Aspergillus Endocarditis of Mitral Prosthesis

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Until recently, fungal endocarditis was an uncommon clinical entity, but with the rapidly expanding field of cardiac surgery and the introduction of prosthetic valves, the incidence of mycotic endocarditis is increasing. Fungal endocarditis is usually caused by a species of candida. Cardiac involvement due to other mycoses has been infrequently encountered. Aspergillus endocarditis has been reported in several nonsurgical patients. Newman and Cordell published the first case of aspergillus endocarditis of a mitral valve prosthesis after open heart surgery. Stein et al. mentioned a case of aspergillus endocarditis occurring after prosthetic valve placement. Two fatal cases of aspergillus infection involving a patch prosthesis for closure of ventricular septal defects have been reported by Amoury et al.

Case Report

A 41 year old white businessman was admitted in March 1954 to the Buffalo Veterans Administration Hospital with evidence of mitral stenosis, complicated by subacute bacterial endocarditis due to alpha hemolytic streptococcus. He recovered uneventfully. A closed mitral commissurotomy was performed in October 1954. In September 1965 he began to have atrial fibrillation with a rapid ventricular rate and was readmitted in November 1965 for evaluation.

Preoperative and Operative Course: On physical examination, the pulse was 160/min. and irregular the blood pressure was 120/80 mm. Hg. The heart was slightly enlarged. A mitral regurgitant murmur and an aortic diastolic blowing murmur were audible. The chest roentgenogram revealed a cardiothoracic ratio of 51 per cent. The electrocardiogram showed atrial fibrillation with rapid ventricular response. Cardiac catheterization and cineangiography demonstrated predominant mitral regurgitation, moderate mitral stenosis and mild aortic regurgitation. Pulmonary hypertension was present (64/40 mm. Hg). The cardiac index was 2.8 L./min./M.².

On March 8, 1966, the mitral valve was excised and a Hufnagel disc prosthesis was inserted. The postoperative course was complicated by a wound infection in the groin, due to enterococci. During the postoperative period the patient received penicillin, streptomycin and methicillin for 10 days; thereafter only penicillin was given. Anticoagulants were administered orally with adequate control. He was discharged 28 days after operation.

Clinical Course: Ten days after discharge the patient was readmitted because of rapid atrial fibrillation. The rectal temperature was 100°F. He appeared pale and sallow. The heart rate was 160/min. and irregular. The click of the mitral valve prosthesis was audible; no systolic murmur was heard; an aortic diastolic blowing murmur was audible along the left sternal edge. The hemoglobin was 11.6 gm.%, a drop of 1.6 gm.%, in 10 days. The white blood count was 13,000 per cu. mm. with a differential count of 68 per cent polymorphonuclear leukocytes and 12 per cent band forms.

During the next three days the patient complained of profound weakness, and his temperature rose to 101°F. Petechiae developed on the skin, eyelids and buccal mucosa; splinter hemorrhages and hepatosplenomegaly were noted. Initially he received tetracycline, 1 gm. orally, and penicillin, 1.2 million units intramuscularly daily, after six blood cultures had been obtained. The blood cultures were incubated on blood agar, but not on Sabouraud's medium. The hemoglobin was 11.6 gm.%, a drop of 1.6 gm.%, in 10 days. The white blood count was 13,000 per cu. mm. with a differential count of 68 per cent polymorphonuclear leukocytes and 12 per cent band forms.

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The patient's condition deteriorated, and septic fever and rapid, uncontrollable atrial fibrillation occurred. The click of the mitral prosthesis was heard until a few hours before death, when it became inaudible. The function of the mitral prosthesis could not be assessed fluoroscopically because of its non-opaque construction. During the patient's last 24 hours severe pulmonary congestion developed; his condition did not respond to treatment, and he died eight days after admission.

Autopsy: The heart was dilated, and petechiae were present over its surface. The thickness of the left ventricular wall was 14 mm., and that of the right ventricle was 5 mm. The left atrium was markedly dilated and filled with recent and old thrombi. A large thrombus virtually obliterated the Hufnagel disc prosthesis in the mitral valve area. The valve orifice was narrowed to 50 per cent on the ventricular side and was almost completely obstructed on the atrial side. The thrombus on the atrial side was dark red, and appeared to be of more recent origin than that on the ventricular side, which appeared yellowish (Fig. 1 and 2).

Microscopic examination of the thrombus (Fig. 3) revealed a dense, felt-like fungus growth, composed of many thick mycelia which were branching and septate. The culture of the thrombus showed a predominance of Aspergillus fumigatus and a small growth of Candida albicans. The edges of the aortic valve showed fibrous thickening. A few microscopic abscesses were seen in the myocardium, but no fungi were observed.

The lungs, liver and spleen were severely congested. A few microabscesses were observed in the liver, spleen and the kidney. Fungal mycelia were demonstrated microscopically in the spleen only.

Discussion

Organisms of the genus aspergillus are widely distributed in nature and are considered non-pathogenic for man. They grow frequently and abundantly as saprophytes on decaying vegetation. In man, A. fumigatus is the usual agent of disease, which in most cases affects the lung. Debilitating diseases, which reduce host resistance, and the use of antibiotics, which may interfere with the normal bacterial flora, encourage growth of fungi. Patients undergoing cardiac surgery have lowered resistance to infection and are frequently treated with prophylactic antibiotics.

In such patients infection may occur during cardiac catheterization or cardiac surgery through the pump-oxygenator, or by contamination of prosthetic valves and suture materials. After cardiac surgery, the development of chills and fever should alert the physician to the possibility of endocarditis, and frequent blood cultures should be obtained. Special media for fungal cultures, such as Sabouraud's medium, as well as blood agar, should be employed. The clinical distinction between bacterial and mycotic infection is extremely difficult.

Treatment of fungal endocarditis has been unsatisfactory. Iodides have been disappointing in disseminated aspergillus infections, but the beneficial effect of this drug on disseminated aspergillus infection has not been reported.

Refractory candida endocarditis has been treated successfully by excision of the infected...
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valve in 3 patients by Kay et al.,\textsuperscript{14,15} who advocate a more aggressive approach toward treatment of candida infections of the heart. It would appear that removal of the infected prosthesis, if technically feasible, offers the best chance of recovery in patients with refractory fungal endocarditis. This approach should be particularly hopeful for aspergillus endocarditis, for which medical therapy has usually been unsatisfactory.

The patient reported on here may well have benefited from replacement of the prosthesis, since the area of the valve attachment was not necrotic and the thrombus had almost completely obliterated the mitral orifice.

Figure 3. Photomicrograph of the thrombus obliterating the mitral prosthesis demonstrates the felt-like growth of Aspergillus mycelia. Magnification, $\times 750$.

Summary

We describe a patient with fatal aspergillus endocarditis after implantation of a mitral valve prosthesis. A thrombus that almost completely occluded the mitral valve prosthesis resulted in obstruction to inflow to the left ventricle. The area of valve attachment was not necrotic, and it appears that replacement of the prosthesis would have been beneficial.

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REFERENCES


