Aspergillus endocarditis: rare but serious Aspergillus ball obstructing the pulmonary artery

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Abstract
Aspergillus endocarditis is considered a rare complication in cardiac surgery, which is usually fatal due to unclear clinical manifestations. We present two cases with early and late post-operative Aspergillus endocarditis. Early diagnosis, more investigation for appropriate antifungal agents and their dosage, and early and aggressive surgical treatment may decrease fatality. © 1998 Elsevier Science B.V. All rights reserved

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1. Introduction
The conventional tools for early detection of Aspergillus endocarditis are usually not conclusive in such areas as blood cultures and echocardiography. Even in diagnosed cases medical and surgical interventions can result in failure.
In the following two case studies, we will be reporting on an early and late post-operative Aspergillus endocarditis both having a successful total correction of Tetralogy of Fallot and then died following Aspergillus endocarditis.

2. Case report

2.1. Patient 1
A 2.5-year-old boy, with Tetralogy of Fallot underwent a total correction. Pre-operatively he was well with a functioning shunt and there was no signs of a chronic or an acute infection or any other systematic disease. He had a normal white cell count and a normal sedimentation rate and angiographic findings were compatible with Tetralogy of Fallot. He underwent a total correction and closure of the previous shunt, using an untreated autologous pericardial patch for VSD closure as well as a transannular patch to relieve the right ventricular outflow tract obstruction (RVOTO). The posterior pulmonic cusp was preserved. The patient initially had a smooth post-operatively course, but 18 h later as he was on spontaneous ventilation, hypotension occurred suddenly which was controlled by fluids and high doses of ionotrops.

The two-dimensional and M-mode echocardiography revealed satisfactory repair and no RVOTO. During the examination, he had a temperature of 39°C and hepatomegaly. On the next day he developed manifestations of hepatic and renal failure. He underwent peritoneal dialysis and management of hepatic failure. A blood examination showed leukocytosis, bandemia and thrombocytopenia. All blood cultures came back negative. The chest X-ray showed bilateral pulmonary expansion with no infiltration. On the next day he developed repeated convulsions and cardiac arrests.

A post-mortem examination revealed a 1 × 1.5 × 2 cm brownish mass located at the origin of a main pulmonary artery with a loose attachment to the tip of the transannular patch (Fig. 1). In a pathologic study the mass was composed of a septated dichotomous hyphae with scanty fibrin deposits (Fig. 2). Both lungs were scattered with an Aspergillus infection, the kidney and the liver specimens were free from...
infection. Unfortunately the brain had not undergone a post-mortem examination.

2.2. Patient 2

A 10-month-old, 8 kg cyanotic baby girl with Tetralogy of Fallot and cyanotic spells underwent a total correction using a GoreTex patch (0.6 mm) for VSD closures and an untreated autologous pericardial patch for subannular patch enlargement of RVOT (post repair RV/LV = 0.32).

She had a smooth post-operative course and her echocardiography, 4 days post-operatively, showed a satisfactory repair except for a small residual VSD.

She had regular follow-up, but 3 months post-operatively she was brought back due to chills and a fever of 40°C. Her blood count was 14 000 with 66% neutrophil, she also had a CRP = 1/60 positive. Due to a persistent fever, an echocardiography was done which showed a vegetation (10.65 mm) on the VSD patch and a gradient of 25 mmHg at the RVOT using Doppler studies. She was treated with gentamycin 5 mg/kg, vancomycin 60 mg/kg and rifampin 20 mg/kg. All blood cultures came back negative.

Despite the above treatment, a repeated echocardiography after 1 week revealed an increase in the size of the vegetation up to 22 × 12 mm with exaggeration of the RVOT gradient to 80–100 mmHg by a continuous wave Doppler.

Amphotericin B was started and a surgical intervention was planned. An intra-operatively residual VSD was repaired and the large fungal ball was removed, in a pathological exam the fungal hyphae and its culture confirmed Aspergillosis. She had a very good post-operative recovery without a fever and amphotericin 1 mg/kg per day was continued for 9 weeks (total dose of 480 mg). Post-operatively all echocardiographic exams were satisfactory with no vegetation, no residual VSD and absent RVOT gradient, her white cell count dropped to 7000.

However, gradually after the eighth week post-operatively echogenicity of the patch increased and VSD recurred. Her fever started and persisted with spikes. A repeat operation was refused by her parents and unfortunately she died 1 month later at her home.

3. Discussion

Aspergillus endocarditis is an opportunistic infection with such factors as sex (male), underlying debilitating disease, previous antibiotic therapy, steroids, chemotherapy and
operations especially open heart surgery, predisposing the patients to infection [1–4]. The presence of foreign bodies in the heart increase the rate of infection [1,5,6]. Contamination in the operating room especially during reconstruction procedures, may play a role. As no similar complication occurred in non-cardiac cases performed simultaneously, this way may emphasize the suggestion of Gage et al. [1] that the operating room air temperature and the air/blood mixture in the pump sucker is the most probable entry route for the organism into the circulation. Prolonged operating and cardio-pulmonary bypass time increased blood exposure to the contaminated room air.

The most common presenting symptom is a high fever (85% of the cases) and signs and symptoms related to the embolic phenomenon are the next [1]. Surgical excision and removal of the vegetation combined with an intensive antifungal therapy using liposomal amphotericin B showed promising results in a less progressive form of the infection [4, 7].

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References