Aspergillus Endocarditis of the Mitral Valve in a Lung-Transplant Patient

A 57-year-old man underwent bilateral lung transplantation at our hospital. On histopathology, aspergillomas were identified in the upper lobes of the explanted lungs. After being treated and discharged from the hospital, he returned 4 months later with ischemic chest pain, which was due to a myocardial infarction complicated by cardiogenic shock. He also had a large vegetation on the anterior mitral leaflet. Herein, we describe the patient’s symptoms, complications, treatment, and recovery. To the best of our knowledge, ours is only the 2nd report of a patient who developed Aspergillus endocarditis after lung transplantation and the 1st such patient to have undergone successful mitral valve replacement. (Tex Heart Inst J 2007;34:95-7)

Mitral valve endocarditis of a native valve with Aspergillus fumigatus is rare. We present a case of Aspergillus endocarditis of the mitral valve in a double-lung transplant recipient. He had a postoperative embolism to the left anterior descending coronary artery (LAD). The patient was treated with percutaneous coronary angioplasty, aggressive antifungal treatment, coronary artery bypass, and mitral valve replacement.

Case Report

A 57-year-old man was referred to us for bilateral lung transplantation. He had end-stage pulmonary disease with chronic obstructive airway disease and interstitial pulmonary fibrosis, for which he was on home oxygen therapy. He also had type 2 diabetes mellitus. He underwent sequential double-lung transplantation through a median sternotomy with cardiopulmonary bypass (CPB). Prednisolone, azathioprine, and tacrolimus were used for immunosuppressive therapy. The procedure was uncomplicated, and the patient was extubated on postoperative day 1.

On histopathology, aspergillomas were identified in the upper lobes of the explanted lungs. The patient’s postoperative course was complicated by the development of acute renal failure. On postoperative day 8, he was found to have right-side empyema, which was treated with the insertion of a pleural drain and intrapleural instillation of streptokinase. Aspergillus fumigatus was identified on cultures grown from pleural fluid and from bronchial washings. We performed video-assisted thoracoscopic decortication of the right lung. The patient was given antifungal drugs in the form of caspofungin acetate, amphotericin B, and voriconazole. He was discharged from the hospital 6 weeks postoperatively with no evidence of residual infection.

Four months later, the patient presented with ischemic-type chest pain. He had sustained an extensive ST-elevation anterior-wall myocardial infarction, which was complicated by cardiogenic shock. A transthoracic echocardiogram showed severe hypokinesia of the mid-anterior left ventricular wall, septal wall, and apex. A large vegetation was found on the anterior mitral valve leaflet, and there was grade 3/4 mitral regurgitation. A coronary angiogram showed total occlusion of the LAD. There was evidence of an aneurysm of the left circumflex coronary artery. The patient underwent successful percutaneous transluminal coronary angioplasty of the LAD, with intra-aortic balloon pump (IABP) support and with dopamine (5 µg/kg per min) for inotropic support.

Blood cultures did not grow any organisms. On the basis of a clinical diagnosis of Aspergillus endocarditis, the patient was treated with liposomal amphotericin B, caspofungin acetate, and voriconazole. The IABP was removed the next day. Anti-
coagulation with warfarin was started. In view of the large size of the vegetation, the patient was scheduled for surgery.

Operative findings included dense intrapericardial adhesions, a dilated left ventricle, and a large vegetation ($2.5 \times 2.5$ cm) on the anterior mitral leaflet (Fig. 1). There was a thick-walled aneurysm involving the 1st obtuse marginal artery. The patient underwent mitral valve replacement with a 29-mm Carpentier-Edwards Perimount\textsuperscript{a} valve (Edwards Lifesciences; Irvine, Calif), and a single coronary artery bypass graft with a segment of the great saphenous vein to the 1st obtuse marginal artery. *Aspergillus* endocarditis was confirmed upon culture and histopathology of the excised mitral valve (Fig. 2). Postoperatively, the patient experienced coagulopathy and respiratory failure, which were managed successfully. His stay in the intensive care unit was 7 days. Echocardiography showed a normally functioning prosthetic valve. The patient received antifungal treatment with amphotericin and caspofungin for 6 weeks. The voriconazole was discontinued during the 1st week of treatment because the patient developed thrombocytopenia; this condition improved thereafter. After 3 months of follow-up and close monitoring, the patient was recovering well without any evidence of prosthetic-valve endocarditis. He is not on any long-term antifungal prophylaxis.

**Discussion**

Fungal infection is a rare cause of infective endocarditis. There is an association of fungal endocarditis with cellular immune deficiency.\textsuperscript{1} Characteristics of fungal endocarditis include large vegetations with an increased potential for systemic embolization, a tendency to grow on prosthetic valves, and a poor outcome despite adequate medical and surgical treatment.\textsuperscript{1} The patient can acquire *Aspergillus* endocarditis during heart surgery when operating-room air and CPB equipment are contaminated.

*Aspergillus* infection may be difficult to diagnose clinically. Blood cultures that test positive for this organism are uncommon.\textsuperscript{2} A high degree of suspicion is required for an early diagnosis. Our patient underwent sequential bilateral lung transplantation with extracorporeal circulation. Although aspergillomas were found incidentally upon histopathology of the native lung, there was no evidence of this infection clinically on pre-transplantation evaluation. In addition, this patient developed *Aspergillus* empyema after lung transplantation. Seeding of the mitral valve occurred either during transplantation or during the immediate postoperative period, when the patient developed empyema. Moreover, CPB has been associated with transient immunosuppression.\textsuperscript{3} In addition, the patient’s concomitant diabetes certainly would have contributed to the development of the invasive *Aspergillus* infection.

*Aspergillus* endocarditis has been described in patients who are on immunosuppressive therapy.\textsuperscript{4} Endocarditis...
of the native mitral valve in patients who have an anatomically normal valve and who have not received immunosuppressive therapy has been described in only a few cases. Treatment should begin as soon as the diagnosis is suspected. **Aspergillus** endocarditis is associated with an extremely high mortality rate of 80% to 96%. Poor health of the patients, recurrent and severe embolic episodes, and diagnostic delays are the main factors responsible for the dismal outcomes. Surgical treatment was indicated for our patient in order to confirm the clinical diagnosis, to reduce the risk of further embolization from the large vegetation, and to treat the severe mitral regurgitation. To the best of our knowledge, ours is only the 2nd report of a patient who developed **Aspergillus** endocarditis after lung transplantation and the 1st such patient to have undergone successful mitral valve replacement.

In a case described by Gilbey and coworkers, a diagnosis of **Aspergillus** endocarditis was made 20 months after bilateral lung transplantation. Their patient had experienced multiple episodes of peripheral embolization before he was diagnosed with mitral valve endocarditis. This patient received only palliative treatment because of his poor clinical condition, and he later died. **Aspergillus** endocarditis of the native valves is an extremely rare condition in transplant patients. Two types of **Aspergillus** endocarditis have been identified. In the 1st type, the infection is very aggressive, and it leads to early death. Our patient had the 2nd type, which is a less fulminant infection. Patients with the 2nd type may present with embolic phenomena.

Another interesting observation regarding our patient is the treatment of his occluded LAD with percutaneous coronary intervention. Because our patient was very sick from severe mitral regurgitation, sepsis, ongoing myocardial ischemia, and cardiogenic shock, our cardiology colleagues decided to proceed with percutaneous intervention of the LAD with IABP support in order to stabilize the patient before we undertook more definitive treatment. We have not found any reports of previous use of this intervention in the setting of presumed aspergilloma embolism to a coronary artery.

Our case illustrates a rare and interesting association of bilateral lung transplantation with **Aspergillus** endocarditis of the native mitral valve. Any focus of **Aspergillus** colonization or infection should be treated aggressively with use of a prolonged course of appropriate antifungal agents after transplantation.

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**References**