

Bacterial Endocarditis of the Mitral Valve Treated by Excision and Replacement

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BACTERIAL endocarditis generally is regarded as a contraindication for operation on cardiac valves. Recently, however, reports have appeared^{1, 7, 10} of patients with florid infections of aortic valves being successfully treated by operation.

A case of a middle-aged man who suddenly developed severe mitral regurgitation due to streptococcus endocarditis is reported. The patient responded to valve excision and replacement combined with antibiotic therapy. As far as we know this is the first such case reported.

Case Report

A 57-year-old retired mechanical engineer had been in relatively good health until 6 months prior to hospital admission. At that time he developed urethral discharge for which he received four penicillin injections. Nothing further was known about this discharge except that the patient stated there was no evidence of venereal disease. Four weeks later he started to complain of severe pain involving his neck, both shoulders and left elbow. This pain failed to improve with mild analgesics and salicylates, but responded well to prednisone (30 mg. daily), which he continued to take during the ensuing months. He was known to have had a heart murmur for the previous 3 years.

Three months before hospitalization, the patient suddenly developed exertional dyspnea associated with a hacking, non-productive cough and a feeling of fullness in his chest which subsided with rest. These symptoms became progressively worse and hospitalization was recommended.

On physical examination he was a pale, chronically ill man. Blood pressure was 140/90 mm. Hg. and pulse rate was 88/mm., regular and equal. Rectal temperature was 98.8° F. There was moderate tenderness and restriction of move-

ments in the left shoulder area. The remaining positive findings were confined to the chest.

The heart was enlarged to the left with the apical impulse two fingerbreadths lateral to the mid-clavicular line in the left fifth interspace. There was a strong systolic thrill palpable and a grade IV harsh, pan-systolic murmur audible over the entire precordium with maximum point of intensity at the apex. A soft diastolic murmur was also heard at the apex. There were no signs of congestive heart failure.

X-rays of the chest showed hilar markings somewhat increased and lung fields otherwise clear. There was marked enlargement of the heart, primarily of the left atrium and left ventricle. Electrocardiogram was indicative of left ventricular hypertrophy. Laboratory findings included: WBC, 12,400; HGB, 11.0; hematocrit, 34%; segs, 68; bands, 6; lymphs, 23; mono, 3; urinalysis, occasional white cells; protein, 1+; bleeding time, 30 seconds; clotting time, 8 min.; prothrombin time, 50%; BUN, 14; total protein, 6.1 Gm./100 ml; albumin, 3.3 Gm./100 ml; globulin, 2.8 Gm./100 ml; total blood volume, 4.78 L; electrolyte studies, essentially normal.

Right heart catheterization showed elevated pulmonary wedge pressure (22/18) and elevated pressure in the pulmonary artery (46/26). Left heart catheterization and angiocardiography revealed the left ventricular end-diastolic pressure to be increased to 12 mm. Hg and severe (4+) regurgitation of contrast medium from the chamber of the left ventricle into the left atrium (Fig. 1).

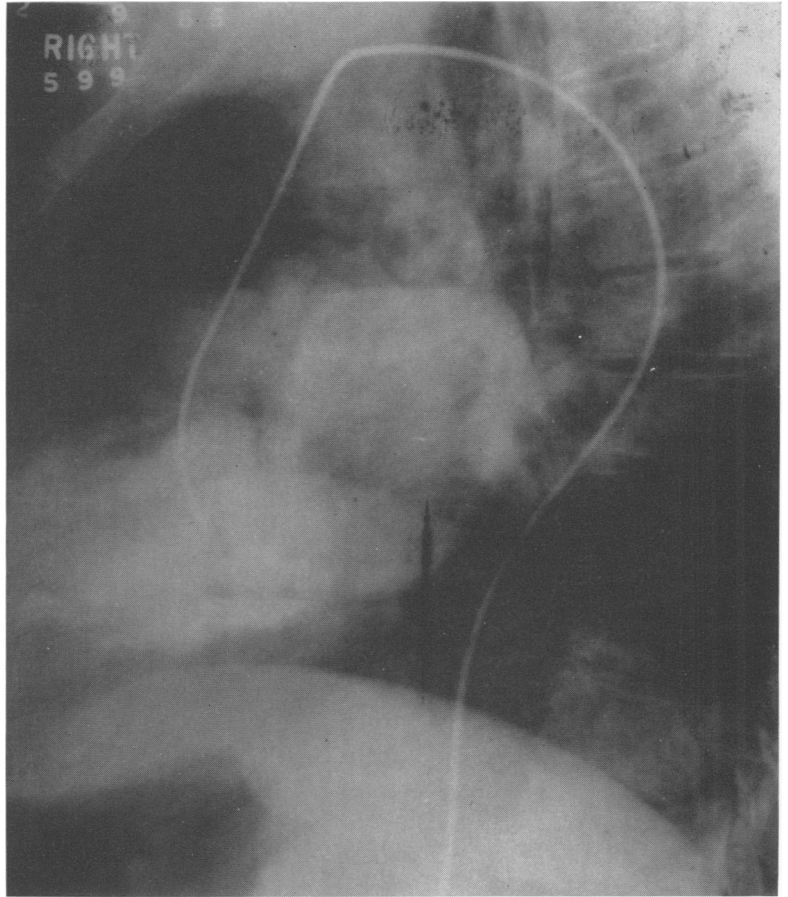
Because of the severity of mitral incompetence and poor response to conservative management, operation was decided upon. While the examinations were performed, the patient did not take prednisone for 2 days. There was an immediate rise in temperature to 101.8° F. which subsided after prednisone was reinstated.

Following routine preparation for open-heart surgery (which included administration of three million units of penicillin and ½ Gm. streptomycin twice daily on the day before the procedure) the mitral valve was exposed to direct vision using cardiopulmonary bypass, normothermic high-flow perfusion and topical cardiac hypothermia.^{5, 6} Again, as a preventive procedure, one million units

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FIG. 1. Catheter angiography. The contrast material injected directly into the cavity of the left ventricle regurgitates in large amounts into the left atrium.



of crystalline penicillin was added to the blood in the oxygenator. The mitral valve was heavily damaged by fungating endocarditis which completely destroyed the posterior leaflet and invaded the lateral segment of the anterior leaflet. This fungating mass occupied a considerable portion of the left atrium and partially occluded the orifice of the left lower pulmonary vein (Fig. 2A). The mitral valve was removed *in toto* and the left atrium was cleared of vegetations by sharp and blunt dissection and by irrigation with saline solution. Following careful removal of the smallest fragments of vegetations, the mitral valve was replaced with a Starr-Edwards prosthesis. (Fig. 2).

Microscopic examination of the removed material revealed severe edema, necrosis and abscess formation in the leaflets of the resected mitral valve (Fig. 3A). The fungating mass was composed of necrotic material containing large colonies of gram-positive cocci (Fig. 3B). On bacterial culture, however, these organisms did not grow, probably due to the antibiotic therapy administered the day before and during the operation.

Immediately after operation the patient received

20 million units of Penicillin intravenously and 1 Gm. Streptomycin intravenously daily for 6 weeks. During this period his temperature remained normal, repeated blood cultures yielded no growth of bacteria and white cell count varied between 7,000 and 11,000. During the first postoperative week he developed a depressive psychotic reaction which cleared gradually. He was discharged the second postoperative week and has been followed since. Now, 16 months following operation, he has no heart murmur or any other signs of heart disease and no symptoms of recurrent infection.

Discussion

Generally it is agreed that antibiotics and supportive therapy constitute the treatment of choice in most instances of bacterial endocarditis.⁹ The concept that infectious endocarditis could be cured by evacuation of vegetations and restoration of normal hemodynamics was first advanced by Kay

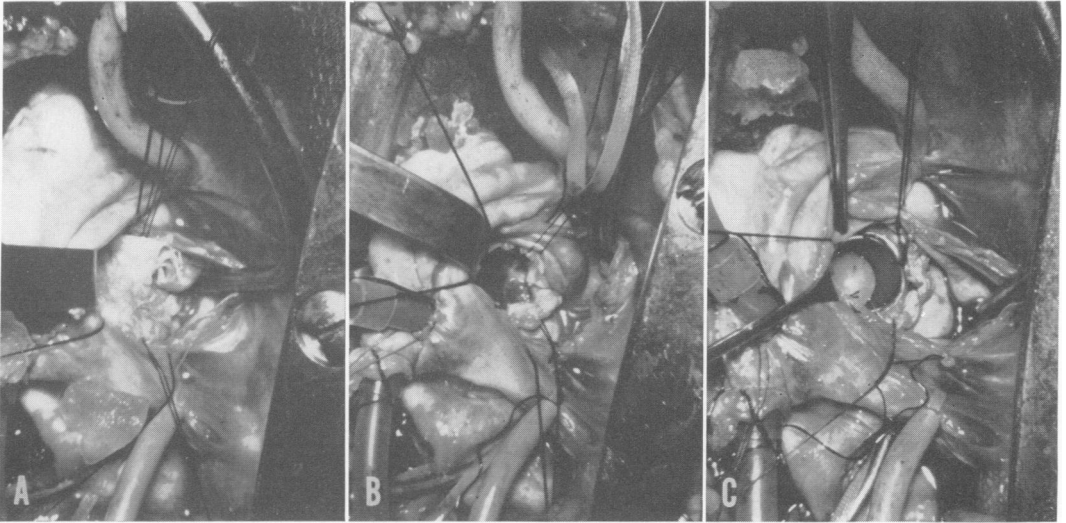


FIG. 2. A) the mitral valve is exposed and the fungating mass partially overlapping the mitral orifice is well visible. B) the mitral orifice with the valve excised and the fungating mass removed. C) the Starr-Edwards valve prosthesis in position.

and associates⁴ in 1961 and later by Durourg and associates³ who successfully treated endocarditis complicating ventricular septal defects.

Operations on severely damaged cardiac valves usually require implantation of a valve-prosthesis. In active bacterial endocarditis, this means leaving material foreign to the body in a potentially infected area, which is against the general principles of surgical practice. Bahnson and associates² demonstrated that any foreign material, even silk sutures, left in the cardiac chambers could lead to persistence of bacterial endocarditis.

Recent experience shows that there should be exceptions to this rule, and if uncontrollable heart failure develops in the course of antibiotic therapy, surgical correction of valvular disease may become urgent. Wallace and Young¹⁰ in 1965 reported a patient who developed aortic insufficiency and congestive heart failure due to *Klebsiella* endocarditis. The patient failed to respond to intensive antibiotic therapy but showed a satisfactory recovery after the aortic valve was excised and replaced with a Starr-Edwards valve pros-

thesis. Experiences similar to theirs were reported by Acar¹ and Scott and associates⁷ who removed the infected aortic valve following a relatively short course of antibiotic therapy in two patients with intractable heart failure.

In our case the operative indication was the sudden development of severe mitral regurgitation and bacterial endocarditis which was undetected until operation. The most likely explanation for the absence of symptoms of bacterial endocarditis is that the patient received large doses of corticosteroids during the preoperative period. Despite the fact that the patient was not treated with antibiotic agents before operation, infection was brought under control, signs of heart failure disappeared, heart size returned to normal and now, 16 months after operation, his condition is satisfactory. This case suggests what has already been proven in aortic valvular disease; in selected instances valve excision and replacement combined with intensive antibiotic therapy provides an effective therapy for bacterial infections of the mitral valve.

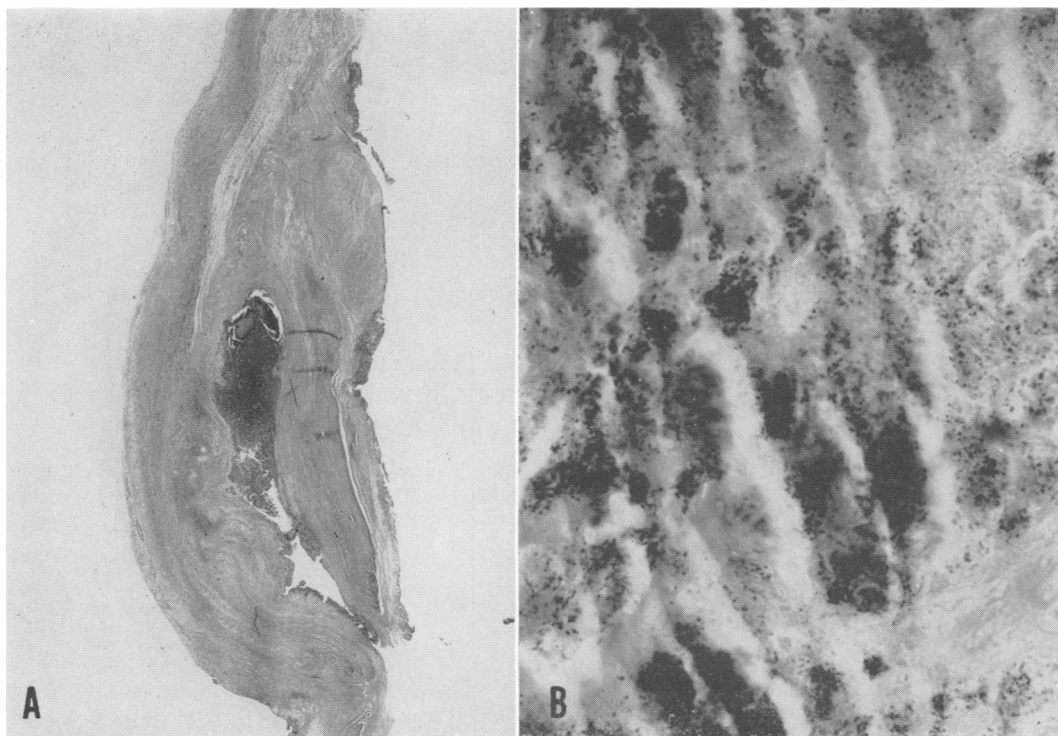


FIG. 3. Histologic picture of the excised mitral valve (A) shows the mitral valve under small magnification. The valve is thickened, edematous, and there is an intra-valvular abscess. Picture (B) shows large colonies of Gram-positive cocci in the vegetation.

Summary

The case of a 57-year-old man who developed severe mitral regurgitation due to acute bacterial endocarditis is reported. At the time of operation the bicuspid valve was severely damaged by endocarditis and the left atrium contained large amounts of bacterial vegetations. Removal of these vegetations, excision of the infected valve and implantation of a Starr-Edwards ball-valve prosthesis was followed by recovery.

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