Surgical valve repair of isolated pulmonary valve endocarditis

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Abstract

Isolated pulmonary valve endocarditis (IPE) is an uncommon clinical entity. We reported 4 cases of IPE without underlying heart diseases that required surgical interventions. Two of the present patients had predisposing factors that included a history of abdominal surgery in Case 1 and intravenous drug abuse in Case 3. All four patients presented with persistent fever together with pulmonary symptoms despite appropriate antibiotic management. Three of the patients underwent elective pulmonary valve repair, but Case 3 underwent an urgent surgical intervention due to uncontrolled septic shock. Pulmonary valve repair was performed using autologous pericardial patch in all 4 patients. All of them had immediate postoperative recovery and satisfactory outcomes in the follow-up.

Keywords: Infective endocarditis • Pulmonary valve • Cardiac surgery

INTRODUCTION

Isolated pulmonary valve endocarditis (IPE) is rare, accounting for <1.5–2% of all cases of infective endocarditis [1]. Most cases of IPE occur in adults with intravenous drug abuse and intravenous catheter. In patients without underlying heart diseases, IPE is extremely rare and only a few cases have been previously reported [2]. We describe 4 cases of IPE that required surgical intervention.

CASE PRESENTATION

Patient 1

An 82-year old man with a history of Hartmann’s procedure 2 years ago presented with a 1-year history of fever, malaise and cough. Blood cultures were positive for Enterococcus faecalis. Sultamicillin treatment was initiated. Transthoracic echocardiography revealed large, mobile pulmonary valve vegetations (maximum 18 × 12 mm), mitral valve prolapse and aortic regurgitation. Thoracic computed tomography (CT) demonstrated bilateral pulmonary septic emboli.

Surgical intervention was required after a 6-week antibiotic therapy. Cardiopulmonary bypass was initiated through a median sternotomy. Intraoperatively, we observed that two pulmonary leafllets were destroyed by vegetations (Fig. 1A). The pulmonary valve was repaired with a glutaraldehyde-treated autologous pericardial patch (Fig. 1B). Concomitant mitral repair and aortic valve replacement were performed.

The microbiological valve study was negative. The patient was transferred to the intensive care unit for 10 days and then to a regular unit. Transthoracic echocardiography performed 3 weeks after surgery showed no vegetations. Antibiotic therapy was continued for 30 days after surgery. After 3 months of follow-up, the patient remained asymptomatic with a functioning pulmonary valve.

Patient 2

A 45-year old man with a traumatic left femoral arterio-venous fistula presented with a 1-year history of fever and chest pain. A CT scan showed bilateral pulmonary infiltrates (Fig. 2A). Blood cultures were negative. Antibiotic therapy was initiated with ceftazidime and amikacin. Transthoracic echocardiography revealed large, mobile pulmonary valve vegetations (maximum 20 × 11 mm; Fig. 2B). Nevertheless, fever persisted with signs of inflammation declining slowly after 4 weeks of antibiotic therapy, therefore, surgical intervention for the pulmonary valve was indicated at this point.

Intraoperatively, the pulmonary trunk was opened longitudinally. The pulmonary valve had been destroyed by vegetations. Complete debridement and excision were performed, and the valve was then repaired with a glutaraldehyde-treated autologous pericardial patch.

Microbiological study showed leucocytes with no bacteria. The postoperative course was uneventful. After 6 weeks of postoperative antibiotic treatment with ceftazidime, the patient was discharged. After 3 months of follow-up, the patient remained asymptomatic.

Patient 3

A 33-year old man, with hepatitis C virus-positive and intravenous drug abuse, presented with a 2-month history of high-grade
fever, cough and chest pain. Blood cultures were positive for Staphylococcus aureus. A CT scan showed an infiltrate in the lateral segment of the right inferior lobe. Antibiotic therapy with vancomycin was initiated. Nevertheless, acute respiratory failure and haemodynamic collapse prompted his transfer to our hospital. Transthoracic echocardiography revealed multiple large, mobile vegetations attached to the pulmonary valve (maximum 15 × 12 mm). A CT scan showed both alveolar and interstitial infiltrates due to septic pulmonary embolism. Since fever persisted around 40°C with haemodynamic deterioration, urgent surgery was required on the 3rd day after admission.

Intraoperatively, we found that all pulmonary leaflets had been destroyed by vegetations. After debridement and excision, pulmonary valve repair was performed with a fresh autologous pericardial patch.

The microbiological valve study revealed methicillin-resistant coagulase-negative Staphylococci. Vancomycin was continued for 30 days after surgery. The patient recovered quickly and was discharged on the 30th day. After 1 year of follow-up, the patient remained asymptomatic with no signs of recurrence of endocarditis.

Patient 4

A 54-year old woman was admitted for a 6-week history of high-grade fever, chills, cough and shortness of breath. Vancomycin and cefoperazone were initiated after admission. Several blood cultures were positive for Escherichia coli extended-spectrum beta-lactamase (ESBL) (−) and E. faecalis. Transthoracic echocardiogram showed large, mobile vegetations (maximum 16 × 13 mm) attached to the pulmonary valve. A CT scan showed right pulmonary infiltrates with holes inside. The fever persisted after 2 weeks of antibiotic treatment.

Figure 1: (A) Excised pulmonary leaflets with vegetations. (B) Exposition of the autologous pericardial leaflets.

Figure 2: (A) CT imaging studies demonstrated bilateral pulmonary infiltrates that are comparable with pulmonary septic emboli (arrows). (B) Transthoracic echocardiography demonstrated a large, mobile pulmonary valve vegetation measuring 20 × 11 mm.
Surgical intervention was required. Intraoperatively, a 15 × 13 mm lobulated vegetation was found on the pulmonary valve. The pulmonary valve was removed and repaired with a fresh autologous pericardial patch.

The microbiological valve study revealed *E. coli* ESBL (−). The patient’s postoperative course was uneventful. Vancomycin treatment was continued for 30 days after surgery. Transthoracic echocardiogram at discharge showed no vegetations. After 2 years of follow-up, the patient remained asymptomatic with no signs of endocarditis recurrence.

**DISCUSSION**

IPE is an uncommon clinical entity of right-side endocarditis [1]. The main predisposing factors for IPE in adults are intravenous drug abuse and central venous catheters. IPE has also been identified in patients undergoing chronic haemodialysis and abdominal surgery [3]. Respiratory symptoms accompanied by fever, rise of serum markers of inflammation differentiate septic pulmonary embolism are the common clinical features in IPE patients. IPE is extremely rare in patients without underlying heart diseases, and only a few cases have been previously reported. All patients presented with persistent fever and respiratory manifestations with pulmonary valve vegetation were documented by transthoracic echocardiography.

Despite the relatively benign prognosis of IPE that can be mostly conservatively managed, IPE also presents a great challenge to the cardiac surgeon due to poor postoperative compliance and high relapse rate. Indications for surgery include persistent fever despite adequate antibiotic treatment, repetitive pulmonary emboli and pulmonary valve vegetations, which were all present in the patients. Regarding the surgical techniques for IPE, ‘prosthetic’ surgical techniques have been reported with satisfactory results [4]. Considering that prosthetic valve replacement theoretically exposes the patients to valve-related complications and to some risk of recurrent endocarditis, ‘non-prosthetic’ surgical techniques with pulmonary valve repair using autologous pericardial patch were applied to these patients.

These 4 cases of IPE represent good examples of diagnosis and management. The role of early surgical treatment should be appreciated and carefully examined as more cases of IPE are encountered.

**Conflict of interest:** none declared.

**REFERENCES**


