done which worsened the haemodynamics and respiratory distress, Nasogastic decompression improved the ventilation.

CECT thorax revealed large diaphragmatic rent with stomach herniation to left Hemithorax and possible volvulus

Management: Emergency thoraco laprotomy done assessment revealed organo axial volvulus of stomach with extensive gangrene not suitable for preservation. Hence total gastrectomy with esophagojejunostomy by routine bypass done. Diaphragmatic rent repaired.

Results: Post operative recovery smooth stated on Jejunostomy feeding, 14ht POD contrast study showed good integrity and passage of the bypass started on oral feed, follow up over 1 year satisfactory.

Discussion: Respiratory distress following Thoraco abdominal injury should have suspecians of diaphragmatic rupture and bowl herniation in to the thorax, Nasogastric tube decompression should by initiated and emergency surgery is mandatory. If the herniated content non salvageable resection and appropriate reconstruction to be done preferably by thorco laprotomy incision. Agastric status need to managed with nutritional supplement. Always rule out gastrothorax prior to intercostals tube drainage in a poly trauma victim with respiratory distress.

BIAURICULAR GIANT MYXOMA WITH A HEPATIC PRESENTATION: CASE REPORT

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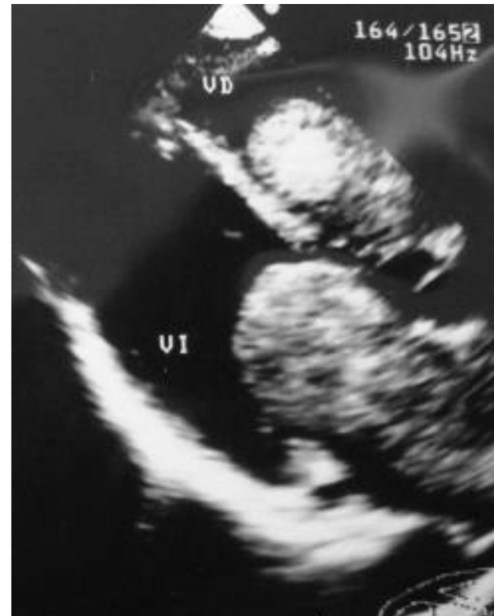
A Hispanic male in his 30's who had a history of weight loss, asthenia, hyporexia, jaundice and hepatomegaly, alteration in all hepatic function tests, an hepatic echography with alteration in venous circulation. During the past 5 months he has been followed up by the gastroenterology department under the suspicion of a hepatic tumor. During his last hospitalization a heart murmur was identified and after a Transthoracic Echocardiogram he was referred to our Department with a diagnose of "giant

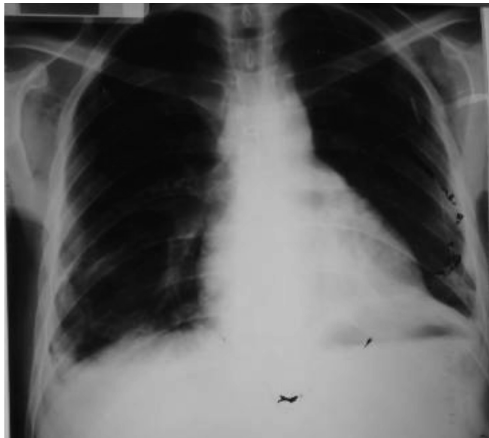
intracardiac mass". As we first met the patient the physical examination revealed a caquectic man with a BMI under 18, jugular ingurgitation, a mesosystolic mitral murmur grade III/VI and multiple sings of right sided cardiac failure. As part of the Hepatic failure, portal hypertension was found, including esophageal varices. Echocardiographic findings reveal a biatrial, pediculated mass, pending from the atrial septum and filling almost all the atrial and ventricular cavities bilaterally. The patient was immediately conducted to the OT, where he underwent resection of a gelatinous like mass and atrial septectomy; the septectomy was due to a permeable Fossa ovalis through witch the mass had pass from right to left side. After resection both atrioventricular valves were tested for any dysfunction, an Alfieri stitch was needed in the mitral valve, with good valve compliance afterwards. A patch was necessary for septum reconstruction.

The patient stayed four days in ICU; during the first 24hours he developed a severe inflammatory response that once controlled lead to a complete recovery, including a restitution of the hepatic function.

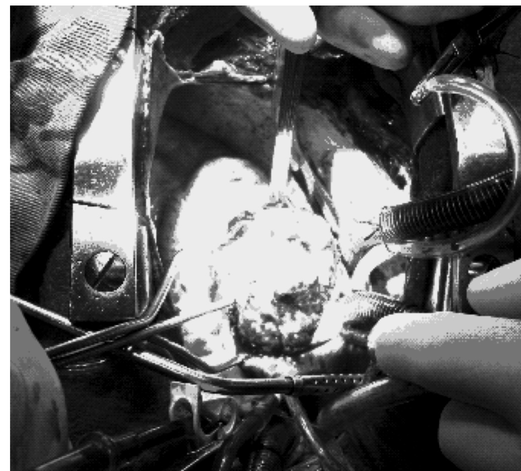
During the follow up period on the last year there has not been any complication in cardiac compliance nor in the hepatic function, recent image studies revealed a normal cardiac anatomy.



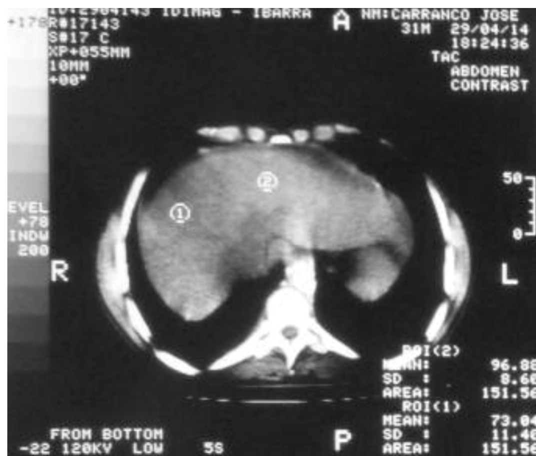
Presurgical Echocardiogram



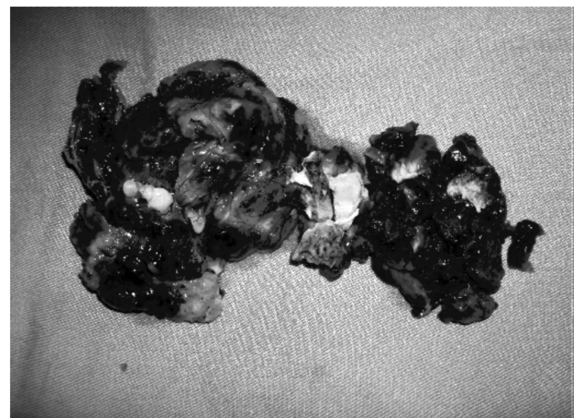
Presurgical RX



Myxoma



Presurgical abdominal CAT in which a hepatomegaly is observed with different densities



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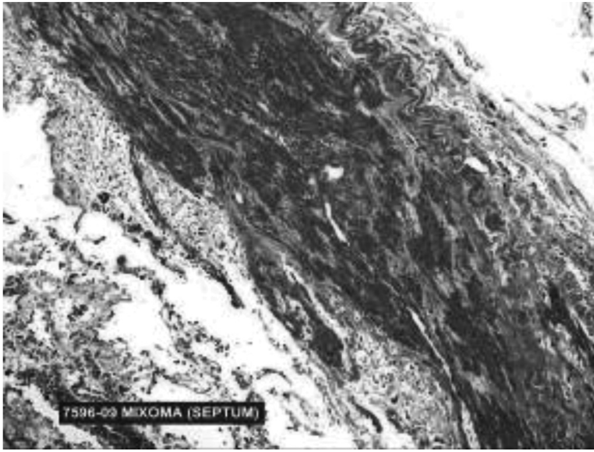

Microscopical view of the myxoma

CATAMENIAL HAEMOPNEUMOTHORAX: A CASE REPORT

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Objective: Catamenial haemo pneumothorax is an unusual condition caused by the presence of intrathoracic endometrial tissue. The spontaneous haemothorax or pneumothorax typically occurs between 24 hours before and 72 hour after the onset of menses. We present a young lady with this condition and review the literature.

Methods: A 34 year-old lady presented to a medical ward with recurrent episodes of dyspnoea with the onset of menstruation. Imaging revealed a right sided pneumothorax and an intrathoracic 2cm nodular mass adjacent to the diaphragm. She was treated with intercostal tube drainage and depoprovera. She continued to have recurrent pneumothoraces and later a significant haemothorax. Despite repeated intercostal tube drainage she had persistent symptoms and a collapsed lung. At thoracotomy several reddish nodules on the diaphragmatic pleura were removed. An area of nodularity and blebs of the right lower lobe was stapled and removed. Decortication was done expanding the lung completely and a pleurectomy was done for pleurodesis. Histopatholgy confirmed intrathoracic endometrial tissue. She made an excellent recovery and continues to be on depoprovera.

Results: The literature review indicates that this entity is commoner than was once presumed. Spontaneous pneumo or haemothorax in women is different from that of men in many ways and a catamenial cause can account for up to 1/3 rd of such presentations in women needing surgery for haemopneumothoraces.

Conclusion: This entity should be suspected in women with recurrent dyspnoea and a relation to menstruation should be specifically sought.

CLINICAL AND ECONOMIC EVALUATION OF FAST TRACK RECOVERY AFTER CARDIAC SURGERY THROUGH RECOVERY UNIT

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Objective: To evaluate the clinical effectiveness and safety of our fast track model through Theatre Recovery Unit and perform an economic evaluation.

Methodology: A prospective controlled observational study over a period of 6 months. A total of 136 patients were included into two groups; the fast track group n = 84, and conventional group n = 52 patients. Fast track patients went through Theatre Recovery Unit (TRU) which is an independent unit of the Cardiac Intensive Care Unit (CICU), and were discharged on the same day to an intermediate progressive care unit and then to the ward. The control group patients went to the intensive care where they stayed for at least one day, and then went to the ward.

Economic evaluation was done using a top down costing for the different units of the model. One-way and multi-way sensitivity analysis was done to account for any uncertainties in costing.

Results: The fast track pathway reduced the intensive care length of stay (LOS) compared to the conventional one (5.92 hours compared to 22.71 hours, $P < .001$). The total duration of intubation was also reduced from 4.08 hours to 2.75 hours, $P < .001$. There was no statistically significant difference in total hospital LOS, complication rate, reintubation or readmission. Fast track is £ 371 cheaper on average with cost savings range from £166 to £1324.

Conclusion: Fast recovery through Theatre Recovery Unit is safe and more cost effective when compared to the conventional recovery through the Cardiac Intensive Care Unit.

CYANOACRYLATE-SEALED DONATI SUTURE FOR WOUND CLOSURE AFTER CARDIAC SURGERY IN OBESE PATIENTS

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Objective: The majority of wound infections after median sternotomy in obese patients are triggered by the breakdown of skin suture and subsequent seepage of skin flora into the deeper tissue layers.

Methods: In a prospective study 60 obese patients (body mass index of 30 kg/m2 or higher) who had undergone cardiac surgery via median sternotomy were enrolled. In 30 patients skin closure was performed according to the Donati technique and suture was sealed with octylcyanoacrylate (Dermabond®, Ethicon) (group A). In 30 patients skin closure was performed by intracutaneous running technique without sealing (group B). Endpoint was wound infection within 90 days.

Results: Degree of obesity and other risk factors for wound infection were equally distributed between groups A and B (all $P > .05$). In group A only one superficial infection occurred whereas in group B there were seven wound infections including one case of

deep infection and one of mediastinitis (P = .026). In 7 of 8 infections (both groups) coagulase negative staphylococci were found in wound smears. In 5 of 8 wound infections the caudal third of the incision was affected. Intertrigo in thoracic (inframammary) skin folds was found in 23.3% (14/60) of all patients but in 62.5% (5/8) of cases with infection.

Conclusions: After median sternotomy in obese patients skin closure seems to be jeopardized by traction and shear forces on skin edges and ample skin flora, often complicated by intertrigo. Therefore, cyanoacrylate-sealed Donati suture is superior to intracutaneous suture technique since it offers tension-resistant closure with immediate microbial barrier properties.

DEEP STERNAL WOUND INFECTION IN COLLABORATED WITH RETAINED EPICARDIAL PACE WIRE

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Objective: Temporary pacing wires are routinely used during open heart surgery.

Although these wires are helpful for diagnosis and treatment of cardiac arrhythmias following surgery, they may be a source for complications, such as malfunction, right ventricular laceration, migration of a wire into the pelvis, laceration of the saphenous vein graft, cardiac decompensation during removal of a wire ensnaring the heart and mediastinitis.

Methods: From February 2009 to January2010, 2686 Patients underwent open-heart surgery through a complete sternotomy at our university hospital. Deep sternal wound infection occurred in Thirty two patients (80.4% Isolated CABG, 6.5%valve surgery and 13.1% combined procedure). After diagnosis of infection based on clinical exam, wound culture and CT scan, patients were treated by partial or total sternectomy, costal cartilage resection, and removal of retained pace wire and chest wall reconstruction. All fistula tracts were injected by methylene blue and were exactly unroofed and explored during operation.

Results: Eight patients had sternal wound infection collaborated with retained epicardial pace wire. In 3 patients, retained pace wire was the only cause of fistula tract or recurrent pustule. Five patients also had other remote pockets of pus and osteomyelitis and chondritis unrelated to infection related to retained epicardial pace wire. Two patients had reoperated due to recurrent fistula tract because retained epicardial pace wire was missed in first operation. Staph aureus was the cause of microbial infection in 66.7% of patients.

Conclusions: Sternal wound infection is still a challenging issue. A reliable history of retained or complete removal of temporary epicardial pace wire is valuable. CT scan should be carefully assed for evidence of retained epicardial pace wire. In the management of deep sternal wound infection, aggressive surgical approach and removal of retained pace wire are highly recommended.

FLOW CYTOMETRIC ANALYSIS OF VASCULAR SMOOTH MUSCLE CELLS (VSMCS) PHENOTYPE IN HUMAN ASCENDING THORACIC AORTIC ANEURYSM (ATAA)

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Introduction and Aims: Aortic wall remodeling is a dynamic process, actively involving immunological system and VSMCs. Aim of our study was to perform quantitative flow cytometric analysis of ATAA VSMCs markers indicative of their capacity to adhere to extracellular matrix and to migrate, proliferate in response to platelet-derived factors, as well as undergo apoptosis.

Methods: Ten patients undergoing operation for ATAA and ten patients with aortic valve disease (controls) have studied. To determine the total cellular amount of the identifying (smooth muscle α-actin) and functional (CD51/CD61, PDGFR-α, APO2.7) markers, after enzymatic digestion, cellular suspensions have been fixed, permeabilized, and simultaneously stained with appropriate associations of monoclonal antibodies. Flow data, based on α-actin positive cells only, have quantified as percentage of positivity or relative fluorescence intensity (RFI), and expressed as mean ± standard deviation.

Results: The positivity for CD51/CD61 in ATAA and controls were 90.51 ± 6.03 and 55.03 ± 9.94 respectively (P < .0001), while corresponding RFI resulted 310.11 ± 61.09 and 227.57 ± 37.03 (P = .0072). The positivity for PDGFR-α were 9.45 ± 6.29 and 0.00 ± 0.00 respectively (P = .0015), while RFI resulted 108.16 ± 20.43 and 0.00 ± 0.00 (P < .0001). The positivity for the apoptotic marker APO2.7 were 72.50 ± 9.09 and 30.58 ± 10.59 respectively (P < .0001), while RFI were 224.20 ± 26.74 and 179.37 ± 27.10 (P = .0029).

Conclusions: Flow cytometry is a powerful tool in quantifying cellular antigen expression. We demonstrated the utility of this procedure in evaluating functional phenotype of VSMCs from the wall of ATAA. Our data suggest a VSMCs more adhesive phenotype in aneurysms, compared to controls. Moreover, on the basis of the importance of extracellular matrix proteins and platelet-derived growth factors in controlling cellular proliferation, our data suggest an increased proliferative state of VSMCs in aneurysmatic lesions, associated with a higher cellular apoptosis. Integration of flow cytometric analysis, immunohistochemistry, and functional in vivo imaging techniques, may contribute to a better knowledge of pathological mechanisms underlying development of ATAA.

FOLLICULAR VARIANT OF PAPILLARY THYROID CARCINOMA EXTENDING INTO THE MANUBRIUM

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Objective: The follicular variant of papillary thyroid carcinoma (FVPTC) is a common subtype of papillary thyroid carcinoma. Despite its well-differentiated characteristics, it may be overtly or minimally invasive. We present a case which has extended into manubrium at the presentation.

Methods: A 53 Year old female presented with swelling over the neck for 1year and lump over the anterior chest wall for 2months which was gradually enlarging in size. No history of shortness of breathing or difficulty in swallowing, no family history of thyroid disease or exposure to radiation. FNAC confirms the diagnosis of FVPTC. CT scan showed tumor extending from the retro-sternum, destroying the manibrium and extending into the presternal region under the skin. Total thyrodectomy done with median sternotomy, tumour (6x4cms) excised with the manubrium from the innominate vein, thymic fat and from both the pleural wall in the anterior mediastinum. Approximately 2-3mm margin of the bone right to both the clavicular heads trimmed with the tumour excision. Prolene mesh used to fill the gap and both the clavicle and ribs attached to the mesh, Bilateral pectoralis muscle used to reinforce the sternum.

Result: Histopathology confirmed FVPTC extending into the anterior mediastinum with partial encapsulation. Regional lymph nodes were negative. Oncology follow-up advised.

Conclusion: Thyroid cancers grow slowly and are associated with a very favorable prognosis. Metastasis is very uncommon and when spread into surrounding structures can be treated by complete resection and reconstruction with very good outcome with regular follow-up.

GASTROTHORAX VERSES TENSION PNEUMOTHORAX: A WORD OF CAUTION

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Background: Post Traumatic Gastro thorax [Stomach Herniation in to the Left Hemithorax], Presenting with respiratory distress need to be differentiated from Tension Pneumothroax and should timely intervented appropriately. We like to present post traumatic gastrothorax with gastric volvulus and gangrene of the stomach in a young girl.

Methods & Materials: *Clinical Profile:* At PSG super specialty hospital 17 years old girl presented with progressive dyspnoea, Tachypnoea and hypotension following a blunt thoraco abdominal injury. On admission she was in near cardio respiratory arrest, reduced air entry in Left Hemithorax with gross mediastinal shift to right, CXR revealed large air space in the Left Hemithorax, emergency intubation done which worsened the haemodynamics and respiratory distress, Nasogastric decompression improved the ventilation.

CECT thorax revealed large diaphragmatic rent with stomach herniation to left Hemithorax and possible volvulus.

Management: Emergency thoraco laprotomy done assessment revealed organo axial volvulus of stomach with extensive gangrene not suitable for preservation. Hence total gastrectomy with esophago – jejunostomy by roun- en-y bypass done. Diaphragmatic rent repaired.

Results: Post Operative recovery smooth stated on Jejunostomy feeding, 14th POD contrast study showed good integrity and passage of the bypass started on oral feed, followup over 1 year satisfactory.

Discussion: Respiratory distress following Thoraco abdominal injury should have suspecians of diaphragmatic rupture and bowel herniation in to the thorax, Nasogastric tube decompression should by initiated and emergency surgery is mandatory. If the herniated content non salvageable resection and appropriate reconstruction to be done preferably by thoraco laprotomy incision. Agastric status need to managed with nutritional supplement. Always rule out gastrothorax prior to intercostals tube drainage in a poly trauma victim with respiratory distress.

INTRAPERICARDIAL TERATOMA IN NEONATES – A SURGICAL EMERGENCY

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Introduction: Primary cardiac tumours are very rare, with a reported incidence of 0.15 to 0.2 % in autopsy series. They can be life-threatening because of myocardial compression and dysfunction. Once diagnosed during pregnancy, the clinical condition of the baby is monitored because of the risk of rupture.

Case Report: We report a rare case of a neonate who presented with respiratory and cardiac compromise due to cardiac tamponade necessitating emergency exploration of the pericardium and excision of tumour. A well encapsulated tumour measuring around 5 cm and bigger than the heart, was debulked. This was diagnosed to be an immature Teratoma. Follow up echocardiogram was normal and on serial monitoring, alpha feto protein was within normal limits. The baby was discharged home with no complications.

Discussion: Intrapericardial teratoma in neonates is a surgical emergency if presented with significant pericardial effusion. It can be a challenge if diagnosed in-utero with rupture before the viability of pregnancy. A multidisciplinary team approach is necessary to manage such situations. Complete excision is necessary due to its association with tissues of malignant potential.

INTRAVENOUS LEIOMYOMATOSIS EXTENDING TO BOTH PULMONARY ARTERIES. A TUMOR THAT ESCAPES FROM THE REALITY

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A 38-year-old woman with two children and no medical history of note had routine laboratory tests ordered by her gynaecologist in the course of an annual control visit. The platelet count was 46 x 10^9/L. Results of the remaining haematological parameters, biochemical profile and urinalysis were within normal limits. Physical examination was unrevealing. The abdominal ultrasound showed a tumor in the uterus with occupation of the inferior vena cava. An abdominal CT scan, echocardiogram and thoracic CT showed an intravenous tumor occupying the iliac veins, inferior vena cava, right atrium, right ventricle, main pulmonary artery and right and left pulmonary arteries. The tumor, 50 cm in length, was removed in one-stage through incisions made in the inferior vena cava,

right atrium and main pulmonary artery with the patient under cardiopulmonary bypass, deep hypothermia (15°C) and cardiac arrest. Total hysterectomy and bilateral salpingo-ophorectomy was also performed.

Diagnosis: intravenous uterine leiomyomatosis with extension to both pulmonary arteries.

INTUBATION THROUGH AN I-GEL SUPRAGLOTTIC DEVICE IN PATIENTS WITH DIFFICULT AIRWAY UNDERGOING CARDIAC SURGERY

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Introduction: We describe successful intubations through an I-gel supraglottic device in difficult airway patients undergoing cardiac surgery.

Methods: Fifty one year old female was scheduled for double valve replacement. Difficult airway was suspected on preoperative evaluation. Airway assessment revealed Mallampati score 3, short neck, small mandible. The other patient was 55 year old male scheduled for CABG. He had no signs that could predict difficult airway. After induction of general anaesthesia, having failed tracheal intubation with conventional laryngoscopy by two anaesthesiologists, ventilation was secured with size 4 I-gel supraglottic device in both patients. Mechanical ventilation was effective, with no audible leak. In a female patient a bronchoscope was inserted through the I-gel, vocal cords visualized and then (size 7.0) endotracheal tube was inserted into the trachea. In male patient (size 7.0) endotracheal tube was blindly inserted through the supraglottic device. Both patients were successfully operated on and underwent uneventful postoperative course.

Discussion: Failed tracheal intubations and prolonged attempts at intubation are major causes mortality directly associated with anaesthesia. Laryngeal mask airway (LMA) were included in the American Society of Anaesthesiologists difficult airway algorithm. LMA for cardiac surgery after airway rescue has been reported. However, concern that high cuff pressures required with LMA could increase pharyngeal mucosal ischemia during cardiac surgery has been raised. I-gel could be beneficial for difficult airway management in cardiac surgical patients in case endotracheal tube could not be inserted.

Conclusion: These cases illustrates a potential role of I-gel supraglottic device in airway rescue in cardiac surgery.

LARGE LEFT ATRIAL MASS WITH EXTRA-CARDIAC EXTENSION- VERY RARE PRESENTATION OF TUBERCULOSIS

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We present a case of a sixteen year old girl who presented to us in severe dyspnoea. Echocardiography showed a large left atrial mass invading into the mediastinum. Cardiac MRI revealed a large lobulated mass (8x5x8cm) inside the left atrium and extending extracardially into the pericardial space. CT guided FNAC confirmed the diagnosis of Tuberculosis. Patient was started on anti-Tubercular regimen (ATT), but she succumbed from pulmonary edema, within three days of starting ATT.

LEFT ATRIAL PAPILLARY FIBROELASTOMA AS A CAUSE OF RECURRENT STROKE

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Left atrial papillary fibroelastoma (PF) is a rare primary benign tumor. Most of the cases are diagnosed postmortem, from autopsy findings, and there is an indication that the true incidence of this phenomenon is underestimated. Soft and vascular cardiac PF fronds are usually complicated with the unclear embolic events. However, improved imaging modalities and routine echocardiography examinations demonstrated that PF in left atrium should be considered a potentially dangerous but preventable disease. PF in left atrium is not commonly seen in the cardiac surgery so we report a case of a young woman, free of traditional cardiac risk factors, who disserved emergency surgery due to left atrial mass complicated with recurrent cerebral vascular events.

LIMITATIONS OF RECURRENT DEEP VENOUS THROMBOSIS AND PULMONARY VENOUS THROMBOEMBOLISM ON SOCIAL AND PROFESSIONAL LIFE OF A CASE WITH COMBINED FAMILIAL TYPE I PROTEIN C DEFICIENCY AND METHYLTETRAHYDROFOLATE REDUCTASE (MTHFR) GENE MUTATION

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Objective: Hypercoagulability-related venous thromboembolism (VTE) is a significant risk factor increasing mortality and morbidity. Many genetic thrombotic factors are responsible for hypercoagulability. Hyperhomocysteinemia (HHI) is an independent risk factor for VTE. Point mutation of the gene encoding MTHFR -which catalyzes remethylation of homocysteine forming methionine- causes hereditary HHI. This genetic mutation is seen in 2-15% of otherwise healthy population, whereas it is seen in 10-25% of cases with first VTE episode. Protein C deficiency has 100-160 separate mutations that may cause both venous and arterial thrombosis. Relative risk for lifelong thrombosis increases 31 times in familial protein C deficiency.

Materials and Methods: Our case was a 47-year-old male. His past medical history was significant for deep venous thrombosis of left lower limb and subsequent pulmonary VTE, 6 years ago. Although receiving oral warfarin, he experienced the same pathology again 1 year after first episode. Hereditary thrombophilic states were investigated revealing familial type I Protein C deficiency and MTHFR C677T gene mutation. His oral anticoagulant therapy was continuing with an INR value of 2.7 ± 0.3. He was also compliant with compressive medical stockings. The circumferences of calf and thigh regions were 2.5 cm and 3.5 cm longer, respectively.

Results: Control RDUS revealed incomplete occlusion and chronic deep venous insufficiency of the common and superficial femoral veins. He was evaluated by our department's clinical council about occupational disabilities on demand of his employer, officially. Use of compression stockings and effective medical therapy were recommended with routine outpatient follow-up. Non-stop travel was limited to 4 hours. Rather than chronic venous insufficiency, familial Protein C deficiency and MTHFR mutation were considered significant for VTE recurrence. Therefore, employment close to a health facility capable of either medical or surgical management of VTE was recommended. Moreover, his current occupation belonging to office work category was not defined as a "drawback".

Discussion: Recurrence rate of DVT in 8 years after the first episode is beyond 30% in adult population. Molecular defects of the hemostatic components predispose this recurrence. Pulmonary VTE is seen in 1/3 of patients with DVT, whereas it is seen in half of patients with familial thromboses. Pulmonary VTE is a condition with high mortality and morbidity rates. Therefore, besides common risk factors, if needed, congenital predisposing factors should be investigated.

ONE STAGE OPERATION FOR RUPTURE OF ANEURYSM OF SINUS OF VALSALVA AND COARCTATION OF AORTA THROUGH MEDIAN STERNOTOMY.

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Coarctation of aorta associated with other cardiac anomalies requiring open heart surgery for correction demands a challenging strategy for management. Single stage correction of both Rupture of aneurysm of sinus of Valsalva (RSOV) and coarctation of aorta (COA) is not reported so far in the literature. Our case is a fifty year old male presenting in NYHA class IV with abdominal distension, hepatomegaly and bilateral pedal edema of one month with acute onset of symptoms. Echocardiography revealed RSOV into right atrium, pulmonary hypertension, biventricular dysfunction with mild mitral regurgitation and coarctation of aorta with a pressure gradient of 60 mm Hg. CT scan and aortogram confirmed RSOV and COA. Considering his severity of illness he was planned for a single stage procedure to correct both COA and RSOV. Through median sternotomy on cardiopulmonary bypass RSOV was repaired by closure with Dacron patch and a 14 mm woven polyester graft was anastamosed end to side distally to the descending thoracic aorta just above the diaphragm posterior to the heart and proximally to the right lateral aspect of ascending aorta. Patient recovered to NYHA class II and was discharged.

OPTIMIZATION OF THE LEFT VENTRICULAR LEAD POSITION DURING THE TRANS-THORACOTOMY IMPANTATION OF THE CARDIAC RESYNCHRONIZATION THERAPY (CRT) DEVICE

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Cardiac resynchronization therapy (CRT) can offer benefit to patients with chronic heart failure , proven LV dyssynchrony and with left ventricular (LV) systolic dysfunction. Factors associated with a less than optimal outcome include suboptimal LV lead placement. CRT device implantation via mini anterolateral thoracotomy has been advocated as an alternative approach in case of malpositioning of LV lead in the coronary sinus, but a little attention has been paid to potential benefits of differential positioning of the lead at the LV.

From January 2009 to February 2010 10 patients received CRT device with the LV lead positioning via mini thoracotomy. Using the test LV lead, pacing was performed in four pre-defined areas of the LV.

Standard transesophageal echocardiography (TEE) data were acquired intrao and postoperatively including standard 2D data, spectral Doppler flows and myocardial velocity data.

The optimal LV pacing site was chosen as the lead position with the lowest measured values of LV end-systolic volume, the smallest amplitude of the septal flash, the highest values of dP/dt and the highest increase in stroke volume/cardiac output.

Preliminary data show that optimal results could be achieved with LV lead position which does not necessarily follows the pattern of "optimal" (eg, posterobasal) position , and that the optimal early results can be achieved by "customization" of the LV lead positioning for every single patient. We believe that optimization of the LV lead positioning under ECHO guidance could further improve efficiency of this procedure.

PERFORMANCE AND MORALE IMPROVEMENT IN CARDIOTHORACIC SURGICAL NURSING AT A HIGH-VOLUME CENTER

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Heart Center Leipzig, Germany

Objective: Cardiothoracic surgical nursing is a critical component of postoperative care. Physician communication deficits, coupled with lack of appreciation, often exacerbate pre-existing performance and morale problems. The role of this study was to determine the impact of a simple intervention designed to address these issues.

Methods: A weekly newsletter designed was distributed to cardiothoracic nurses and ancillary personnel at a high-volume academic center. Topics varied according to personnel requests, and relevant historical anecdotes and inspirational quotations were included. After 20 weeks, a survey assessing the impact of this newsletter was performed.

Results: 51 personnel responded to the survey, of which 20% had been practicing for > 20 years. 14/36 (39%) nurses felt physicians rarely recognized the work they did. 44/50 (88%) felt the newsletters improved their job performance, 37/43 (86%) felt

more pride in being a nurse, and 34/39 reported an increased sense of pride in the institution. 33/41 (80%) indicated the newsletters promoted attention to detail, and 36/40 reported an improvement in patient care/skills as a result. Subjectively, a cascade effect was noted over the ensuing 6 months, in which the readership continually expanded to over 150 personnel, and the newsletters were used to orient new nurses and personnel within the intensive care unit and operating rooms.

Conclusions: The initiation of a weekly newsletter dealing with contemporary cardiothoracic surgical issues is a simple, cost-effective measure to improve nursing and ancillary personnel performance and morale within an institution.

PRIMARY ATRIAL FIBROSARCOMA OF THE HEART

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Primary fibrosarcoma of the heart is a rare tumor. The prognosis for these lesions remains poor, despite the enhanced diagnostic ability of newer technology. The reasons for the poor prognosis are (1) the advanced tumour stage at presentation, (2) non-specific symptomatology, (3) insufficient awareness of these lesions, due to their rarity, (4) delayed diagnosis and/or misdiagnosis, which leads to (5) advanced tumour stage at presentation, thus a vicious circle is created. Primary treatment of choice is surgery, followed by several possible adjuvant strategies. The median survival is typically 6 to 12 months. We present a 63-year-old male patient with progressive dyspnea since two months. The clinical examination was unremarkable apart from a systolic murmur. Echocardiography (Figure 1) demonstrated a left atrial tumor protruding through the mitral valve, with a severe mitral regurgitation. A cardiac myxoma was suspected and the patient was admitted to the hospital for surgical resection. The tumor infiltrated the superior and left-side wall of the left atrial roof and involved the posterior mitral valve ring and leaflet. Histopathology of the tumor revealed a high grade fibrosarcoma (Figure 2).

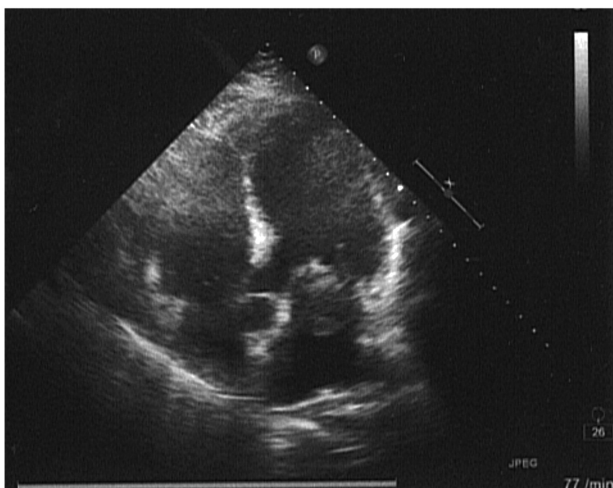

Figure 1. Transthoracic view of the tumor in the left atrium.

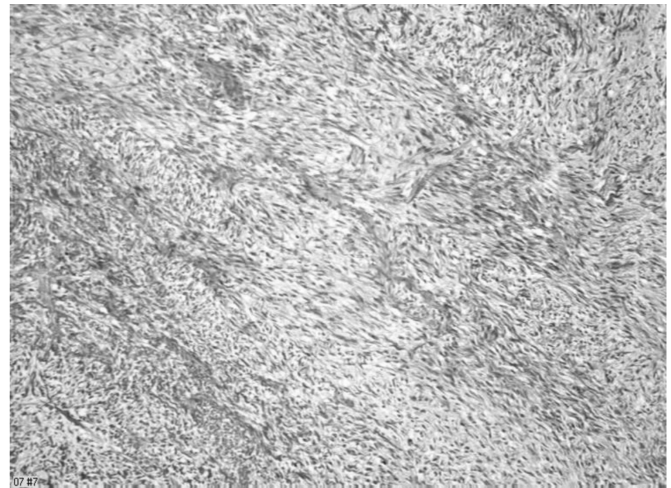

Figure 2. Monomorphous tumor cell population in a "herringbone" pattern characteristic of fibrosarcoma (ABvG, x 100), note the pseudomyxoid area (upper right).

ABvG = alcian blue combined with elastica van Gieson.

PULMONARY THROMBOENDARTERECTOMY FOR CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION: A SYSTEMATIC REVIEW

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Objective: Pulmonary thromboendarterectomy is a treatment option for patients with chronic thromboembolic pulmonary hypertension. The present systematic review was performed to assess the safety and efficacy of this treatment option.

Methods: A systematic review was performed and six electronic databases were searched for published studies from January 1999 to February 2010. All articles that presented morbidity and mortality data, survival data or preoperative and postoperative pulmonary hemodynamic indices were included. The major outcome measures extracted were early morbidity and mortality, pulmonary hemodynamic and functional outcome indices prior to and after operation, and survival data.

Results: Of the 654 publications retrieved, 19 relevant papers (total number of 2,729 patients) representing the most recent and the most complete data set from each institute were included for appraisal and data extraction. No randomized controlled trials or matched comparative studies were identified. Thirty-day mortality ranged 1.3%-24% (median 8%). Residual pulmonary hypertension was reported in 11%-35% of patients after operation. Pulmonary artery pressure and pulmonary vascular resistance significantly decreased after surgery in all studies. Before operation, 60%-100% of patients were in NYHA functional class III or IV. This percentage decreased to 0%-21% after operation. Five-year survival ranged 74%-89%.

Conclusions: The current literature suggests that pulmonary thromboendarterectomy for patients with chronic thromboembolic pulmonary hypertension is associated with acceptable

perioperative morbidity and mortality rates and improved hemodynamic indices and survival when viewed against the prognosis associated with historical controls using medical therapy.

REPORT ON RADIOLOGICAL OBSERVATIONS OF PACEMAKERS WITH LITHIUM BATTERIES

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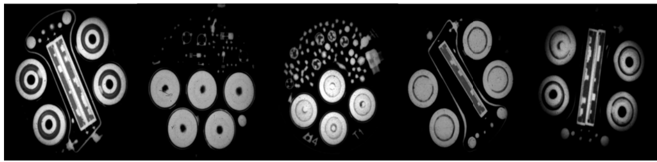
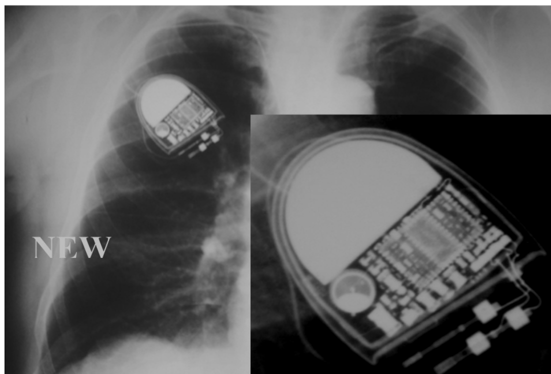


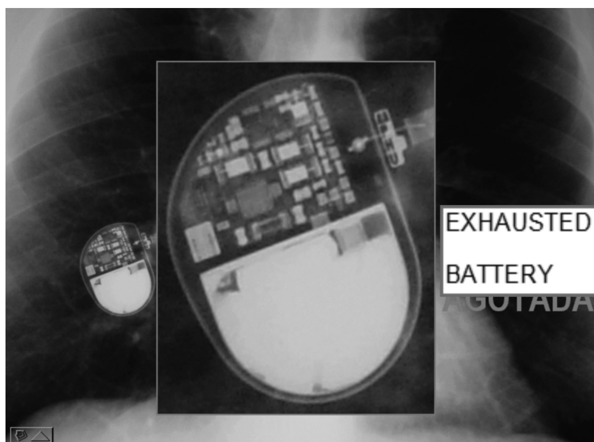
In the time of the mercury batteries, the radiological diagnosis of the batteries depletion had an important value.

It could be known the presence of a good and reliable loading, or if they were in an advanced exhaustion grade.

Also It could be detected a quick failure of one of the piles, which made us to suspect a precocious depletion of the battery, allowing a prophylactic replacement of the generator.



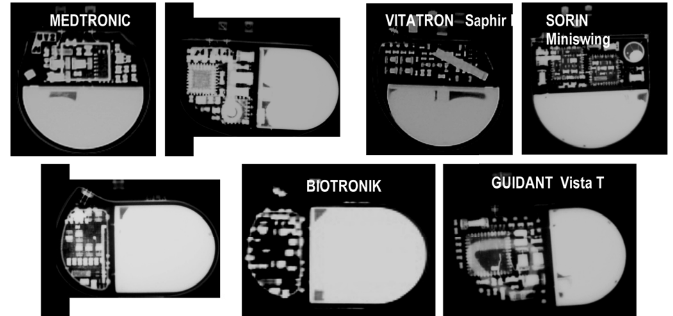
The lithium batteries present a radio-opacity that doesn't allow to appreciate the state of their elements.



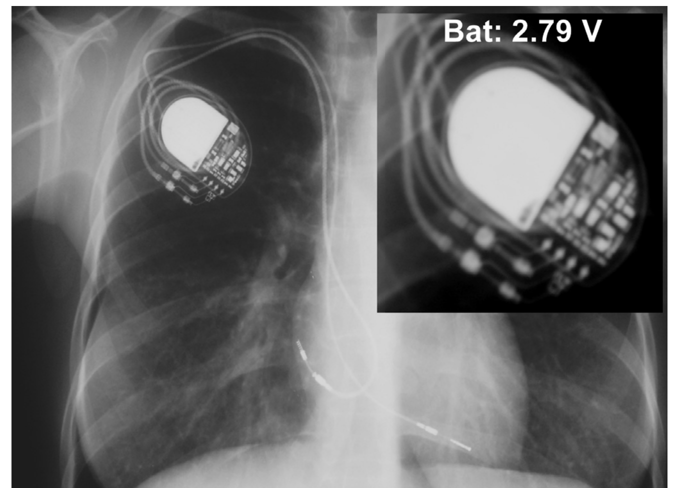
However, in advanced phase of exhaustion, it can be observed some radio-lucid stains in the radiological image of the battery.

These discoveries are show up in all of the markings from different manufacturers.

The stains are always located in the area where the electrodes connect the battery with circuits.



The stains are easily appreciable when the generator is in the front face of the thorax and perpendicular to the X-ray tube.



The stains rarely appear in new generators. Although their presence doesn't seem to be related with the degree of exhaustion of the battery, it is advisable to increase the frequency of pacemaker controls.

When the spots are discover in a fortuity revision, it seems advisable that the follow up controls should be carried out more frequently to avoid the surprise of a premature exhaustion of the battery.

The chemical behavior of those batteries is discussed.

RIGHT AORTIC ARCH AND ABERRANT LEFT SUBCLAVIAN ARTERY WITH THYROID HEMIAGENESIS

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Objective: Vascular ring incidence is less than 0.2%. Patients are mostly asymptomatic (1).Thyroid hemiagenesis is about 0.05-0.2% in normal population .

Material and Method: The chest X-ray of a case of an asymptomatic 26-year-old man showed abnormal right upper mediastinium enlargement in routine check-up.

Results: Multidetector computed tomography showed right aortic arch with aberrant left subclavian artery which constituted an incomplete vascular ring. Also the left lobe of the thyroid gland was not visible. The final diagnosis of thyroid hemiagenesis was established by thyroid ultrasound and thyroid scan by Tc 99m.

Conclusion: The genetic basis of the concomitant development of these disorders has not been understood in humans (2). This is the first report of right aortic arch with left aberrant subclavian artery accombined with thyroid hemiagenesis.

1. Lunde R, Sanders E, Hoskam JA. Right aortic arch symptomatic in adulthood. *Neth J Med*. 2002; 5:212-5.
2. Apaydin M, Varer M, Sarsilmaz A, Akin H. Thyroid hemiagenesis. *European Journal of Radiology Extra*. 2007; 62:65–7

RUPTURED PULMONARY ARTERIO VENOUS MALFORMATION [AVM]: A RARE CAUSE OF HEMOTHORAX

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Clinical Profile: 26 years female second gravida, 8 months gestation presented with sudden onset of Left side chest discomfort, breathlessness, with profound hypovolemic shock. Past History of recurrent episode of epistaxis present.

Initial assessment revealed massive left sided pleural effusion for which tube thoracostomy done. Revealed to be massive hemothorax, following which he was referred to our centre for expertised management.

Further workup revealed Hemoglobin of 5 GM% with significant hypoxia and evidence of left lower lobe pulmonary AVM, Complicating with free pleural space rupture and diagnosed to have Heriditary telangectasis [osler weber Linda syndrome].

She was taken up for urgent thoracotomy and left Lower lobectomy In view of the multiple large AVM in theleft lower lobe. Procedure completed with declotting of left pleural space. Subsequent recovery was uneventful.

Discussion: Pulmonary AVM, as a component of hereditary Telangoectasis is a rare presentation. They may present with resistant hypoxia to oxygen therapy.. Pregnancy likely to accentuate the size of the AVM and increase the risk of complication including rupture Eventhough percutaneous catheter intervention is the option of treatment, large AVM with ruputure, the best option of treatment is surgical intervention.

SURGICAL APPROACH TO A CASE WITH NATIVE AORTIC VALVE ENDOCARDITIS WITH VEGETATION FOLLOWING CORONARY ANGIOGRAPHY AND LEFT MAIN STENOSIS EQUIVALENT

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Izmir Ataturk Training and Research Hospital, Turkey

Objective: Diagnosis of infective endocarditis (IE) following cardiac catheterization is a rare situation. Echocardiography is the crucial method in diagnosis and follow-up of IE.

Material and Method: Our case was a 66-year-old male. His past medical history was significant for iron-deficiency anemia for 3 years and Type 2 DM regulated with oral anti-diabetics for 2 years. Five weeks before his admission to our center, he underwent coronary angiography at another health institution due to chest pain. Left circumflex artery (Cx) was dominant and both this and left anterior descending (LAD) arteries were 80% stenosed, equivalent to left main stenosis. Coronary bypass surgery was planned for this case but he was rehospitalized due to dyspnea he was suffering 5 days after coronary angiography. Emergency transthoracic echocardiography revealed severe aortic regurgitation (AR) and a vegetative mass of 10x7 mm on the aortic valve. Methicilline-resistant Staphylococcus aureus species were isolated from blood culture. Dual antibiotherapy with vancomycin and rifampicin was initiated. After two-week therapy, he was referred to our Cardiology Department. Same dual therapy was continued. Control TTE was done in the 4th week after initiation of parenteral antibiotherapy. It showed that vegetative mass of 9x6 mm on aortic valve persisted. Erythrocyte sedimentation rate and C-reactive protein values showed regression. No microorganismal growth was observed in blood cultures carried out in our institution. Valve surgery was planned.

Results: Native aortic valve was resected including the vegetative mass. St. Jude bileaflet mechanical valve was replaced. Concomitantly, two-vessel coronary bypass surgery using saphenous venous graft was performed on LAD and 2nd obtuse marginal branch of Cx artery. Postoperative period was event-free and he was discharged with surgical cure.

Conclusion: Ratio of identification of the vegetative masses with TTE was around 50% among patients with suspicion of IE. Discrimination whether this vegetative mass is in active or recovery phase is impossible echocardiographically. Two main issues concerning the surgery are: controlling the infection with debridement of the infected and necrotic tissues and reconstruction of the cardiac morphology including repair or replacement of the affected valve.

THE IMPACT OF THE POSTOPERATIVE ‘FAST-TRACK’ PROTOCOL ON PATIENT MANAGEMENT AND OUTCOMES FOLLOWING CARDIAC SURGERY: WHY SHOULD IT BE UTLISED IN FIRST CASES ONLY?

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Objective: A stay on the intensive care unit (ICU) is a significant component of the cost of cardiac surgery. There has been a move to ‘fast-track’ patients, involving early extubation and management on a high dependency unit. We sought to determine if there was any difference in postoperative management and complication rates between patients who were fast-tracked and those who were not.

Methods: Our Infoflex hospital database identified patients who underwent CABG x3 or aortic valve replacements (AVR) during a 6-month period. 10 consecutive patients from each operative group who were fast-tracked, and 10 who were suitable to be fast-tracked, but were not, were identified. A retrospective case note review was performed. Patient demographics, operative and postoperative management and complication data was analysed.

Results: Mean age was comparable and there was no significant difference in logistic Euroscore, cross-clamp times or bypass times between the groups. Fast-tracked patients had a significantly shorter time to extubation (CABG 3.09 versus 5.66 hours $P = .02$, AVR 2.26 versus 5.84 hours $P = .00003$) and lower volumes of intravenous fluids given post-operatively (CABG 2.95 versus 4.00L $P = .006$, AVR 2.76 versus 3.34L $P = .018$). In the CABG groups there was a significantly lower percentage of patients requiring inotropic support in the fast-tracked group, 20% versus 70%. There was also a lower respiratory complication rate in the CABG group who were fast-tracked, zero versus 30%.

Conclusions: Fast-track protocols should be employed for all suitable patients regardless of their position on the operating list to reduce unnecessary ICU stay and the potential complications associated with it.

INTRACTABLE CHEST PAIN IN A YOUNG ADULT FEMALE DIAGNOSED BY CORONARY ANGIOGRAPHY AND TREATED BY CORONARY ARTERY LIGATION

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A 25 year old female, Mrs TS, presented with the chief complaint of centrally localized chest pain. She did not have palpitations or breathlessness. She had no fever and no other relevant respiratory symptoms. She had been to several doctors in several hospitals and was being treated as a psychotic case.

Clinical Examination revealed a well built female.

Systemic examination was normal.

ECG showed a Normal Sinus Rhythm and no evident abnormality.

2D echocardiography showed a mild mitral valve prolapse.

Chest roentgenogram was normal.

CT scan of Thorax was normal.

All routine blood laboratory tests were normal.

Finally, after joint consultation with our cardiology colleagues and physicians and psychiatrists, it was unanimously decided to perform a coronary angiogram on this patient.

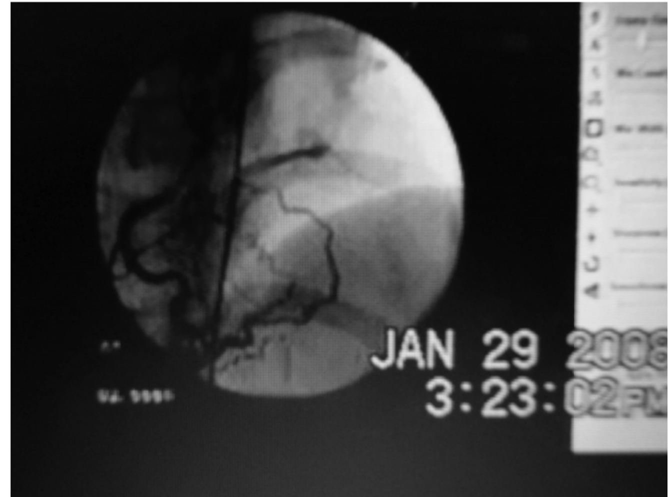
CAG revealed a right coronary arterial cameral fistula of the RV branch opening into the LV chamber.

Open heart surgery was performed by ligation of the tortuous dilated RV branch of RCA using 5,0 prolene sutures on a beating heart using Octopus III stabiliser and the Argentina two finger stabilisation method.

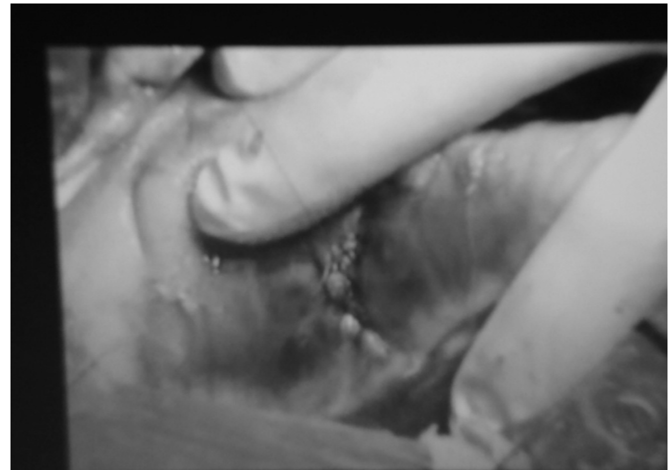
This patient had an uneventful recovery in the hospital and was discharged home in seven days.

Regular follow up of two years confirms that the patient has been asymptomatic ever since surgery.

Conclusion: An open mind with a lateral thinking approach helped us to diagnose unusual chest pain in this young female and treat it successfully.



CAG showing tortuous RV branch (coronary arterial cameral fistula).



Ligation of right ventricular(RCA) branch using beating heart surgery technic.

Pediatric

A LATE PERIOD GIANT ANEURISMAL DILATION OF AUTOLOGOUS PERICARDIAL PATCH INSERTED IN TOTAL CORRECTION OF TETRALOGY OF FALLOT

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Izmir Ataturk Training and Research Hospital, Department of Cardiovascular Surgery, Turkey

Objective: Pericardial patches are still the first choice in repair of some congenital heart defects. Incidence of aneurismal dilation of pericardial patch located in right ventricular outflow tract is 3.5-4.5%.

Materials and Methods: Our case was a 7-year-old male. His past medical history was significant for total correction of tetralogy of Fallot 4 years ago that had been performed at our institution. During his postoperative late period follow-up controls, giant aneurismal dilation of transannular autologous patch was detected. He was then hospitalized for reoperation. Cardiac catheterization and angiography confirmed this giant aneurysm and showed that the pulmonary arteries and their branches were well developed.

Results: During the operation, autologous pericardial patch showing aneurismal dilation was excised first in order to reconstruct and restorate the right ventricular outflow tract. Then, right ventricular outflow tract was reconstructed using e-PTFE (polytetrafluoroethylene) patch. After his discharge, early and late postoperative period control echocardiograms showed no significant pathology.

Conclusion: We recommend use of e-PTFE patch in cases of aneurismal dilation of right ventricular outflow tract due to use of autologous pericardial patch. Moreover, in this type of reoperations, early postoperative mortality rates are low and long-term survival is proven by large case series.

BARE METAL VERSUS THE COVERED STENTS: SINGLE INSTITUTION'S EXPERIENCE IN THE PERCUTANEOUS TREATMENT OF COARCTATION OF AORTA

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Background: Bare stents are widely in use for the percutaneous treatment of Coarctation of aorta but associated with unpredictable results and high incidence of complications. Covered stents that have been in use for the past few years are found to be better than the Bare stents.

Materials and Methods: From year 1997 to 2009, 134 patients underwent 140 percutaneous stent implantation procedures (Median age: 18 (4-67) years).There were 71 patients in the Bare stents (BS) Group and 68 patients in the Covered stents (CS) Group. Mean follow up period was 92 and 41 months for BS and CS Group respectively.

Results: The two groups did not differ in terms of drop in peak systolic gradient (P < .0001) or increase in diameter of coarcted segment (P < .0001). Stent positioning was correct in all without blocking any aortic branch.The number of complex coarctation cases undergoing successful percutaneous stent implantation increased after the introduction of covered stent in the institution. Early complications were higher in BS group (P = .04) including one early post-procedural death due to acute aortic dissection .Despite the need for larger sheath, vascular complication were not higher in the CS group (P = .01). Covered stent were successfully redilated in nine children. Late restenosis occurred more in the Bare stent group (P < .0001). Late aneurysm formation following bare stent implantation was treated with covered stent in two adult patients avoiding surgery.

Conclusion: Covered stent is a safer and more effective alternative to Bare stent for the percutaneous treatment of aortic coarctation especially for the complex lesions.

COMBINED DISCRETE MEMBRANE RESECTION AND MORROW OPERATION IN A CASE WITH AORTIC SUBVALVULAR MEMBRANE PATHOLOGY FORMING SIGNIFICANT LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION

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The turbulent flow in subaortic stenoses and pressure gradient through left ventricular outflow tract cause injury and thickening of aortic valve with time.

Our case was a 29-year-old male. He was suffering for shortness of breath and palpitation for 2 months. Echocardiographic examination showed left ventricular outflow tract obstruction due to subaortic membrane. This membrane was 11x4 mm in dimensions. It formed a peak pressure gradient of 94 mm Hg and a mean gradient of 64 mm Hg. In aortographic investigation peak-to-peak gradient was measured as 100 mm Hg through subaortic membrane. Mild aortic regurgitation also existed. .

With these findings, he was taken to the operating room. Aortic valve leaflets were evaluated as thin with good competence. According to Morrow technique, septal myectomy was performed beneath right coronary leaflet between below right coronary ostium and commissure between right and left coronary leaflets. After removal of aortic cross-clamp weaning from cardiopulmonary bypass could be accomplished without any event. Before decannulation, the pressure gradient was measured as dropping to 35 mm Hg. A late period echocardiographic investigation showed regression in pressure gradient through left ventricular outflow tract to 19/11 mm Hg. It also showed that subvalvular membrane was completely resected and outflow tract was open optimally.

In left ventricular outflow tract obstruction due to aortic subvalvular membrane, regarding the short duration of operation and low complication rates, surgical intervention is necessary.

FIFTEEN YEARS OF EXPERIENCE IN REPAIR OF AORTOPULMONARY WINDOW IN CHILDREN

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Objectives: Aorto-pulmonary window accounts for about 0.15% of cardiac anomalies.

Methods: We reviewed our cases From 1992 to 2007. We evaluated 30 patients. The approach for AP Window repair was ligation (2), division and suturing (1), trans-window in 19 trans-aortic in 9 and trans-pulmonary in 2.

Results: Among patients male to female ratio was 2:1. Mean age was 28 ± 9 months, weight 8.6 ± 4.6. Morphology was type I (87%), type II (10%), type III (3%). Preoperative EF was 0.66 ± 0.07 which increased to 0.75 ± 0.07 post-operatively. Nineteen (63%) of patients had associated cardiac anomalies most frequently Aortic stenosis (23%) followed by interrupted aortic arch.In-hospital mortality was 10%. Mean

ICU stay was 4.4 days. Mean post-operative hospital stay was 10.7 days. Early complications were bleeding (2), pneumonia (one), CVA (one). Mean follow-up was 49 months , and there was no re-operation or late death. There were 4 cases of residual AP Window. Two in banding group (100%)one in transaortic patch repair (11%) and one in trans-window patch repair (5%).

Conclusions: Using multivariate analysis Age,sex and weight had no clear impact on post operative course. The mortality was no different among patients with or without associated anomaly (3%). There was no difference among various methods of repair in respect of morbidity, ICU stay; ventilator support and post operative EF.

Trans-aortic repair of APW is the procedure of choice for all APWs, except in the case of large defects where trans-window repair may be done. Simple ligation without CPB should be avoided due to the possibility of residual APW.

Trans-aortic repair of APW is the procedure of choice for all APWs, except in the case of large defects where trans-window repair may be done. Simple ligation without CPB should be avoided due to the possibility of residual APW.

INTRAOPERATIVE CELL SALVAGE IN PAEDIATRIC CARDIAC SURGERY – IS IT JUSTIFIED?

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Mother and Child Health Institute of Serbia

Intraoperative cell salvage (ICS) is procedure which aspirates blood from the operative field and returns it to the patient after being processed in the cell saver machine. The use in paediatric cardiac surgery has been enhanced in the recent years by the introduction of small volume centrifugal bowls.

Between December 2004 and May 2010, the ICS was used in 54 open heart procedures. In the first year, the method was applied only to redo cases, whilst in the last 2 years the indications for the intraoperative cell salvage are for patients with haematological disorders, Jehovah's witnesses and patients with anticipated higher blood loss and in all cyanotic patients with preoperative haematocrit over 50%. We combine the ICS with conventional and modified ultrafiltration.

In this study we compared the ICS patients with the control group. The following postoperative parameters were compared: haematocrit, platelet count, fibrinogen, ACT, PT, APTT, 3, 6, and 12 hours post surgery. Apart from haematocrit, the results did not show statistical differences between the groups. The postoperative bleeding at 1, 3, 6, 12, and 24 hours post surgery was compared with the control group as well as the use of blood and blood products postoperatively. These results showed postoperative lower bleeding rates and smaller administration of blood products.

The ICS did not show significant benefits in the quality of the restored blood, but it lowered the postoperative blood administration.

PARACHUTE MITRAL VALVE IN AN ADULT WITH MULTIPLE CONGENITAL CARDIAC MALFORMATIONS - A RARE CASE REPORT

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Introduction: Parachute mitral valve (PMV) in adult patient is an uncommon condition with only nine cases mentioned in the literature. Among them one case had associated VSD, but none of them had systemic venous malformation. Absent right SVC is also uncommon anomaly (0.07%-0.1% of congenital malformation). This case is presented in view of rarity of combination of all these three congenital anomalies. This has not been reported in literature and to our knowledge this is the first.

Case Report: A male patient aged 18 years presented with signs and symptoms of increased pulmonary flow. Patient had auscultatory findings of VSD. Echocardiography showed PMV with mild MS, subaortic VSD and dilated coronary sinus. Peroperatively, right SVC was absent with a persistent LSVC. Sub aortic VSD of 15 mm diameter was closed with savage patch. Nothing was done to mitral valve as it was mild MS. Intraoperative TEE revealed mild MS. Patient is fine after six-months follow-up.

Conclusion: Combination of these three anomalies that is; PMV, VSD, absent right SVC and LSVC is rare and routine techniques can be employed for ICR with good result.

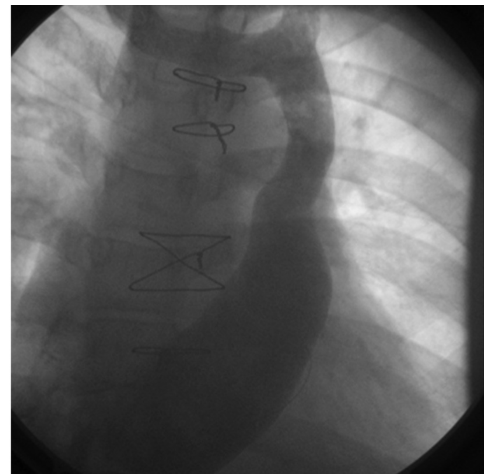

Figure 1. Venogram showing absent RSVC, dilated coronary sinus.

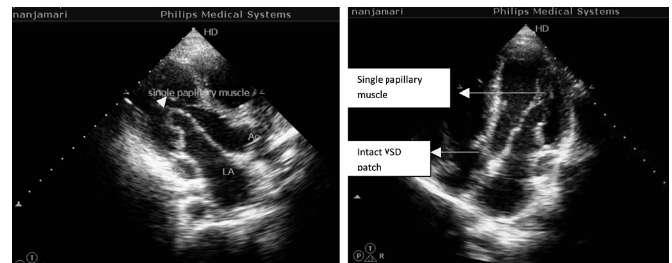

Figure 2. Left, Transthoracic ECHO, showing single papillary muscle (parasternal-short-axis-view). Right, Transthoracic ECHO, showing single papillary muscle (apical-four-chamber-view).

POST-OPERATIVE IATROGENIC POLYURIA: A CASE OF GOOD INTENTIONS GONE HAYWIRE

Aditya Singh, MS, Saket Agarwal, MCh, Sadashiv Tamagond, MS, Deepak K. Satsangi, MCh
Department of Cardiothoracic & Vascular Surgery, G. B. Pant Hospital, New Delhi, India

The Blalock-Taussig (BT) shunt is an excellent and widely accepted form of palliation for patients with congenital cyanotic heart disease. Shunt blockage is a dreaded complication and has been causally linked to post-operative dehydration. We report an unusual case of severe polyuria developing in a case of post-operative BT shunt as a result of injudicious fluid administration, which was carried out to prevent dehydration developing from the polyuria- thus leading to a vicious cycle.

RIGHT VENTRICLE TO PULMONARY ARTERY RECONSTRUCTION USING VALVED HOMOGRAFT IN CHILDREN

Eva Maria Delmo Walter, Michael Huebler, Christoff Stamm, Vladimir Alexi-Meskishvili, Roland Hetzer
Germany

Background: Although the valved homografts have become a preferred alternative for right ventricle (RV) and pulmonary artery (PA) reconstruction, in children, its durability remains controversial. Objectives: The present study was undertaken to evaluate the outcome of the valved homograft used for RV-PA reconstruction, and to analyze the factors related to homograft survival and vitality, in children.

Methods: Between 1987-2009, 276 cryopreserved homograft valves were implanted in children (median age 5 years range 0-17 years) for anomalies requiring a RV-PA connection. Patients who underwent the Ross procedure were excluded. Perioperative clinical data were analyzed with particular reference to variables associated with deterioration of homograft, as well as factors influencing homograft vitality.

Results: Total follow up time was 1789 patient years. Progressive homograft wall calcification resulting in increasing peak systolic gradients occured at a mean of 3 years, on 72 (26.47%) patients, with varying primary congenital diagnosis, who eventually underwent reoperations, comprising 2.57%/patient years. Mean homograft gradient before replacement was 60.1 ± 10 mm Hg. The decision to replace the valve for structural degeneration depended on the homograft function, presence and degree of tricuspid insufficiency, right ventricular dimensions and patients' functional status. Cox's regression analysis shows that age-related homograft size, younger recipient age, younger donor age influence longer homograft survival ($P < .001$). Anatomic factors for which the homograft was implanted did not reach statistical significance ($P = .54$). Kaplan Meier homograft survival rate is 81.0 ± 2.4, 79.0 ± 2.5 and 78.1 ± 2.5 at 5, 10 and both 15 and 20 years respectively. Cumulative freedom from homograft failure is 85.6 ± 2.5, 76.4 ± 3.1 and 61.0 ± 3.9 at 5, 10, and both 15 and 20 years respectively.

Conclusions: The clinical results of homografts in the right ventricular outflow tract remain extremely satisfactory. Its durability is associated with age of the donor and recipient as well as its age-related size during implantation.

STENT VERSUS SURGERY FOR COARCTATION OF THE AORTA: SYSTEMATIC REVIEW

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Introduction: Coarctation of the aorta (CoA) accounts for 5% to 7% of congenital heart disease, with an incidence of 0.3 to 0.4 / 1000 live births. Surgery was the only choice of therapy for CoA until 1982 when the balloon angioplasty has become a rational alternative to treat. Re-coarctation, aneurysm and aortic dissection remain disadvantages of balloon angioplasty. In 1990s, endovascular stents were introduced for native coarctation and re-coarctation and since then is demonstrated to be a safe and effective alternative approach to surgical repair. Currently, questions related to both the techniques of surgery or stent remain unsolved such as pos-operative, outcomes and costs.

Objective: To analyze the effectiveness and safety of open surgery compared with stent placement in patients with CoA.

Methods: This is a systematic review of randomized clinical trials in patients with CoA undergoing open surgery or placement of a stent. Children and adults of both sexes with CoA alone or associated with other congenital heart defects were analyzed. Survival, quality of life and cardiovascular complications after intervention were available. For the search, a combination of controlled vocabulary terms was used in The Cochrane Library, MEDLINE, EMBASE and Web of Science.

Results: There aren't studies that fill the criteria for inclusion. In the analyzed studies (reports, series, trials without comparison), the short follow-up and late complications were observed.

Conclusions: There is insufficient evidence about the best treatment for CoA. There is need for prospective clinical trials comparing with long follow-up where the main outcomes will be analyzed.

SURGICAL OUTCOME OF CHD WITH PH REPAIR IN INFANTS

Hospital of Tashkent Pediatric Medical Insitute, Tashkent

Objective: Congenital heart diseases with large left-to-right shunt often have signs of pulmonary artery hypertension. It is an important determinant of morbidity and mortality in patients without educate surgical treatment especially in infants.

Methods: Ninety patients with congenital cardiac septal defects and pulmonary arterial hypertension had been operated to close their septal defects. All the patients have been checked by Chest X-ray, EchoCG, ECG, selectively performed the cardiac catheterization and lung biopsy. Before and after surgery all the patiens had the medical treatment by vasodilatators, glycosides and diuretics selectively. Before and after surgery the PA pressure was compared to systemic by needle puncture measurement.

Results: All the patients received the surgical repair: 12 patients had received the Pa banding and later total correction; 7 patients underwent valved patch repair for the septal defect closure, and others operated for the complete repair for the CHD. Twenty patients died in the hospital after operation and there were no later deaths in follow-up. Hemodynamic changes after operation included a significant decrease in pulmonary artery pressure (mean pulmonary artery pressure, 28.3 ± 2.4 mm Hg versus 58.45 ± 1.69 mm Hg before repair). The follow-up period was from 3 months to 4 years (mean 1.3 ± 0.6 years).

Conclusion: Studies from developed countries have shown that in term infants, young age is not a risk factor for adverse postoperative outcome after surgical closure of septal left-to-right defects. The data presented in this study shows that operations to close cardiac septal defects in the presence of severe pulmonary hypertension are effective, but must be done during first 6 month.

SURGICAL TREATMENT OF COMPLEX CONGENITAL HEART DISEASE WITH EXTRACARDIAC CONDUIT TOTAL CAVOPULMONARY ANASTOMOSIS

Min Zhao, Liang Bin Pan, Feng Zhu
Su Zhou Kow Loon Hospital, China

Objective: To evaluate the indication, operative technique, and effect of application of extracardiac conduit total cavopulmonary anastomosis (TCPA) in complex congenital heart diseases.

Methods: From Jun. 2006 to Dec. 2007, 5 patients underwent extra cardiac conduit TCPA for complex congenital heart diseases. Among them, 4 had functional univentricle with transposition of the great artery (TGA) and pulmonary artery valve stenosis, 1 had tricuspid atresia with hypoplasia of right ventricle, five cases were performed under cardiopulmonary bypass with general anesthesia and hypothermia.

Results: There was no death. All patients were followed up from 1 to 3 years with no clinical symptoms. The arterial oxygen saturation was 90%~96%, the cardiac function were in NYHA class ?-?.

Conclusions: The extra cardiac conduit TCPA is a simple procedure and superior to other type of Fontan procedure.

TRANSCATETHER CLOSURE OF TRIAL SEPTAL DEFECT BY AMPLAZTER OCCLUDER DEVICES [ASO] IN BENGHAZI CARDIAC CENTER

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Objective: Our study reports the clinical experience and outcome of transcatheter closure of atrial septal defect done in Benghazi Cardiac Center. Significant atrial septal defects are closed surgically or through a transcatheter device, in order to avoid pulmonary hypertension in late life.

Methods: During a 5 years period between December 2004 and December 2009, 68 ASD patients were referred to Benghazi cardiac center for possible transcatheter closure with ASO. Seventeen patients were excluded for TCC, 10/17 patients after TOE evaluation [in which 4 with small defect, 4 with large ASD, 2 with deficient inferior rim], 7/17 after angiographic, balloon sizing and TOE. TCC with ASO done in 51 patients [35 female and 16 male] All procedure carried out under general anesthesia & fluroscopy guide and TOE control .The selected device was 1 to 2 mm larger than the maximum defect size .The physical examination and TTE were performed prior to procedure and follow up [0, 1, 3, 6, 12 months and yearly after].

Result: Patients age between 3.5-61 years, and weight between 15-108 kg, diameter of ASD 6–3.2 mm. Fourty-two patients with single defect, 4 with 2 ASD, (5 with fenestrated ASD). The size of device range 8-34 mm (ASO, PFO and cribriform device).

Conclusion: The Amplatzer septal occluder is an effective ASD transcatheter treatment device Careful and detailed patient evaluation and selection of an ASO of appropriate size are important factors for success and avoidance of complication.The atrial septal aneurysm which is frequently associated with multiple fenestrated defects is not problem for transcatheter closure.

Thoracic & Vascular

ENDOVASCULAR TREATMENT OF A PARAANASTOMOTIC ANEURYSM IN A CASE WITH A PRIOR AORTOBIFEMORAL BYPASS

Orhan Gökalp , Tevfik Güneş,Levent Yılık, İsmail Yürekli, Ufuk Yetkin, Ömer Tetik, Kazım Ergüneş, Ali Gürbüz
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Objective: Aortobifemoral bypass procedure is a common treatment modality with several complications performed in peripheral arterial disease. One of these complications, although rare, is the paraanastomotic aneurysms.

Material and Method: Our case was a 71-year-old male suffering from intermittent claudication for one year. Her past medical history was significant for aortobifemoral bypass surgery 12 years ago due to peripheral arterial disease, obesity, diabetes and smoking. Physical examination revealed that none of the pulses of left lower limb was palpable. All the remaining peripheral pulses were palpable. Intraarterial digital subtraction angiography (DSA) revealed an aneurysm of 4x4 cm of infrarenal abdominal aorta at the level of proximal anastomosis and an occlusion of left leg of ePTFE graft.

Results: Endovascular repair was planned due to previous aortobifemoral surgery and comorbid factors. Thoracoabdominal computed tomography with contrast showed a saccular aneurysm of 3.5 cm at the level of infrarenal abdominal aorta extending for 4.5 cm. Under epidural anesthesia, ePTFE graft was explored through left groin incision, revealing a total occlusion. Right leg of this graft was patent. 7F introducer sheath was inserted through right leg of the graft. A uniiliac endovascular stent graft (Medtronic Talent) of 22x22x79 mm was implanted. The proximal part of the graft was stabilized by fixation balloon. Then, control angiography confirmed that the aneurysm was excluded and there was no endoleak. An 8-mm ePTFE graft from right leg of the graft to left common femoral artery. All the peripheral pulses of lower limbs were palpable postoperatively.

Conclusion: Paraanastomotic aneurysms are rare but life-threatening complications seen after vascular reconstructive surgical procedures. Therefore, urgent treatment is necessary after the diagnosis. The surgical therapy of this type of aneurysms has relatively high mortality and morbidity rates. But, developments in endovascular repair procedures made minimally invasive approaches possible. Moreover, advantages such as easy applicability with local anesthesia, shorter ICU stay and earlier mobilization make us recommend endovascular repair in treatment of such cases.

A LOST FOREIGN BODY FOUND IN LOBECTOMY SPECIMEN AFTER EIGHT YEARS – A RARE CASE REPORT.

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Foreign body aspiration is a common clinical scenario in children though its occurrence in adults is rare though more common in specific clinical settings of advanced age, underlying neurological disorders, poor dentition, alcohol consumption etc. We present a very rare case of aspiration of a nasal ring in a young healthy woman while sleeping. The condition remained undiagnosed, and the patient remained asymptomatic for eight years at which time she developed hemoptysis. CT Chest revealed bronchiectasis which necessitated a right upper lobectomy.

IS SERUM ALUMINUM LEVELS A RISK FACTOR IN THE APPEARANCE OF SPONTANEOUS PNEUMOTHORAX?

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Background: This study aimed to investigate the relationship between aluminum and spontaneous pneumothorax (SP) development.

Materials and Method: A patient and a control group were formed with 100 individuals in each. The serum aluminum levels of the groups were determined and statistically compared.

Results: The mean serum aluminum levels were 5.6 ± 2.4 µg/L (1.6-11.9) and 23.2 ± 15.4 µg/L (2-81) in the control and SP groups respectively ($P < .001$). The specificity and sensitivity of the measurement of aluminum level were 74.4 % and 86.4 % in the SP group. The risk of SP development was found to be 18 times higher in individuals with high serum level of aluminum than in those with low serum level of aluminum.

Conclusion: High level of aluminum is a risk factor for the development of SP.

LOBECTOMY FOR HEMOPTYSIS FOLLOWING CHILI ASPIRATION: A CASE REPORT

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Objective: Red Chili (Capsicum annum L.) is used as a very common ingredient in South Asian cooking. Reported cases of chili aspiration leading to morbidity or mortality in adults are rare. We report a case of a 46yrs old female who had aspirated a piece of chili and presented to us with hemoptysis.

Methods: This patient had a history of aspiration of a chili piece and subsequently developed a sudden onset wheeze. She had undergone fiberoptic bronchoscopy which was normal and treated with bronchodilators and antibiotics. With passage of time she had developed chronic cough with foul smelling sputum and hemoptysis. Chest X Ray showed opacity over right lover lobe and CT scan showed Fibroparanchymal lesion in the lateral basal segment of right lower lobe of the lung. Right Lower Lobectomy was carried out through the Right Mid Axillary Thoracotomy.

Results: Patient was discharged on 6th post operative day with good post operative recovery with no residual symptoms. Histology revealed right lower lobe consolidation, most likely due to a foreign body, without any atypical cells.

Conclusion: Endobronchial foreign bodies like pieces of chili can lead to significant morbidity if not removed in the initial presentation. Fiberoptic bronchoscopy is used to remove the foreign bodies but it can be difficult at times leading to further complications. When a suspected foreign body is not seen on a plain CXR, then a CT scan of the chest must be done to look for other clues. Unsuccessful foreignbody removal via bronchoscope needs surgical intervention.

LOCALIZATION CHARACTERISTICS OF THE CASES WITH CHRONIC TOTAL OCCLUSION OF THE ABDOMINAL AORTA REGARDING THE LEVEL OF RENAL ARTERIES

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Objective: Nearly 10% of patients operated for chronic occlusive aorto-iliac disease have totally occluded abdominal aorta, which also known Leriche syndrome. This chronic abdominal aortic occlusion (CAAO) can extend as far as the renal arteries causing juxtrarenal aortic occlusion which is the case in 50–60% of patients with Leriche syndrome (1). In particular, fundamental argument over the prevalence of proximal thrombus propagation leading to renal and visceral artery occlusion has been a point of ongoing debate (2).

Methods: Twenty consecutive male patients undergoing surgery for chronic totally occluded abdominal aorta between March 2001 and December 2009 were included. All of the patients were male. Mean age was 61.76 ± 8.01 years.

Results: Juxtarenal aorta occlusion occured in six (30%), occlusion of the suprarenal aorta in three (15 %), and occlusion of the infrarenal aorta in eleven patients (55%). In one patient, arteriography demonstrated juxtarenal abdominal

aortic occlusion and left renal artery duplication beside left renal artery stenosis. Aortobifemoral bypass and proximal aortic thromboendarterectomy were performed in all patients. In statistical analyses among evaluated cases, no significant correlation was found between juxta-, supra-, and infrarenal aortic occlusion and coexistence of smoking, diabetes, hyperlipidemia and hypertension ($P > .05$).

Conclusion: Our results indicated that aortic reconstructive surgery is a successful option for the management of chronic totally occluded infra- or juxtarenal abdominal aorta.

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OUR EXPERIENCE OF MODIFIED BENTALL OPERATION FOR ASCENDING AORTIC ANEURYSM WITH AORTIC VALVE DISEASE

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Introduction: The modified Bentall procedure is the surgical repair of ascending aortic or aortic root aneurysm in combination with aortic valve disease. During the procedure, a composite aortic valve graft is used to replace the proximal ascending aorta and aortic valve and both the coronary arteries are implanted onto the graft using the button technique. The purpose of this report is to retrospectively review our early results with modified Bentall procedure.

Patients and Methods: From June 2009 to May 2010, ten patients with ascending aortic or aortic root aneurysm with aortic valvular disease underwent modified Bentall procedure for aortic root replacement using composite valve graft. In one patient the native aortic valve was competent and was preserved.

Results: There were no intra-operative mortality and one patient was re-explored for postoperative bleed. The mean duration of ventilatory support and ICU stay was 1.5 ± 1 day and 3 ± 1 day respectively. One patient (10%) died on the fourth postoperative day, due to postoperative thromboembolism. The mean duration of hospital stay was 11 ± 4 days (range, 7 to 15 days). Patients were followed up for 2 to 11 months postoperatively and no complications were detected. All patients were in NYHA Class I on follow up.

Conclusions: Composite valve graft replacement of the aortic root by modified Bentall technique carries low morbidity and mortality and produces excellent results. It currently remains the treatment of choice for aneurysm of ascending aorta or root with aortic valve disease.

REPAIR OF A GIANT PSEUDOANEURYSM AT THE VENOUS COMPONENT SIDE OF THE RIGHT FEMORAL ARTERIOVENOUS ACCESS GRAFT PROVIDING THE GRAFT CONTINUITY

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Objective: Arteriovenous fistula formation facilitates the application of hemodialysis in patients with chronic renal failure and increases the quality of life of the patient. The basic need for long-term hemodialysis program is a good functioning vascular access.

Materials and Methods: Our case was a 29-year-old male. He was under continuous hemodialysis program for 6 years. An access graft was inserted between his right femoral artery and vein 4 years ago at our institution. Although his graft was functioning well, he was suffering from worsening symptoms of swelling and pain in his right groin region. Intraarterial digital subtraction angiography revealed a giant pseudoaneurysm at the venous component side of the right femoral arteriovenous access graft.

Results: During the operation, arterial and venous origins of the access graft were explored and suspended first. Cutaneous projection of the pseudoaneurysmal sac was then cut and the sac was identified. After the resection of the sac, the continuity of the access graft was provided by interposition of an 8-mm polytetrafluoroethylene (Gore-tex) graft. The postoperative period was event-free and he was discharged on 4th postoperative day.

Conclusion: Angiographic investigation methods are gold standard for vascular access in hemodialysis. If possible, partial resection of the aneurysm protects the fistula. Moreover, switching the puncture sites continuously would help avoiding this complication.

SUCCESSFUL RE-REPAIR OF PECTUS EXCAVATUM RECURRING 7 YEARS AFTER FIRST REPAIR

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Objective: The most common congenital anterior chest wall deformity is pectus excavatum. Due to psychological and cosmetic disturbances, this pathology is recently well corrected.

Materials and Methods: Our case was a 29-year-old male. His past medical history was significant for modified Ravitch operation he underwent 7 years ago due to pectus excavatum. He was under follow-up of Psychiatry Department due to schizophrenia. He was suffering from recurrence of pectus excavatum deformity, feeling of pressure in the chest and chest pain for the last one year. After investigations, he was hospitalized for reoperation.

Results: Under general anesthesia, a limited median thoracic incision was made on the previous incision scar. Pectoral muscles were separated laterally with blunt and sharp dissection to expose the deformed cartilaginous part of thoracic cage. The attachments of rectus abdominis muscle to the inferior ribs were disrupted for a better surgical exposure. It was observed that this recurrence was originated from depression of the cartilaginous rib cage into

the thoracic cavity. Deformed inferior ribs were resected via subperichondrial dissection. Xiphoid process was also resected. Then a retrosternal Hemovac® drainage system was placed. Since the pleural cavities were entered, one chest tube into each cavity was inserted. In order to obtain a sternal fixation during the early postoperative period, retrosternal criss-cross Kirschner wires were inserted. These wires were removed on 15th postoperative day. In the 2nd month follow-up visit it was detected that the deformity was totally corrected and the sternum was stabilized.

Conclusion: The up-to-date treatment protocol in case of recurrent pectus excavatum deformity is surgical re-repair. Thus, the normal position of the sternum may be provided with satisfactory cosmetic results.

THE POSSIBILITY TO PERFORM THORACOTOMY IN LATE POSTTRAUMATIC GASTROTHORAX BASED ONLY ON HISTORY AND CLINICAL EXAM

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Introduction: Due to possible severe complications, posttraumatic gastrothorax must be surgically corrected as soon as the diagnosis is reached.

Aims: We tried to demonstrate that a thorough history and clinical exam can lead to the right diagnosis and consequently to the right surgical attitude in gastrothorax cases.

Methods: We retrospectively analyzed all cases with viscerothorax (6) admitted to our department over a 6 years period (2002 – 2007). Four of them were gastrothorax. All the cases were clinically examined and at least one chest X-ray was taken, with 3 of them having a CT scan performed.

Results: The diagnosis based on history (2 minimal stab wounds, 1 polytrauma three years before, 1 difficult nephrectomy two years before) and clinical exam matched the post surgical diagnosis. In one case (difficult nephrectomy two years before) the radiologic interpretation led to a wrong diagnosis of tension pneumothorax (even though the history and clinical exam was significant for gastrothorax) and a chest tube was inserted with consecutive gastric perforation and leakage of gastric content. Promptly recognized, thoracotomy was performed like in all the other cases.

Conclusions: It is difficult to diagnose a late gastrothorax when the traumatic event happened years ago and you base your diagnosis more on the radiological studies than on history and clinical exam. A careful history focusing on possible past traumas and a thorough clinical exam can give you the correct diagnosis.

TRACHEOBRONCHIAL AMYLOIDOSIS

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Introduction: Amyloidosis, is a disease characterized by extracellular deposition of fibrillar proteins in organs and tissues. He present in diffuse manner involving organs or located in the airways.

In the latter, May have other presentations: Diffuse - alveolar septal; Lung nodule - single or multiple; Located - tracheobronchial, more frequent of evolution nonbenign.

Objective: A rare case of tracheobronchial amyloidosis with difficult diagnosis and evolution.

Case Report: Patient, age 52, male, diabetic,born in São Paulo, Brazil. Begins the disease, with shortness of breath on exertion, chest pain on the left baseline, wheezing, cough without hemoptysis.

Initially symptomatic treatment for bronchitis and asthma. Chest radiography and computed tomography scan with opacification of the left posterior basal segment and bronchial wall thickening of the left lower lobe.

Laryngotracheobronchoscopy: 11/08/1998 (photos 1 to 4) shows lesion with neoplastic aspect in left lower lobe. Submitted to left thoracotomy on 8/24/1999 for lung biopsy. Frozen section was without malignancy.

Results: The examination of pulmonary and bronchial biopsies with Congo red and polarized light resulted in diagnosis of amyloidosis.

Conclusions: Disease with long definition difficulties, diagnostic errors, inappropriate use of resources.

Symptomatic treatment, with worsening of stenosis, mediastinal shift.

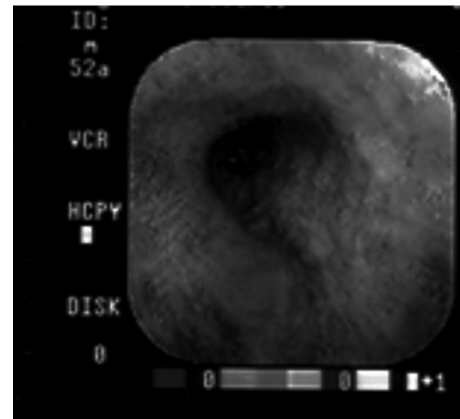

Figure 1. Right main bronchus

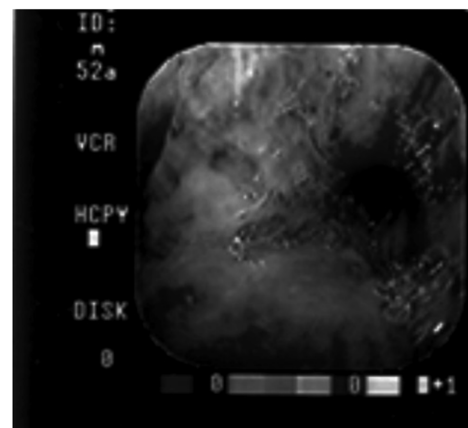

Figure 2. Left lower lobe

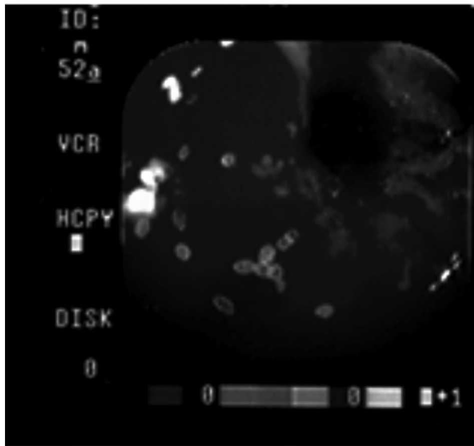

Figure 3. Lesion

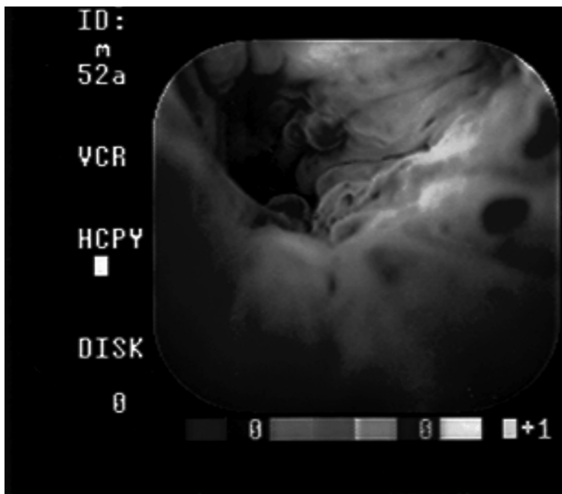

Figure 4. Lesion