became pronounced radiographically. The diagnosis was established by echocardiogram and confirmed using computed tomography scan with contrast, which clearly delineated the pseudoaneurysm with shunt discontinuity (Fig 2). Unlike previous case reports, the need for a cardiac catheterization to establish the diagnosis was not necessary [4, 5] and a noninvasive investigative approach was considered to be adequate before surgical repair.

This case indicates that a single-stage repair in such patients is feasible and can be accomplished with minimum morbidity. Importantly, exploration of all the cardiac tissues and valves for occult vegetations proved essential. In this patient, the posterior leaflet of the pulmonary valve and the surrounding tissue was noted to be infected and was removed in its entirety. The extent of the infection and the involvement of the pulmonary valve were not appreciated on preoperative studies. Inadequate exploration might have undermined the success of the surgery. Performing the initial portions of the surgery on hypothermic low-flow bypass facilitated evaluation of all the cardiac pathology while avoiding potentially catastrophic hemorrhage entering the pseudoaneurysm itself.

This unusual case alerts physicians to consider shunt-related pathology if the patient presents with respiratory symptoms and ipsilateral signs of consolidation with or without signs of compression of mediastinal structures. Despite the extensive nature of the operation, a single-stage repair should be considered if the cardiac anatomy is favorable. Every effort to completely remove the infected material and cardiac tissue is essential.

References


A Cluster of Cases of Aspergillus Endocarditis After Cardiac Surgery

Ismail El-Hamamsy, MD, Nicolas Durrleman, MD, Louis-Mathieu Stevens, MD, Raymond Cartier, MD, Michel Pellerin, MD, Louis P. Perrault, MD, PhD, and Michel Carrier, MD

Research Center and Department of Cardiovascular Surgery, Montreal Heart Institute, Montreal, Quebec, Canada

Aspergillus endocarditis is an ominous condition whose prevalence is increasing in the hospital population. Despite the life-threatening nature of the disease, detection of the source, establishment of the diagnosis, and treatment remain highly challenging. A cluster of three cases of Aspergillus endocarditis recently encountered at the Montreal Heart Institute are presented.


Accepted for publication June 13, 2003.

Address reprint requests to Dr Carrier, Department of Surgery, Montreal Heart Institute, 5000 Belanger St East, Montreal, Quebec H1T 1C8, Canada; e-mail: carrier@icm.umontreal.ca.

0003-4975/04/$30.00
doi:10.1016/S0003-4975(03)01430-9
Aaspergillus is a ubiquitous agent capable of causing several diseases in healthy humans and immunocompromised hosts. The prevalence of Aspergillus endocarditis (AE) is increasing in the hospital population [1]. Several conditions predispose to AE including underlying cardiac abnormalities, prosthetic heart valves, indwelling central venous catheters, prolonged use of broad-spectrum antibiotics, and intravenous drug use. Despite its epidemic proportions, identifying the source, establishing the diagnosis, and treating AE remain highly challenging and are often met with little success. Three cases of Aspergillus aortic valve endocarditis recently encountered at the Montreal Heart Institute within a short period of time are presented in this report.

Case Reports

Patient 1
A 28-year-old male underwent aortic valve repair (leaflet plication) using no prosthetic material for severe bicuspid aortic valve prolapse in December 2000. The patient was discharged on postoperative day (POD) 7 in excellent condition. Two months later, he presented with fever, diplopia, back pain, and generalized weakness. A new aortic systolic murmur and a splinter on his right fifth toe were noted. Hematological and biochemical examinations were within normal range. All blood cultures were negative (6/6). Intravenous gentamycin and vancomycin were started. Transesophageal echocardiography (TEE) revealed a 2.5 × 1.4 cm periaortic abscess with lack of apparent aortic valve involvement. Thoracoabdominal computed tomographic (CT) scan demonstrated two pseudoaneurysms of the ascending aorta (Fig 1) and mycotic emboli of the left iliac artery. He underwent replacement of the ascending aorta using a homograft and a thromboembolectomy of the left ilio-femoral axis. Pathologic examination revealed characteristic septate hyphae (Fig 2) and cultures of the infected material grew Aspergillus fumigatus. Intravenous Amphotericin B (AmphoB) was immediately started. He died on POD 15 from multiorgan failure. At autopsy, infection of the homograft material was visible along with hepatic and renal artery mycotic emboli.

Patient 2
A 56-year-old male underwent aortic valve replacement for aortic stenosis using a mechanical prosthesis in January 2001. The patient was discharged soon after surgery in good condition. He was readmitted in August 2001 with fever, chills, and fatigue. A new systolic heart murmur along with a diastolic ejection murmur were noted. Hematological and biochemical data were normal and blood cultures were negative (5/5). Intravenous gentamycin, vancomycin, and rifampin were empirically initiated. TEE revealed a 1 × 0.7 cm aortic valve vegetation with a moderate paravalvular leak. Right hemiparesis suddenly developed and the patient suffered a seizure episode. Before pathogen identification, he underwent aortic valve and root replacement using a homograft with debridement of a large size mitro-aortic valve abscess. On POD 6, control echocardiography revealed a 1-cm nodule over the left coronary cusp. Antibiotics were continued despite negative blood cultures. The patient suffered a cardiac arrest 2 days later and died. Autopsy revealed Aspergillus vegetations over the left coronary cusp with extension into the homograft and subtotal obstruction of the left coronary ostium.

Patient 3
A 50-year-old male underwent aortic valve replacement for severe aortic stenosis using a mechanical prosthesis in October 2001. He was discharged on POD 7 in excellent condition. Two months later, he presented with fever, weakness, and weight loss. His white blood count was normal and blood cultures were all negative (4/4). No vegetations were observed on the initial TEE. One week later, a de novo Janeway lesion was noted and the patient presented a sudden episode of torsades de pointe. Intravenous vancomycin and rifampin were started. Repeat TEE revealed a 0.6 × 1 cm aortic annular abscess. He underwent emergency and repeat aortic valve replacement using a mechanical prosthesis due to severe and sudden hemodynamic instability. Left and right subcoronary abscesses and a valvular vegetation were found.

Fig 1. Ascending aortic artery mycotic pseudoaneurysm. Notice the high concentration and outgrowth of Aspergillus vegetations.

Fig 2. Microscopic view of aspergilli showing characteristics septate hyphae.
intraoperatively. A homograft was avoided to reduce cardiopulmonary in an emergency situation bypass times. Smears from the aortic valve showed septate hyphae and grew Aspergillus niger. Intravenous AmphoB and oral itraconazole were initiated. The patient recovered well and was discharged on POD 7 with intravenous AmphoB. Two months later he presented with fever and an aortic pseudoaneurysm ~4 cm above the aortic valve on TEE. Within 1 week he suffered three embolic strokes leaving him in critical condition. He underwent a homograft replacement of the aortic valve and root. Postoperative course was marked by severe coagulopathy, bleeding, and death on POD 1.

Comment

AE typically develops in patients with valvular risk factors (previous valve surgery, infective endocarditis, rheumatic heart disease, mitral prolapse) or medical risk factors (malignancy, indwelling central venous catheters, prolonged use of broad-spectrum antibiotics, intravenous drug use) [2]. All three cases presented here were immunocompetent but had undergone prior aortic valve replacement. AE therefore probably developed after intraoperative seeding by airborne spores, emphasizing the importance of operating room (OR) sterility and the use of high-efficiency particulate air (HEPA) filters.

Air remains the principal means of transmission to patients in cases of AE. Molds release an extremely high number of small-sized conidia (3–5 μm) increasing the risk of contamination in cases of colonized air environment. In hospitals, the presence of demolition or construction work is the most commonly incriminated factor. Spores can accumulate in air ducts creating bursts of air contamination elicited by air currents from repeated door opening in the OR. Air sampling may sometimes identify the source of contamination. A thorough investigation of the air environment, the filters, the ducts, and all OR activities at the Montreal Heart Institute was undertaken by a team of expert epidemiologists in public health. Although no tangible sources were found, the final report suggested reinforcing sterility rules and procedures by restricting personnel movements in and around the OR, strict use of surgical scrubs in the vicinity of the OR environment, and limiting door opening during the actual operations. No cases of AE have been observed since these rules have been imposed.

Typically, AE presents with a relative paucity of peripheral signs of endocarditis. The most common clinical features are fever, major peripheral emboli, and a changing heart murmur [3] as seen in all three presented cases. Blood cultures are negative and are not a reliable means of establishing the diagnosis as was the case here.

Despite attempts at combined medical and surgical therapy in our patients, mortality was 100%. Amphotericin B remains the mainstay of Aspergillus treatment. Its efficacy is, however, disappointingly low and the optimal dosage and length of therapy have not been established. Most authors recommend a minimum of 6 weeks of therapy with some advocating life-long prophylactic therapy [4]. Itraconazole is the second licensed agent with activity against Aspergillus. Although considered adequate first-line therapy in carefully selected patients, it remains less frequently used than AmphoB. Surgery as an adjunct to the medical therapy is recommended in all cases.

Radical debridement of necrotic tissue with valve replacement using biomaterials is the recommended procedure. Results are, however, disappointing with a limited number of reported survivors in the literature [5]. Patients who present a fever of unknown origin after valve replacement should undergo transthoracic and transesophageal echocardiography and several sets of blood cultures. If the cultures are negative and annular abscesses or prosthetic vegetations are shown, then AE is a serious possibility. Despite aggressive surgical treatment, the prognosis remains poor.

In conclusion, Aspergillus endocarditis, although rare, is an ominous complication of cardiac surgery with a dismal prognosis. A multidisciplinary approach is therefore warranted to act on the primary prevention of the disease.

References


Off-Pump Coronary Artery Bypass in Patients with Takayasu’s Disease

Atsushi Yamaguchi, MD, PhD, Hidehito Endo, MD, Hideo Adachi, MD, PhD, Koji Kawasaki, MD, PhD, and Takashi Ino, MD, PhD

Department of Cardiovascular Surgery, Omiya Medical Center, Jichi Medical School, Saitama, Japan

We report 2 patients with ostial stenoses of coronary arteries and heavy aortic calcification caused by Takayasu’s disease in which severe angina was successfully relieved by off-pump coronary artery bypass grafting. In one case, visceral arteries such as the right gastroepiploic artery, the superior mesenteric artery, and the splenic artery were used as proximal blood sources of saphenous vein grafts. In another case, an aortic connector system was employed for proximal anastomoses of saphenous vein grafts. The use of off-pump coronary artery bypass grafting techniques should be considered in surgical coronary revascularization in patients with Takayasu’s disease, thus leading to wide-spreading indication for the surgery.


Accepted for publication June 13, 2003.
Addresses reprints requests to Dr Yamaguchi, 1-847, Amanuma, Omiya-ku, Saitama, 330-8503, Japan; e-mail: yamaatsu@omiyamed.sch.ac.jp.