Severe Bivalvular Pneumococcal Endocarditis and Suppurative Pericarditis in an Immunocompetent Patient

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Abstract

Pneumococcal endocarditis is a very serious and rare clinical entity that results in significant morbidity and high mortality rates. It causes severe disease and is typically seen in alcoholics and immunocompromised patients. Antimicrobial therapy and timely surgery are warranted for optimal management and improving outcomes. We present a case of a previously healthy 31-year-old Hispanic man with bicuspid aortic valve who developed severe bivalvular pneumococcal endocarditis complicated by suppurative pericarditis that was promptly treated with antimicrobial therapy and subsequent aortic valve replacement with initial favorable clinical and hemodynamic improvement.

Key words: infective endocarditis, Streptococcus pneumoniae, bicuspid aortic valve, prognosis

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Introduction

Endocarditis caused by Streptococcus pneumoniae is a rare clinical finding with a prevalence below 3 percent (1, 2). Pneumococcal endocarditis (PE) is associated with high mortality rates and typically occurs in immunocompromised patients (3). We present an unusual case of severe bivalvular PE complicated by purulent pericarditis in a man patient with a bicuspid aortic valve.

Case Report

A 31-year-old Hispanic man presented with frontal headaches, nausea, vomiting, fever, confusion, and lethargy for 2 weeks. He had an unremarkable medical history and was HIV negative. He was recently diagnosed with sinusitis and received Ampicillin 2 days prior to admission.

The initial exam showed a temperature of 39°C, heart rate of 97 bpm, and blood pressure of 82/30 mmHg. He was alert and oriented with no neurological deficits. Throughout the precordium a 3/6 systolic and diastolic murmur was auscultated. His left leg was cold, pale, with absent dorsalis pedis and posterior tibial pulses.

Initial electrocardiogram displayed sinus rhythm, complete heart block, and accelerated junctional escape rhythm (Fig. 1). Head CT scan showed ethmoidal and maxillary sinusitis. A transesophageal echocardiogram (TEE) showed a bicuspid aortic valve with severe aortic regurgitation and large (1.2 cm) aortic valve vegetations with mobile fragments. Additionally, 1.0 by 1.1 cm vegetation was noted on the anterior mitral valve leaflet (Fig. 2a-c).

Intravenous Ceftriaxone and Vancomycin were started. An angiogram of the left leg confirmed the presence of a septic embolus in the left femoral artery and an embolectomy was performed in the operating room. He was then transferred to the intensive care unit on mechanical ventilation and vasopressors were started for hypotension and heart failure with intermittent complete heart block. Within 12 hours, blood cultures came back positive for Streptococcus pneumoniae with intermediate-resistance to penicillin (MIC, 1.5 mcg/mL).

The patient subsequently underwent an aortic valve replacement. Intraoperative findings noted large amounts of
Figure 1. 12-lead electrocardiogram showing normal sinus rhythm with complete heart block and accelerated junctional escape rhythm.

Figure 2. Transesophageal echocardiogram (TEE). a) Mid-esophageal short axis view of the bicuspid aortic valve in systole. b) Mid-esophageal long axis view showing a large multilobulated vegetation with mobile fragments on the bicuspid aortic valve (arrow) with extension to the anterior mitral valve leaflet (arrowhead). c) Mid-esophageal long axis view showing severe aortic regurgitation.

Figure 3. High power (original magnification ×400) microphotography, showing acute endocarditis, microabscesses aggregating on the valve leaflet surface in a Hematoxylin and Eosin staining.

Discussion

Streptococcus pneumoniae is an uncommon cause of bacterial endocarditis (1). The most common risk factor is alcoholism (1, 2). In the present patient, the obvious risk factor

pericardial pus and a completely destroyed aortic valve with many periannular abscesses which were debrided. His mitral valve vegetations were also resected. Macroscopic pieces of the resected aortic and mitral valve were sent for microscopic analysis (Fig. 3). Cultures performed on all specimens were negative. Repeat blood cultures were also negative. He was extubated and weaned off vasopressors.

The patient exhibited 2:1 atrioventricular heart block which prompted the placement of a permanent pacemaker. His antimicrobial regimen consisted of 4 weeks of intravenous Ceftriaxone and Vancomycin. Three weeks after his aortic valve replacement, the patient developed worsening heart failure. TEE showed aortic valve dehiscence and severe perivalvular regurgitation. He underwent another aortic valve replacement surgery. Unfortunately the aortic valve became dehisced due to extensive debridement of infected surrounding tissues required during the first surgical intervention. He was referred to another center for consideration of cardiac transplantation.
was the bicuspid aortic valve and partially treated sinusitis with resultant bacteremia. The actual incidence of PE in patients with bicuspid aortic valves is unknown, although it seems to be a very rare occurrence. To our knowledge, only one other case of PE in the setting of a bicuspid aortic valve has been reported in a case report (4).

The clinical course is fulminant and associated with high mortality rates. This is due to its acute presentation and the lack of peripheral stigmata of endocarditis which delays diagnosis (1). PE has a predilection for the aortic valve and causes significant native valve destruction (5). Systemic embolization commonly occurs due to the tendency of PE to form large vegetations (5), which was also exhibited in our patient.

The treatment can be medical alone, or combined medical and surgical therapy. Medical treatment requires antibiotics selected according to the sensitivities of the causative pathogen. Penicillin remains the therapy of choice against penicillin-sensitive (MIC<0.1 mcg/mL) Streptococcus pneumoniae (6). This pathogen, however, is becoming increasingly more resistant to penicillin (7). A study by Martinez et al examining the effect of penicillin resistance of Streptococcus pneumoniae on the prognosis of PE found that the degree of penicillin resistance is not correlated with worse prognosis (8). Surgical therapy with timely valve replacement in addition to antimicrobial therapy is associated with a decreased mortality rate compared to patients who are treated with antibiotics alone (1-5).

Severe invasive pneumococcal disease still remains a significant cause of morbidity and mortality; however, endocarditis and pericarditis have become very rare complications of bacteremic pneumococcal disease. In a prospective, multicenter, international, observational study of hospitalized patients with S. pneumoniae bacteremia, only five of 844 (0.6%) patients developed endocarditis and three of 844 (0.36%) developed pericarditis (9).

The concurrence of pneumococcal pneumonia, meningitis, and endocarditis is also rare and represents one of the most virulent forms of invasive pneumococcal disease (10), first described by Osler and later described and published by Austrian, as a triad (10, 11), remains rarely reported in the literature. To date, only one case in the literature has been reported regarding suppurative pericarditis and cardiac tamponade complicating Austrian’s triad (10).

Pneumococcal pericarditis was the most common cause of purulent pericarditis before the antibiotic era. This is probably a reflection of penicillin therapy. The postulated pathophysiology has been that the adjacent endocardial infection may cause an inflammatory response in the pericardium with migration of neutrophils and eventual deposition of fibrin and cellular debris (12, 13). It has not been clear whether bacteria migrate directly from the cardiac tissue itself or if there is subsequent bacteremia and invasion of the pericardial sac (13).

Conclusion

The present patient exemplifies a very rare and particular case. Although the incidence of PE is low, severe and complicated cases can still occur even in healthy young adults. Despite optimal medical and surgical intervention, PE is a serious condition associated with significant morbidity and high mortality. Early and prompt diagnoses with appropriate therapy are pivotal in preventing complications and death.

References


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