Calcified mitral subannular left ventricular aneurysm

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Abstract

Mitral subannular left ventricular aneurysms are not frequently seen, and those described have occurred mostly in Africa and India. This condition is rare in the Caucasian population.

In this case report we describe a mitral subannular left ventricular aneurysm which was calcified, in a pregnant, HIV-positive African woman.

This condition should be suspected in patients of African or Indian descent presenting with mitral incompetence and a localised bulge and ring calcification on the left cardiac border on a chest radiograph.

Case report

A 33-year-old African woman presented with pain in the left arm, dyspnoea, and chest pain. She was 24 weeks pregnant and was sent for a chest X-ray by the antenatal clinic, with the history of cardiac disease in pregnancy. The chest X-ray (Figs 1a + b) showed an enlarged heart with a mitralised configuration as well as a large left atrium extending past the right cardiac border on the PA view.

A calcified ring (AP 4 cm x TV 5 cm x HT 4 cm) suggestive of an aneurysm of the left ventricle in the region of the mitral valve was also present. The left main bronchus was displaced posteriorly due to the enlarged left atrium.

The lung fields showed early pulmonary venous congestion.

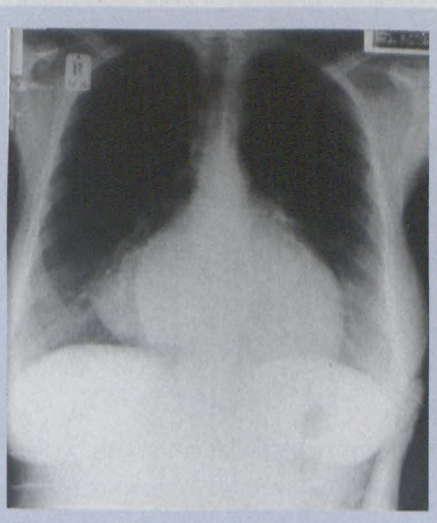

Fig. 1A. PA view of the chest.

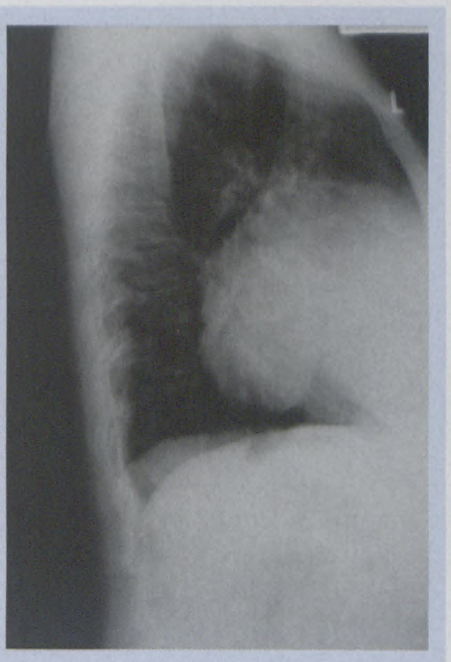

Fig. 1B. Lateral view of the chest.

The patient then had a cardiac sonar (Fig. 2) which showed severe left atrial dilatation and mitral imcompetence. The left ventricular walls were normal but the left ventricular function was low.

The right atrium and right ventricle were normal and a small tricuspid incompetence was present.

There was a 4 x 3 cm well-outlined hypoechoic area protruding into the left atrium just below the posterior mitral leaflet. There was a connection between this area and the left ventricle.

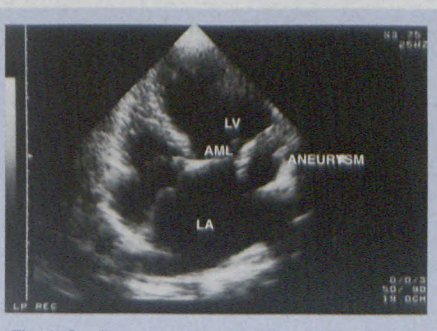

Fig. 2. Cardiac sonar demonstrating the relationship of the aneurysm arising just below the posterior mitral valve leaflet.

This was considered to be a mitral subvalvular LV aneurysm protruding into the left atrium. The walls of the aneurysm were calcified.

Laboratory investigations

Laboratory investigations included the following: (*i*) serology for syphilis (negative) (*ii*) blood culture for anaerobic organisms (negative); (*iii*) rheumatoid factor 10.6 (normal 0.0 - 15.0 IU/ml); (*iv*) ASO titre 184.0 (0.0 - 200 IU/ml); (*v*) an HIV test (positive); and (*vi*) a sputum investigation, which showed no growth.

The patient was referred to the cardiothoracic surgeons whose preoperative diagnosis was chronic rheumatic endocarditis with mitral stenosis/incompetence and pulmonary hypertension.

At operation the mitral valve was replaced by a Sorin prosthesis, and the mitral valve aneurysm was repaired.

Pathological report

The pathological specimen included the anterior leaflet of the mitral valve and a single calcified nodule measuring 8 x 5 x 2 mm as well as multiple calcified fragments of the mitral valve and mitral valve ring tissue.

Histological examination showed multiple valve leaflet fragments with areas of nodular fibrosis, dystrophic calcification, as well as focal neovascularisation.

There were areas of ossification with marrow elements present.

The aneurysm as such could not be identified with certainty, but fragments probably of the wall of the aneurysm were present.

The final pathological diagnosis was late-phase rheumatic valvulitis.

Postoperative follow-up

Five days after operation the patient delivered a premature baby who died 9 days later.

The patient was dyspnoeic and received Lasix.

Chest X-ray (Fig. 3) still showed cardiomegaly, residual calcified aneurysm and the prosthetic mitral valve.

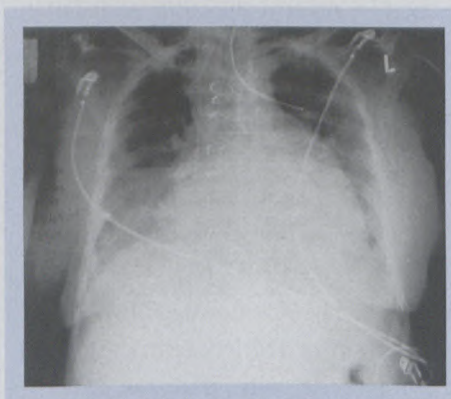

Fig. 3. Immediate postoperative supine view of the chest. Relationship of mitral valve prosthesis to residual calcified aneurysm. Postoperative lung changes present.

Seven weeks later the patient was seen in casualty with cardiovascular collapse and a GCS of 3/15. A heart sonar was done which showed no life-threatening abnormality. The international normalised ratio (INR) was 15 (therapeutic range 2 - 4.5) and as she was on anticoagulant therapy a cerebral haemorrhage was suspected. However the patient died before a brain scan could be done in spite of intensive resuscitation.

Discussion

Ventricular aneurysms can be classified as congenital or acquired. The congenital type, seldom with any obvious aetiology, may affect any part of the heart.

The acquired type may result from myocardial infarction, TB, syphilis, rheumatic fever, collagen vascular disease, Takayasu's arteritis, mycotic emboli, myocarditis or trauma.

The majority of ventricular aneurysms occur secondary to atherosclerosis of the coronary arteries.

When the aneurysm is not attributed to ischaemic heart disease, syphilis has been noted as the next most common cause.

In our case the cause was rheumatic fever.

One previous case seen last year by the sonar department was due to syphilis. The clinical presentation varies. Heart failure may present as acute pulmonary oedema or when murmurs of MI are present it may mimic heart failure seen in chronic rheumatic heart disease. Chest pain may be due to stretching of the pericardium or coronary insufficiency.

Left ventricular aneurysms of the annular subvalvular type were described in the literature before 1962, when Abrahams introduced the term 'annular subvalvular left ventricular aneurysm' for this unusual type arising in the fibrous rings below the mitral or aortic valves.

The submitral type is more common than the subaortic type.

Submitral aneurysms occur in the epicardium related to the base of the left ventricle. They have ovoid ostia which are frequently multiple and located under the posterior leaflet of the mitral valve.

The aneurysms are of the false type and may frequently reach enormous proportions.

They may be calcified or contain

mural thrombus. When the aneurysm walls are thin, rupture may occur.

In contrast to the anterior leaflet of the mitral valve, which has fibrous continuity with the aortic root, the posterior mitral leaflet is attached to the myocardium of the left ventricle by the fibrous tissue of the mitral ring. It is this region where the ostia of submitral aneurysms occur, and here the mitral ring is directly related to the epicardium of the atrioventricular groove.

Sections through this leaflet and the ring reveal that the epicardium in this region contains abundant fat as well as the circumflex coronary artery and the coronary sinus.

Imaging

1. A chest radiograph may suggest the diagnosis of the submitral type. Characteristically there is a bulge on the left cardiac border, the size and shape depending on the size and position of the aneurysm. It may also show partial or total calcification.

2. On fluoroscopy it can be seen to pulsate.

3. Cardiac sonography is used for the detection, confirmation and assessment of the submitral type.

4. Cardiac catheterisation helps to confirm the diagnosis and locate the origin of the aneurysm and assess the severity of the haemodynamic disturbance.

5. Recently three cases were described in India, using MRI as a modality for diagnosis.

MRI has the unique capability of multiplanar imaging with multiple imaging parameters.

The exact dimensions and extent of the lesion, especially the neck of the aneurysm and the degree of mitral regurgitation, were well seen on gradient echo cine images.

Complications

Complications include myocardial ischaemia and infarction, systemic embolisation, congestive cardiac failure and infective endocarditis as well as rupture of the aneurysm.

Treatment

Surgical resection of the aneurysm with or without valve replacement is indicated in severe valvular regurgitation or cardiac failure resistant to medical therapy.

Summary

Calcified mitral subannular left ventricular aneurysm can be suspected on a chest radiograph when there is a high index of suspicion of this condition in a relevant clinical setting. The purpose of this case report is to familiarise general radiologists with this rare condition which is more known to cardiologists, cardiothoracic surgeons and echocardiographers. Therefore as we say in radiology: 'You only see what you look for and you only recognise what you know.'

Acknowledgement

We would like to thank Annelize Gates for her help in the preparation of this case report.

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