

Disappearance of opening sound of Starr-Edwards mitral valve due to valvular detachment

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Disappearance of the opening sound of a Starr-Edwards prosthetic mitral valve postoperatively led to the diagnosis of detachment of the valve, which was proved by necropsy. Since detachment of prosthetic valves is not rare and can lead to serious complications, one must take into consideration every change regarding the auscultatory and phonocardiographic findings. Disappearance of the Starr-Edwards mitral valve opening sound can be one of the earliest signs which must arouse serious suspicions of valvular detachment.

Disappearance of the opening sound of the mitral valve due to partial detachment of the Starr-Edwards mitral prosthesis has not been reported previously to our knowledge. Early antemortem recognition of this complication is of great importance since it can lead to further laboratory studies and correction of the lesion.

We present the report of a patient in whom the opening sound of the Starr-Edwards mitral valve disappeared a few months after operation due to partial detachment of the prosthetic valve.

Case report

A 37-year-old man entered hospital in June 1968 in heart failure. On admission he appeared dyspnoeic and orthopnoeic. From the clinical examination, cardiac catheterization, and angiocardiology, mitral insufficiency and aortic regurgitation of severe degree were diagnosed. In December 1968 the patient underwent a cardiac operation; both the mitral and aortic valves were grossly incompetent and calcific. Two Starr-Edwards ball valve prostheses were inserted using continuous sutures. The patient made an uneventful recovery and his condition improved considerably for about 4 months, after which he started complaining again of dyspnoea and orthopnoea and felt very tired. On readmission to the hospital he appeared dyspnoeic and orthopnoeic; the jugular veins were distended and the liver was enlarged three fingers below the right costal margin. Jaundice was present for the first time. On auscultation a soft grade 2/6 systolic murmur was heard at the apex and the opening sound of

the mitral valve prosthesis had disappeared. P₂ was loud and was followed by a soft diastolic murmur over the 3rd left interspace. Blood pressure was 120/80 mmHg. The phonocardiogram confirmed the above findings (Fig. 1). On x-rays the heart appeared very enlarged with congestion of the lungs; from the position of the prosthetic mitral valve there was suspicion of detachment. Laboratory tests showed the following: haematocrit 40 per cent; haemoglobin 11.4 g/100 ml; leucocyte count 6700, with normal differential count; platelet count 240,000. Stained films showed a considerable number of fragments of red blood cells and irregular, contracted, deeply stained red blood cells. Serum bilirubin was 3 mg/100 ml; serum iron 38 µg/100 ml. Serum haptoglobins were absent. Direct antiglobulin (Coombs) test was negative and serum transaminases normal. Electrophoresis showed haemoglobin A and F < 1 per cent. Sick cell test was negative. The urine contained urobilinogen, urobilin, and large amounts of haemosiderin.

The clinical impression was that of a detached prosthetic mitral valve which was responsible both for the heart failure and for the haemolysis. The patient refused any further haemodynamic studies and angiocardiology. He left the hospital under digitalis and diuretics; he deteriorated rapidly and three months later he entered another hospital with pulmonary oedema and died shortly after admission. At necropsy the heart was greatly enlarged and weighed 1240 g. The coronary arteries were normal. The left atrium, right atrium, and pulmonary artery were dilated and both ventricles were hypertrophied and dilated. No thrombi were found in the prosthetic valves or the cardiac chambers. The mitral valve was found detached along the left and posterior margins due to suture disruption (Fig. 2). The aortic valve was normal in its position. No evidence of

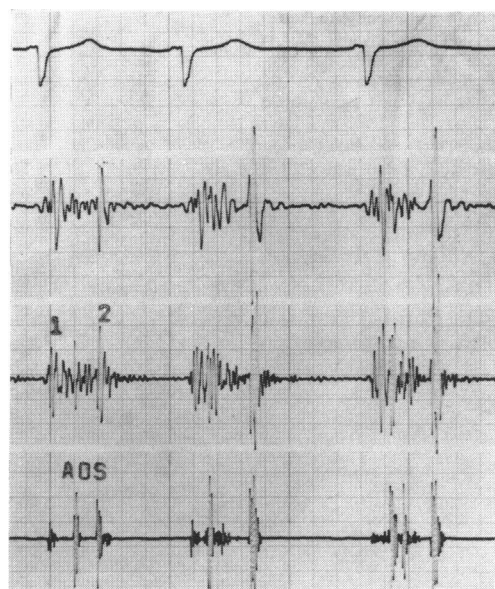


FIG. 1 Phonocardiogram taken at the apex. The opening sound of the mitral prosthetic valve is absent (1, 1st sound; 2, 2nd sound; AOS, aortic opening sound).

physical or chemical changes in the prosthetic valves was noted.

Discussion

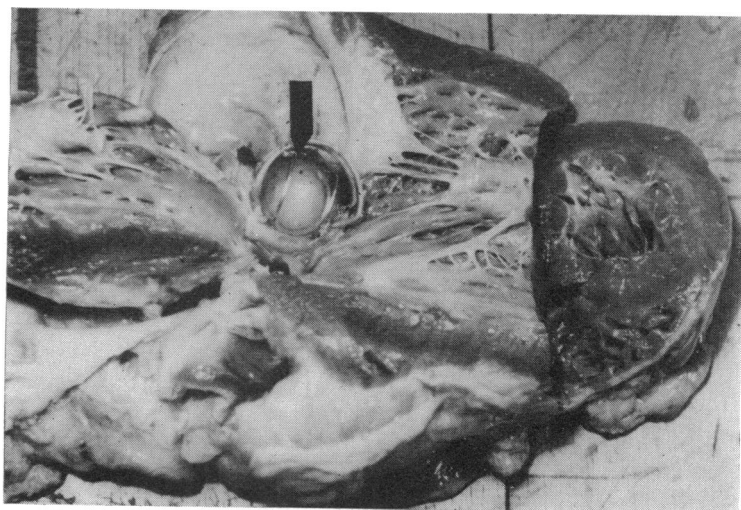
The use of the Starr-Edwards prosthetic valves has helped a great number of patients incapacitated by valvular lesions (Starr, Herr, and Wood, 1967). In spite of newer valves, complications resulting from malfunction of the valve, peripheral emboli, or suture disruption are of great importance with the possibility of correction. Among other diagnostic methods phonocardiography may give valuable information regarding normal function and possible changes in the prosthetic valves, since the mechanisms of the creation of the sounds resulting from a ball and cage valve are known (Starr *et al.*, 1966; Zitnik and Burchell, 1963; Hultgren and Hubis, 1965). In the presence of malfunction of a prosthetic valve changes in the sounds usually take place.

Detachment of a prosthetic valve results from suture disruption, poor preparation of the perivalvular bed or infection, and in our case suture disruption was responsible for the valvular detachment. Mitral valve detachment can lead to reappearance of the systolic murmur at the apex. Signs and symptoms of heart failure appear again or become worse,

and in some cases the paravalvular leak is responsible for haemolysis and jaundice (Yacoub and Keeling, 1968). Our patient had considerable improvement for four months after the operation when he started having symptoms of heart failure and for the first time jaundice appeared. From the clinical examination, a systolic murmur was present at the apex and the opening sound of the prosthetic mitral valve had vanished. No changes regarding the function of the aortic valve were noticed, and the faint diastolic murmur was probably due to functional pulmonary insufficiency. Phonocardiography confirmed these findings and laboratory tests proved the presence of haemolytic anaemia due to destruction of red blood cells.

The auscultatory and phonocardiographic findings of the prosthetic mitral valve are of great importance since they can lead to early detection of valvular malfunction and consequently to further laboratory tests and re-operation on the patient. Decreased intensity of the opening sound is of particular diagnostic value, since usually it is one of the earliest and most important signs of valvular malfunction. Disappearance of the opening sound due to detachment has been reported only for discoid valves (Leachman and Cokkinos, 1969), but to our knowledge not for the Starr-Edwards valve. The responsible mechanism for the loss of the opening sound is that ventricular filling takes place through the perivalvular leak and thus blood flow through the prosthetic valve is insufficient to accelerate

FIG. 2 Partially detached mitral valve prosthesis (arrow).



the ball and strike it to the point of an audible sound.

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Erratum

The article, *The early detection of congenital malformations*, by H. Watson, which appeared in the January issue of this journal (vol. **34**, pages 37-40) contains a fairly major error. Page 38, lines 39-40, left-hand column, should read—'had almost 4 times this number, 27.5/1000, in 1334 stillbirths'.