Mycotic prosthetic-valve endocarditis

Carefully planned antibiotic prophylaxis\(^1\) has led to a decrease in postoperative bacterial endocarditis but fungal infections\(^2,3\) have become more prominent. We report four cases of mycotic endocarditis that occurred in our Cardiothoracic Surgery Centre during 1 year.

One hundred and seventy-three patients had open heart surgery during 1988–89. Endocarditis was clinically diagnosed in 12 of these on the basis of pyrexia, loss of weight, hepatosplenomegaly, skin petechiae (case 2) and echocardiography. Blood was collected in biphasic brain–heart infusion medium and observed for fungal growth for 4 weeks. Valve tissue or embolus (\textit{post mortem}) were cultured on Sabouraud 2·0% dextrose agar and brain–heart infusion agar with addition of 0·5 mg ml\(^{-1}\) of cycloheximide and 0·016 mg ml\(^{-1}\) of chloramphenicol. Cultures were identified by following standard techniques\(^4\). Bacteria were isolated from blood cultures in 4 cases, and Table I shows the fungi isolated or demonstrated in different clinical samples.

A 30-year old male who had undergone a closed mitral valvotomy 4 years previously underwent mitral valve replacement (Bjork Shiely valve) and was re-admitted after 2·5 months with symptoms of endocarditis. He expired within a week despite broad spectrum antibiotic coverage (long-acting penicillin, ampicillin, chloramphenicol, norfloxacin). Repeated blood cultures were sterile. At autopsy a large grey thrombus was seen covering the valve. Histology showed septate fungal hyphae resembling \textit{Aspergillus} sp. in the tissue, but the specimen was received in formalin and not cultured.

The second case was a 47 year old male, re-admitted three months after aortic valve replacement (Bjork Shiely valve) with a clinical diagnosis of prosthetic endocarditis. He had petechial rashes on the skin and emboli in the femoral artery. \textit{Mucor} sp. and \textit{Aspergillus} sp. were isolated from blood culture repeatedly. He was given amphotericin B, cefotaxime, cloxacillin and metronidazole. Histology and culture of the embolus revealed \textit{Mucor} sp. and \textit{Aspergillus} sp. After his death autopsy was not permitted by the relatives.

The third case was a 19 year old non-diabetic male who underwent open mitral valve and aortic valve replacement with a Carpentiar Edward valve. Re-exploration was done after 1 week and a Doyan’s patch was placed on the aorta to repair a leak. The patient took antibiotics for a month and blood cultures were repeatedly sterile. He died on the 35th postoperative day. Autopsy revealed greenish pus posterior to the left and right ventricles with cardiomegaly and a vegetation on the aortic valve. Subvalvular loose fragments were examined histologically and showed septate fungal hyphae typical of \textit{Aspergillus} sp.
Table I. *Fungi isolated or demonstrated after valve replacement*

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age/Sex (yrs)</th>
<th>Operation</th>
<th>Blood culture</th>
<th>Embolus</th>
<th>Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>30 Male</td>
<td>MVR</td>
<td>NG</td>
<td>—</td>
<td>Septate hyphae (valve)</td>
</tr>
<tr>
<td>2.</td>
<td>47 Male</td>
<td>AVR</td>
<td><em>Mucor sp.</em> and <em>Aspergillus sp.</em></td>
<td>Aseptate septate hyphae</td>
<td>Septate &amp; aseptate hyphae (embolus)</td>
</tr>
<tr>
<td>3.</td>
<td>19 Male</td>
<td>OMV AVR</td>
<td>NG</td>
<td>—</td>
<td>Septate hyphae (valve)</td>
</tr>
<tr>
<td>4.</td>
<td>25 Male</td>
<td>MVR</td>
<td>NG</td>
<td>Septate hyphae</td>
<td>Septate hyphae (valve)</td>
</tr>
</tbody>
</table>

MVR = Mitral valve replacement, OMV = Open mitral valvotomy, AVR = Aortic valve replacement, NG = No growth.
The fourth case was a 23-year old male with a history of rheumatic heart disease and mitral stenosis and regurgitation. He underwent open mitral valve replacement with a Bjork Shiley valve. Echocardiography was performed after about 20 days and vegetations were suspected. The patient was febrile but blood cultures were repeatedly sterile. The patient died in spite of heavy antibiotic coverage, i.e. cefotaxime, cloxacillin and metronidazole. Autopsy revealed grey thrombi covering the valve, occluding the lumen and limiting its motion. Septate fungal hyphae resembling *Aspergillus* sp. were demonstrated in the vegetation of the heart valve, but there was no growth on culture.

Fungal endocarditis complicating open heart prosthetic surgery is well recognised and the time interval between cardiac surgery and death ranged from 2–112 weeks but mostly occurred after 2 months. The mean duration from the date of heart valve replacement to death in all our four cases was eight weeks. Suspicion of fungal heart valve involvement was based on symptoms of endocarditis not responding to antibiotics and repeatedly sterile blood cultures. In only one patient (Case 2) was the diagnosis made prior to death when *Mucor* sp. and *Aspergillus* sp. were isolated in blood culture. Long term antibiotic use could have been a predisposing factor in all these cases.

Attempts to isolate fungi from operating room equipment and the blood of the pump oxygenator and heart lung machine were unsuccessful. Dust from an air conditioner duct yielded *Mucor* sp. and *Aspergillus* sp. in culture. The air filter used was of 5-0 μm pore size, which probably was not sufficient to eliminate fungal spores; air samples collected through an air sampler (Dynatest M, Micromed Division of Dynamicro, India) contained both of these spores. The possibility of contamination despite a laminar flow system ('Gel Air') cannot be ruled out. Side panels of this horizontal system were sometimes kept partially opened to accommodate the surgical and anaesthetic team, making it less effective. Sucker systems, drawing a mixture of blood and air from the heart during replacement, may also create conditions for contamination.

The operation theatre was closed for a week and thoroughly disinfected. The air-conditioner ducts were cleaned and new filters have been ordered. The laminar flow was checked by air sampling before and after running the system. Instruments and equipment were thoroughly cleaned of debris, sterilized and assembled under aseptic conditions before use.

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Letters to the Editor

References


Sir,

Transmission of chickenpox to two intensive care unit nurses from a liver transplant patient with zoster

A 41-year-old female patient developed zoster after an orthotopic liver transplant. She had a complicated postoperative course necessitating treatment in our intensive care ward. She developed a small cluster of vesicles on the right side of her chest 20 days after transplantation. This was initially thought to be an allergic reaction to adhesive tape which had been applied to this site. However, 18 h after the development of the rash, examination of vesicle fluid by electron microscopy revealed the presence of herpes type viruses. A diagnosis of herpes zoster was made and she was transferred to an isolation cubicle in the intensive care unit, and nursed by staff known to be immune to varicella-zoster virus (VZV; VZV antibody positive).

Although the area of the vesicles had been covered by dressings during the development of the rash, all staff and patients in the unit were investigated for evidence of immunity to VZV. All four patients in the unit were VZV antibody positive. Of the 61 staff on the unit, most had been assessed for VZV history or antibody status previously. Two, who had not been tested, were screened for VZV antibody by ELISA (Biostat) and were antibody positive. Two, already known to be VZV antibody negative, were excluded from the unit from days 10–21 inclusive from the date of contact with the patient. Both had been involved in her intensive care. One had just returned to work having been excluded for the second time because of contact with other patients with VZV infection. Both of them developed chickenpox after incubation periods of 17 and 18 days and, as a result, were absent from work for 2 and 3 weeks respectively.