

Frequency of Diabetes Mellitus, Impaired Oral Glucose Tolerance Test, Hepatitis B Surface Antibody (HCV Ab) in Saudi Population Undergoing Cataract Surgery

Khawaja Khalid Shoaib, Amjad Ali Khan, Adnan Qadir

Pak J Ophthalmol 2008, Vol. 24 No. 1

.....
See end of article for
authors affiliations

.....
Correspondence to:
Khawaja Khalid Shoaib
Eye Specialist
CMH, Kharian Cantt.

Received for publication
July' 2007
.....

Purpose: To assess the frequency of diabetes mellitus and serological markers of viral hepatitis in Saudi Arabian patients undergoing cataract surgery.

Material and Methods: The medical records of all the patients who had undergone cataract surgery during the two years period extending from 2002 to 2003 at the ophthalmology unit of Najran Armed Forces Hospital Programme (NAFHP), Kingdom of Saudi Arabia (KSA) were retrieved and records of 80 randomly selected patients were analyzed to find the frequency of diabetes mellitus (DM), impaired oral glucose tolerance test (IGT), hepatitis B surface Antigen (HBsAg) and antibody to hepatitis C (anti HCV).

Results: The patients ranged in age from 44 to 93 years (mean: 72 years). They comprised of 45 males and 35 females. 12.5% patients were having IGT while 25% patients were diabetic. Of all the diabetic patients, 70% were known diabetics whereas 30% were newly diagnosed. HBsAg was present in 2.5% of patients whereas HCV Ab was detectable in 5.2% of cases.

Conclusion: Cataract patients should undergo preoperative laboratory investigations to reveal any undiagnosed prevalent conditions like DM/IGT and viral hepatitis, as hyperglycemia is a known etiological factor for infections and affects wound healing, whereas viral hepatitis can be transmitted to the surgeon or the paramedical staff.

Cataract surgery is an elective procedure in most of the cases, thus the eye surgeon has got time at his hands in order to detect and eliminate or control all important medical conditions like hypertension, asthma and DM that can produce pre or post operative difficulties. The risk of developing cataract is more in diabetics than in non diabetics. Retinal assessment is required for diabetic cataract patients, so that the surgeon can weigh the

probable results of the cataract surgery and apprise the patient of the probable outcome. Presence of serological markers for hepatitis makes the staff extra vigilant while dealing with such patients so as to avoid acquiring the infection. Secondly it eliminates the responsibility of transmitting the disease in positive case from the medico legal point of view; this is in fact true for every type of surgery.

MATERIAL AND METHODS

The medical records of all the patients who had undergone cataract surgery during the two year period extending from 2002 to 2003 at the ophthalmology unit of Najran Armed Forces Hospital programme (NAFHP), Kingdom of Saudi Arabia (KSA) were retrieved. Records of 80 randomly selected were analyzed to find the frequency of diabetes mellitus (DM), impaired oral glucose tolerance test (IGT), hepatitis B surface antigen (HBsAg) and antibody to hepatitis C virus (HCV Ab).

Only the Saudi patients were included in the study. Cataracts resulting from penetrating injuries were excluded. Finally 80 patients were randomly selected from the remaining operated patients. Plasma glucose levels were. The Diabetes Expert Committee Criteria for evaluating the standard oral glucose tolerance test were followed (Table 1)¹. If fasting glucose was more than 110 mg/dl, the test was repeated and if the result was the same, glucose tolerance test was carried out with 75 grams glucose. HBsAg was detected by using HBsAg EIA II Qualitative tests and antibodies to HCV were detected by using Anti-HCV EIA II Qualitative test.

RESULTS

A total of 80 randomly selected Saudi patients were included in the study. The patients ranged in age from 44 to 93 years (mean: 72 years). They comprised of 45 males and 35 females. Three (6.7%) out of 45 males had IGT while 12 (26.7%) males had DM. Seven (20%) out of 35 females had IGT while 8 (22.9%) females had DM (Table 2).

Ten (12.5%) patients had impaired glucose tolerance test, 2 (20%) patients out of these 10 had been diagnosed previously while 8 (80%) patients were diagnosed during preoperative laboratory investigations.

Twenty (25%) patients were diabetic, 14 (70% of diabetics) were known diabetics and 6 (30% of diabetics) were newly diagnosed i.e. cases who did not have any history of diabetes but were declared diabetic on performing the preoperative investigations (Table 3). In presenile cataract (age 30 – 50 years) only 1 (16.7%) patient had IGT and 1 (33%) had DM.

HBsAg was present in 2 (2.5%) patients out of 80 and anti HCV antibodies were detectable in 4 (5.2%) patients out of 77.

DISCUSSION

Najran is a small city in the southern region of KSA and the operated cases were mostly retired army personnel, their wives or dependent parents of the serving soldiers so most of our patients can be considered to represent rural with low/modest income group.

The risk of developing cataract is more in diabetics than in non-diabetics, moreover cataract formation and its rate of progression depends upon duration of diabetes.² High glucose concentration in the aqueous leads to increased intracellular accumulation of glucose, which saturates the normal anaerobic glycolytic pathways. Accordingly the polyol pathway is unregulated via aldose reductase, and polyols accumulate in the cells, thereby increasing the osmotic drag of water into the cell. Activation of the osmoreceptor aquaporin O (MIP 26) is then induced. This causes dysregulation of cellular metabolism, with reduction in the levels of cellular ATP and glutathione. It results in secondary damage to the cell. In addition, the increased water content of the cell causes phase separation between proteins rich and protein poor regions of the cells and increased light scatter i.e. cataract³.

Table I. Diabetes expert committee criteria for evaluating IGT and DM.

	Normal	Impaired glucose tolerance	DM
Fasting	< 110	110-125	≥ 26
2 Hours after glucose load (mg/dl)	< 140	≥140 < 200	≥ 200

Table 2. Frequency of IGT and DM

	IGT (%)	DM (%)
Males	6.7	26.7
Females	20	22.9
Total	12.5	25

Table 3. Newly or previously diagnosed cases.

	IGT (%)	DM (%)
--	---------	--------

Newly Diagnosed	80	30
Previously Diagnosed	20	70

Hyperglycemia has been shown to impair the phagocytic function (leading to reduced resistance to infection) and wound healing.⁴ Infections in persons with diabetes may not occur more frequently than in non diabetics but they tend to be more severe, possibly because of impaired leukocyte function, a frequent accompaniment of poor diabetic control.⁵

The best-known predictor of postoperative success is the preoperative severity of retinopathy.⁶ Diabetic patient is more prone to have corneal abrasions, glaucoma, optic neuropathy and cranial nerves neuropathy. Anterior segment complications are more common in diabetics like neovascularization of iris, pupillary block, posterior synechiae, pigmented precipitates on the implant and severe iritis⁷. Posterior segment complications of diabetes include macular edema and ischemia, proliferative retinopathy, vitreous hemorrhage and retinal detachment.

In our study the frequency of DM in males (26.7%) and in females (22.9%) was higher than prevalence found in other community based studies (e.g. M: F, 8.5:19.5 in >35 years of age)⁸. The reason for this high prevalence seems to be additive effect of diabetes mellitus and advancing age for development of cataract. The community based studies include all age groups (both healthy and diseased population) whereas all our patients (presenting with cataract) were above 44 years of age. Moreover DM is one of the known etiological factors for cataract formation. So it can be said that frequency concluded in our study is for a certain age group or disease entity and not representative of the whole community. As the prevalence of diabetes mellitus increases with advanced age^{9,10}, higher income¹⁰ and urban population⁹, we expect the prevalence to be still higher in urban, high-income cataract patients.

30 % of diabetics and 80% of IGT were newly diagnosed in our study confirming the fact that a significant proportion of the patients were not aware of their disease (in some studies 65% of diabetic patients)⁹.

In our study, frequency of IGT was more in the females (20.9%) than males (6.7%) while frequency of DM was almost the same in the two sexes. The

reported sex prevalence has been variable. Slightly higher prevalence in females has been noted⁹, some noted prevalence double than the males^{10,11} and still others claimed more than the double⁸. Higher prevalence of DM in the males has also been reported¹².

In presenile cataract patients (age: 30-50 years), only 1(16.7%) patient had IGT and 2(33%) patients had DM, while in another study 20% had DM and 42% IGT¹³.

Asia and Africa have previously been classified as areas of high endemicity for hepatitis B virus (HBV). Amongst the Middle Eastern countries, areas of low endemicity are Bahrain, Iran, Israel and Kuwait. Intermediate endemicity is found in Cyprus, Iraq and United Arab Emirates. The countries of high endemicity include Egypt, Jordan, Oman, Palestine, Yemen and Saudi Arabia. As all these countries reach a large proportion of their population with hepatitis B vaccination, therefore the infection rate is reducing, particularly in Saudi Arabia¹⁴.

In our study, HBsAg was positive in 2 (2.5%) out of 80 patients. It is less than observed figure in drug dependent patients in Jeddah (6.7%) in non intravenous and 18.5% in intravenous users¹⁵. HCV Ab was detectable in 4 (5.2%) patients out of 77, close to the finding of 5.9% in Jeddah¹⁶ but more than the finding of 1.7% in blood donors¹⁷ and less than the figure of 68% in dialysis patients¹⁸. It was interesting to find higher frequency of HCV than HBC in our study while in blood bank of Qaseem, Saudi Arabia, higher prevalence of Hepatitis B than C was found¹⁹. This could be due to large number of patients included in their study and the observation that HCV positivity is seen more frequently in otherwise healthy individuals above 45 years of age²⁰. Testing for HB core antibody (Ab) and for HCV by nucleic acid testing is likely to reveal more positive cases as has been observed by others^{21,22}. The prevalence of hepatitis B core antibody positive donor was significantly higher in non - Saudi (41.3%) compared with Saudi nationals (16.7%)²². Anti-HCV prevalence has been found to be more in Egyptians than Saudis^{16, 17} while less in Asian¹⁵. Male medical staff was found to have increased prevalence of HBV than medical students but same prevalence of HCV was observed in the two groups²³. Thus vaccination of medical staff has a definitive role in preventing the infection.

Author's affiliation

Lt. Col. Khawaja Khalid Shoab
Eye Specialist
CMH, Kharian Cantt

Amjad Ali Khan
Najran Armed Forces Hospital Programmed (NAFHP)
Kingdom of Saudi Arabia (KSA)

Adnan Qadir
Najran Armed Forces Hospital Programmed (NAFHP)
Kingdom of Saudi Arabia (KSA)

REFERENCE

1. **Masharani U, Karam JH.** Diabetes Mellitus & hypoglycemia. In: Lawrence M. Tierney, Jr., Stephen, J. McPhee, Maxine A. Papadakis, editors. *Current Medical Diagnosis & Treatment*, 41st edition. Lange Medical Books/McGraw-Hill. 2002: 1203-44.
2. **Chitkara DK.** Cataract formation mechanisms, In: Myron Yanoff. Jay S Duker editors. *Ophthalmology*, Mosby. 1999: 4.8. 1-4.8.8.
3. **Forrester JV, Dick AD, McMenemy PG, Lee WR.** editors. *Biochemistry and Cell Biology. The Eye Basic Sciences in Practice*. Second edition. W.B. Saunders, 2002, 155-222.
4. **Frier BM, Truswell AS, Shepherd J, et al.** Diabetes Mellitus & nutritional & Metabolic disorders, In: Christopher Haslett, Edwin R. Chilvers, John ctice of Medicine, Churchill Livingstone, London 1999: 471-542.
5. **Daniel W.** Foster, Diabetes Mellitus, In: Anthony S. Fauci, Eugene Braunwald, Kurt J. Isselbacher, Jean D. Wilson, Joseph B. Martin, Dennis L. Kasper, Stephen L. Hauser, Dan L. Longo, editors. *Harrison's principles of Internal Medicine*; Vol.2 International edition, Mc Gray Hill. 1998; 2060-81.
6. **Hykin PG, Gregson RMC, Stevens JD,** et al. Extracapsular cataract extraction in proliferative diabetic retinopathy. *Ophthalmology*.199; 100: 394-9.
7. **Benson WE.** Diabetic Retinopathy. In: Myron Yanoff, Jay S Duker, editors. *ophthalmology*, Mosby,1999: 8.20 1-8.20.10.
8. **Karim A, Ogbeido DO, Siddique S, et al.** Prevalence of Diabetes Mellitus in a Saudi community. *Saudi Med J* 2000; 21: 438-42.
9. **Al-Nuaim AR.** Prevalence of glucose intolerance in urban and rural communities in Saudi Arabia. *Diabet Med*. 1997; 7: 595-602.
10. **Bacchus RA, Bell JL, Madkour M, et al.** The prevalence of diabetes mellitus in male Saudi Arabs. *Diabetologia* 1982; 23: 330-2.
11. **Fatani HH, Mira SA, el-Zubier AG.** Prevalence of diabetes mellitus in rural Saudi Arabia. *Diabetes Care*. 1987; 10: 180-3.
12. **Warsy AS, el-Hazmi MA.** Diabetes Mellitus, Hypertension and obesity common multifactorial disorders in Saudis. *East Mediterr Health J*. 1999; 5: 1236-42.
13. **Al Sammarrai AR.** The role of impaired glucose tolerance in patients with idiopathic presenile cataract in Kuwait. *Saudi Bulletin of Ophthalmology*. 1988; 3:208-9.
14. **Andre F.** Hepatitis B epidemiology in Asia, the Middle East and Africa. *Vaccine* 2000; 18: 20-2.
15. **Njoh J.** The prevalence of hepatitis B surface antigen (HBsAg) among drug dependent patients in Heddah, Saudi Arabia. *East Afr Med J*.1995 Mar; 72(3): 198-9.
16. **Fakeeh M, Zaki AM.** Hepatitis C: prevalence and common genotypes among ethnic groups in Jeddah, Saudi Arabia. *Am J Trop Med Hyg*. 1999; 61: 889-92.
17. **Abdelaal M, Rowbottom D, Zawawi T, et al.** Epidemiology of hepatitis C virus: a study of male blood donors in Saudi Arabia. *Transfusion*. 1994; 34: 135.
18. **Huraib S, al-Rashed R, Aldrees A, et al.** High prevalence of and risk factors for hepatitis C in haemodialysis patients in Saudi Arabia, a need for new dialysis strategies. *Nephrol Dial Transplant*. 1995; 10: 470-4.
19. **Mehdi SR, Pophali A, Al-Abdul Rahim KA.** Prevalence of hepatitis B and C and blood donors. *Saudi Med J*. 2000;21:942-4.
20. **Daw MA, Elkaber MA, Drah AM, et al.** Prevalence of hepatitis C virus antibodies among different populations of relative & attributable risk. *Saudi Med J*. 2002; 23: 1356-61.
21. **Akhter J, Roberts GT, Perry A, et al.** Use of nucleic acid testing for blood donor screening of human immunodeficiency virus and hepatitis C virus in the Saudi population. *Saudi Med J*. 2001; 22: 1073-5.
22. **Al-Sebayel MI, Khalaf HA, Ramirez CG.** The prevalence of hepatitis B core antibody positivity in donors for liver transplantation in Saudi Arabia. *Saudi Med J*. 2002; 23: 298-300.
23. **Al-Sohaibani MO, al-Sheikh EH, al-Ballal SJ, et al.** Occupational risk of hepatitis B and C infections in Saudi medical staff. *J Hosp Infect*. 1995; 31: 143-7.