Aspergillus species are uncommon causes of infective endocarditis\(^1,2\). Kammer et al and Barst et al reviewed the clinical features of aspergillus endocarditis and found that most of them had various underlying organic heart diseases and prosthetic implantations\(^3,4\). The characteristic features were fever, cardiac murmurs and embolisms in large vessels. Antemortem diagnoses were difficult because hemoculture yielded positive results in only 8-15 per cent of patients. *Aspergillus fumigatus* was the most common responsible species. The mortality rate of aspergillus endocarditis was over 90 per cent.

**Case Report**

A twenty-four-year-old Thai female had a history of dyspnea on exertion since childhood. For two years before admission her symptom had become worse and she sought medical treatment from a provincial hospital with slight improvement; subsequently she was referred to Siriraj Hospital. Cardiac catheterization revealed ventricular septal defect (VSD) and ruptured aneurysm of right aortic sinus into the outflow tract of the right ventricle. On April 27, 1981 cardiac operation was done with closure of VSD with teflon patch, repair of ruptured sinus of Valsava and aortic valvuloplasty. She was given cloxacillin and gentamicin for five days, beginning on the operative day. Her postoperative recovery was uneventful and she was discharged on May 11, 1981. On June 6, 1981, five weeks after the operation, she developed sudden palpitation, dyspnea and chest pain. On admission she had a temperature of 37.2°C, blood pressure of 140/60 mmHg, pulse rate of 100/min and respiratory rate of 24/min. All peripheral pulses were present. She had tachypnea, orthopnea and high jugular venous pressure. There were systolic thrills and continuous murmurs grade 5/6 at the second and third intercostal spaces, left sternal border. There were crepitations in both lower lung fields. The liver was palpable 3 cm below right costal margin with smooth surface and slight tenderness. There were no signs of embolism. The hematocrit was 29 per cent and the leucocyte count was 10,500/mm\(^3\) with 68 per cent neutrophils, 32 per cent lymphocytes. Urinalysis and blood chemistries were within normal limits. Chest radiograph showed cardiomegaly and pulmonary congestion. All six blood cultures were negative after incubation for 3 weeks. She had fever, intractable congestive heart failure and vegetation from echocardiography; as the evidence cloxacillin and amikacin were parenterally administered on the tenth admission day and reoperation was done on the following day. The operative findings were large vegetations (Fig. 1) on previous aortotomy, previously repaired aortic aneurysm and teflon patch; false aortic aneurysm at anterior part of previous aortotomy, ruptured aortic

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Fig. 1  The second operative findings: multiple large vegetations on teflon patch and reopened VSD (inserted rubber catheter).

Fig. 2  Gomeri-Methenamine Silver stain of a vegetation; showing thrombus with branching septate mycelium of aspergillus pattern.

Fig. 3  KOH preparation of a vegetation; showing hyaline cells producing laterally on a septate hypha which is the characteristic of *Aspergillus terreus*.
sinus just above the site of previous repair and tearing of the teflon patch. The teflon patch and vegetations were removed as far as possible, aortic sinus was repaired and VSD was covered by a new teflon patch. The largest vegetation was about 1.5x1 cm and branching septate hyphae were observed in both direct smear and histological sections (Fig. 2). She was found to have left hemiplegia and petechiae on conjunctiva and trunk when she regained consciousness from anesthesia. She was treated with amphotericin B and 5-fluorocytosine on the operative day. Amphotericin B was gradually increased to 35 mg per day and she tolerated it quite well. Though the fungus was sensitive to amphotericin B in vitro; the patient’s condition deteriorated gradually and she expired 21 days after the second operation. Autopsy was not permitted by her relatives.

Mycological Studies.

Direct (KOH) microscopic examination of small pieces of vegetation revealed septate hyphae arranging in pseudo-dichotomous branching of the actinomycetoid type and globose hyaline cells produced on vegetative mycelium were also present (Fig. 3). The material was inoculated onto slants of Sabouraud dextrose agar and brain-heart infusion agar, incubated at 25°C and 37°C. Growth was rapidly visible after 48 hours; by 10 days the colonies were well developed. The fungus was identified as *Aspergillus terreus* according to Raper and Fennell, and later on it was confirmed by Dr. G.A. de Vries, Centraalbureau voor Schimmelcultures, Baarn, the Netherlands as *Aspergillus terreus* var. *terreus*(5). The broth dilution method was prepared for susceptibility test of the fungus to amphotericin B in vitro; the patient’s condition deteriorated gradually and she expired 21 days after the second operation. Autopsy was not permitted by her relatives.

Discussion

The unusual presenting symptom of aspergillus endocarditis in this patient was congestive heart failure due to reopening of VSD and reruptured aneurysm of sinus of Valsava. She was empirically treated for common postoperative bacterial endocarditis(2). Fungal endocarditis was suspected because of negative hemoculture and large vegetation on echocardiography as previously described(7). Hemoculture in aspergillus endocarditis was not helpful because of low yield and long duration required(3,4). Antemortem diagnoses were usually made by demonstrating *Aspergillus* species in surgically removed emboli(3,4,8,9). Although focal neurological signs after open-heart surgery might be due to air, fat, atheromatous material, calcified debris, fibrin, bland thrombi and cholesterol, cerebral embolism due to *Aspergillus* is common as demonstrated by Dayal et al(3,4,10). Left hemiplegia in this patient was thought to be caused by cerebral embolism because of simultaneous peripheral embolism to conjunctiva and skin. Multiple large vegetations were found on both sides of the heart as previously reviewed(3,4). *Aspergillus terreus*, an uncommon species, was the causative pathogen of the patient. The source of infection was believed to be air-borne inoculation of the spores during prolonged operative exposure because *Aspergillus* species were cultured repeatedly from operating room surfaces and occasionally from air(11). Treatment of aspergillus endocarditis is very difficult for the vegetations are multiple, large and most patients had disseminated infection by the time of diagnosis(4). All the patients treated with antifungal agents alone expired(3). The non-fatal cases were treated either antifungal chemotherapy and valve replacement or valve replacement alone(4,8,12,13). Many *Aspergillus* species were resistant to amphotericin B, the MIC of 5-fluorocytosine for *Aspergillus* species was higher than for *Candida* or Cryptococcus(3,14). Several studies favored combined treatment with amphotericin B and 5-fluorocytosine(7,15,16). This combination was successfully treated invasive aspergilllosis and aspergillus endocarditis(8,12,17). Unfortunately, this patient succumbed despite of intensive chemotherapy and cardiac operation; a not unusual outcome of aspergillus endocarditis.

Summary

A twenty-four-year-old female had congestive heart failure 5 weeks after open heart surgery for VSD and ruptured aneurysm of sinus of Valsava. *Aspergillus terreus* endocarditis was diagnosed by reoperation and examination of vegetations. The patient expired despite receiving amphotericin B and 5-fluorocytosine for 3 weeks.
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REFERENCES


