Endocarditis of a prosthetic heart valve is a life-threatening condition that is associated with high morbidity and mortality. Here we describe a case in which transoesophageal echocardiography assisted in the diagnosis.

Case presentation

A 76-year-old woman was admitted to our hospital because of fever episodes (>38°C) that had occurred during the last month. She had also suffered an episode of loss of consciousness. Echocardiography revealed acute aortic regurgitation and dehiscence of the prosthetic valve with excessive “rocking motion”, aortic abscesses and left ventricular outflow obstruction caused by a semilunar shelf of tissue probably due to endocarditis vegetations. She underwent an urgent surgical procedure that confirmed the echocardiographic findings. Our case report reinforces the value of early diagnosis in the presence of a high clinical suspicion of prosthetic valve endocarditis. An extended workup, including transoesophageal echocardiography, in such a patient with a mechanical valve is mandatory.
gurgitation (Figure 2A). There were 2 large echogenic masses attached to the ventricular surface of the mechanical valve ring (Figure 1) and the posterior aortic wall appeared thickened (10 mm) with echolucent regions. The diagnosis of aortic abscess was made (Figure 1 B).

Laboratory tests showed increased white blood cells (13,500), anaemia (haemoglobin 9.3 g/ml, haematocrit 27.2%), and increased C-reactive protein (8.5 mg/dl) and sedimentation rate (105) during the first hour. All the blood cultures (9 in all) that were taken were negative, but based on the clinical, laboratory and echocardiographic findings the diagnosis of culture-negative infective endocarditis was made. The patient received antibiotic treatment with gentamycin 1.0 mg/kg every 8 hours and vancomycin 15 mg/kg twice per day, according to the current guidelines of the European Society of Cardiology. She was referred for an emergency operation for replacement of the aortic valve.

The patient presented at surgery in a severely debilitated condition and attempts to improve her haemodynamic status prior to surgery did not achieve much.

A few days later she was taken to the operating theatre and there on cardiopulmonary bypass the aortic root was opened and crystalloid cardioplegia was administered though the left and right coronary ostia. On inspection of the mechanical valve it was found to have almost complete dehiscence from the aortic valve ring (Figure 3). The valve was held in place by only 2 to 3 stitches at the right side of the aortic ring; these stitches were cut and the valve removed. The left ventricular outflow tract below the valve was almost completely obstructed by a semilunar shelf of tissue, similar to sub-aortic stenosis tissue, to which adhered clumps of fibrous tissue that were probably healed endocarditis.

**Figure 1.** Transoesophageal echocardiography in the mid-oesophageal position at 139 degrees revealed dehiscence of the aortic mechanical valve, mainly from the posterior aortic ring. The aortic valve moves freely in the aorta in systole (A) while it prolapses to the left ventricle in diastole (B). In addition, there were large echogenic masses (B, red arrow) attached to the ventricular surface of the mechanical valve ring and the posterior aortic wall appeared thickened with echolucent regions (B, green arrow). The diagnosis of aortic abscess was made. Ao – aorta; AV – aortic valve; LA – left atrium; LV – left ventricle; MV – mitral valve.

**Figure 2.** Transoesophageal echocardiography in the mid-oesophageal position shows severe paravalvular aortic regurgitation (A). In addition, the large echogenic masses attached to the ventricular surface of the mechanical valve ring are shown (B, red arrow). IVS – interventricular septum. Other abbreviations as in Figure 1.
vegetations (Figure 4). Once all of this tissue was removed 2 very large abscess cavities became apparent, one under the left coronary ostium and the other under the right. Both these cavities were healed and epithelialised.

After careful debridement of all excess tissue and removal of all fibrous growth from the anterior mitral valve leaflet — also healed endocarditis vegetations — pledgeted mattress sutures were placed around the valve ring in such a manner that the edges of the abscess cavities were incorporated into the sutures.

The sutures were then passed through the new valve ring and when the valve was tied down the abscess cavities were obliterated. A mechanical St. Jude No 21 valve of the Regent series was used, since the patient had a small aortic root (the previous mechanical valve placed was No 19). Another reason for choosing this valve was that the new valve needed to have a thin suture ring so as to not obstruct the coronary artery ostia.

Tightening this valve into position was difficult, because on the one hand there was a danger of the sutures cutting through the friable sub-annular tissue, and on the other the valve had to be positioned well underneath the coronary artery ostia so that they would not be occluded.

The end result obtained was quite good and continuity of LV outflow endocardium and healthy aortic root tissue was achieved. The operation was then concluded in the usual manner. The patient was easily weaned off cardiopulmonary bypass and maintained in a stable haemodynamic condition with little inotrope support. The subsequent 5-day stay in the intensive care unit, as well as the 5-day stay in the ward, were uneventful. Echocardiography revealed a well functioning valve with no regurgitation. During all this time, the patient remained on an antibiotic schedule for endocarditis.

However, on the discharge day, she suddenly developed a shock picture, with low blood pressure, vomiting and progressive loss of consciousness. She was urgently readmitted to the intensive care unit. The echocardiography revealed a well functioning mechanical valve but severely depressed LV function. The patient died a few hours later, in spite of all medical support with inotropes and mechanical ventilation. Intracranial haemorrhage with neurogenic stress cardiomyopathy was suspected as the cause of death, as we found a very
prolonged prothrombin time with an international normalised ratio of 8.4. Unfortunately the relatives refused an autopsy.

Discussion
Despite the tremendous advances in medical therapy over the past few decades, prosthetic valve endocarditis (PVE) remains a life-threatening disease and is associated with increased and very significant morbidity and mortality.4,6 The incidence of culture negative endocarditis is around 5%,1,7 while neurological complications continue to occur in approximately 20-40% of all patients with infective endocarditis and represent a major factor associated with the increased mortality rate.8,9 Furthermore, periannular complications, including abscesses, pseudoaneurysms, and fistulas, indicate advanced disease with a poor prognosis.8

Abscess formation in infective endocarditis is not a rare complication, and in a necropsy study10 an incidence of 89% of abscesses in aortic endocarditis and 7% in mitral endocarditis was found. Aortic PVE is more common than mitral PVE. Because the synthetic material in mechanical valves does not allow microorganisms to grow, mechanical PVE begins at the sewing ring. When the disease is not controlled early, the infection extends beyond the prosthesis and involves the annulus and other neighbouring structures, such as the conduction system and the mitral valve. Abscess formation occurs and may become circumferential, resulting in partial or complete ventriculoaortic endocardial discontinuity. This requires special technical steps—such as obliterating the abscess cavities with Dacron patches and then tying the valve onto them—apart from simple replacement of the prosthesis.

The now generally accepted surgical strategy to treat aortic PVE accompanied by abscesses consists of radical debridement of infected tissue, in order to obtain a margin of healthy tissue and to avoid recurrent or residual infection.11,12 Aortic allografts are known to have excellent haemodynamic performance associated with a very low incidence of reinfection and late mortality.13 Nevertheless, operation for PVE, especially with perivalvular abscess, remains a surgical challenge, with some series reporting mortality rates of 20-60%,14,15 although more recent reports give lower mortality rates, less than 10%.13 Additionally, there is a high rate of recurrence of infection (about 7%)15 when a new prosthesis is implanted. This has drawn attention to the use of allografts, which are considered to have the lowest incidence of postoperative recurrence of infection, when compared with other valve substitutes.16,17

In several studies, pre-operative transosophageal echocardiography has proved to be a valuable and useful technique for the early diagnosis of perianular involvement14,18,19 and has now become a preoperative requirement in the evaluation of the patients with infective endocarditis.

This case report reinforces the value of early diagnosis in the presence of a high clinical suspicion of PVE. An extended workup, including transosophageal echocardiography, is mandatory in such a patient with a mechanical valve, especially when there are clinical findings suggestive of PVE, such as fever or embolic events.

References
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