

Two Cases of Nosocomial Infection Protetic Valve Endocarditis Caused by *Pseudomonas aeruginosa*

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Abstract

Recently, changes have been observed in the occurrence and clinical presentation of *Pseudomonas endocarditis*, with increasing incidence of nosocomial infections and involvement of the aortic and mitral valves.

Two cases of patients who had suffered cardiac surgery in the recent past, successfully treated for pseudomonal endocarditis, are presented here.

Keywords: Nosocomial infection; Endocarditis; Mitral valve; Aortic valve; *Pseudomonas aeruginosa*; Protetic valve

Introduction

Pseudomonas aeruginosa endocarditis are uncommon (<1.8% of cases) [1,2]. Previous report mostly described rightsided heart involvement in intravenous drug abusers.

Recently is also an occasional cause of nosocomial endocarditis. It carries a very high mortality rate of 80% necessitating, therefore, early diagnosis and intervention. The clinical outcome of right sided endocarditis has improved with cure rates, reaching 84% while that of the left side remains 33% [3,4]. Numerous studies have shown significantly better outcomes with combined medical/surgical treatment.

Here we present two cases of non-IVDU, one prosthetic aortic valve and other prosthetic mitralic valve *Pseudomonas aeruginosa* endocarditis.

Cases Reports

Case 1

On August 17, 2015, a 55 year old man was admitted to the University Hospital A. Gemelli in Rome with the diagnosis of *Pseudomonas aeruginosa* mitral valve endocarditis. He has past medical history of high blood pressure history and previous surgery lithotripsy for ureteral stones several years before.

On June 2015 patient is subjected to the cardiothoracic surgeon with plastic surgery of the mitral valve and Physio II ring system, for severe mitral regurgitation secondary to chordal disease at another hospital. On admission laboratory data included C Reactive Protein 70.7 mg/dl and mild anemia.

Supraventricular tachycardia episode and high fever have been reported in the postoperative setting. The first three sets of blood culture were positive for *Pseudomonas aeruginosa* and cefepime

therapy was started (2 g I.V. Q 8 hr) in accordance with the antibiogram.

Seven days after discontinuation of a five weeks antibiotic course, the patient's condition exacerbated with the occurrence of high fever. Imipenem therapy was started (500 mg IV Q 6 hr). Abdominal CT scan demonstrated sigmoid colon's wall thickening. Colonoscopy didn't evidence dysfunctions. The transthoracic echocardiogram was negative for vegetations; but a transoesophageal echocardiography showed mitral plastic outcomes with a mass (11 × 5 mm) compatible with endocarditic vegetation on the ring of mitral valve, floating in the left atrium, with abscess.

Antibiotic therapy was started with cefepime IV for five weeks and gentamicin (7 mg/kg IV) for four weeks, suspended because of renal toxicity and he started on maintenance hemodialysis for two months. On September, patient is subjected to the cardiothoracic surgeon with mechanical replacement mitral valve. The bacterial culture of the valve was negative.

After 2 weeks postoperatively, patient had had hemorrhagic stroke for which he was transferred to ICU. On October, because of Acynetobacter XDR isolation on BAL, antibiotic therapy with colistin and tigecycline was started and continued for two weeks.

Following a recurrence of fever was performed blood cultures from peripheral blood and from CVC tested positive for *Pseudomonas* with times of positivity indicative of sepsis by CVC.

The transthoracic echocardiogram didn't report evidence of endocarditic vegetations. He began therapy with meropenem (2 gr IV q 8 hr) and daptomycin (10 mg/kg/die) for four weeks; than he was transferred to the neuromotor rehabilitation center. In the last follow up, four months later, the patient continued to do well clinically.

Case 2

A 73 year old male admitted to the University Hospital A. Gemelli in Rome for *Pseudomonas aeruginosa* sepsis with valvular dysfunction suggestive of endocarditis. He has past medical history of hypertension, diabetes mellitus, renal stones, polypectomy of the transverse colon, gallbladder.

On May 2015, patient is subjected to the cardiothoracic surgeon with biological replacement aortic valve for severe aortic stenosis at another hospital. The bacterial culture of the valve was negative.

An episode of transient ischemic heart attack and endocarditis with abscess perivalvular has been reported in the postoperative setting. On June 2015 was performed aortic valve replacement surgery with biological prosthesis, without complications. He was transferred to the rehabilitation center. Two months later, low grade fever occurred and on readmission to the ward, he was febrile, normotensive and blood cultures were positive for *Pseudomonas*.

Antibiotic therapy with imipenem (500 mg IV Q 6 hr) and gentamicin (3 mg/kg IV) was started, with benefit. The patient was admitted in our department on September 30, 2015.

On admission, the transthoracic echocardiogram reported no evidence of vegetations, but the transoesophageal echocardiogram showed a mass attached to the prosthesis ring of the valve suggestive of vegetation (18 × 30 mm) with blood lacunae inside indicative of periprosthetic abscess.

Early cardiac surgery was considered, but since the patient was hemodynamically stable, the decision was made to try to establish the control over the infection with antibiotics before referring him to cardiac surgery. During hospitalization antibiotic therapy is continued for 6 weeks.

One week after discontinuation of antibiotic therapy, the patient became febrile again and blood cultures came back positive for *Pseudomonas*. So he resumes antibiotic therapy with imipenem (500 mg IV Q 6 hr) and gentamicin (3 mg/kg IV) and on November 2015 successful biological aortic valve replacement surgery was performed without complications. The bacterial culture of the valve was negative.

The patient fully recovered during a six week postoperative imipenem plus gentamicin. Laboratory analysis on discharge demonstrated normalization of most inflammatory markers (white blood cell count, CRP, fibrinogen). Four months later, he was symptom free and in good health.

Discussion

Pseudomonas endocarditis was first noted in 1899, as described by Reyes et al. [5]. Risk factors for *Pseudomonas endocarditis* are valvular heart abnormalities, congenital heart diseases, heart surgery, intravenous drug usage, and presence of central catheters, hemodialysis and cardiac catheterization, gastrointestinal and genitourinary procedures. *Pseudomonas aeruginosa* usually affects tricuspid valves and right ventricle [6-9]. It's important to highlight that transthoracic echocardiography have a sensitivity of less than 70% in the diagnosis of endocarditis.

Conclusion

The present cases illustrated that infective endocarditis due to atypical organisms such as *Pseudomonas aeruginosa* poses a diagnostic challenge and a significant risk to the patient.

Treatment of *Pseudomonas aeruginosa* endocarditis is a point of discussion and as yet there has been no consensus on treatment. A

multidisciplinary approach is the success of treatment. Medical treatment of *Pseudomonas endocarditis* is usually composed of a high dose aminoglycoside and extended spectrum penicillin for more than six weeks.

In case of catheter related bacteremia with *Pseudomonas*, the line should be removed as soon as possible. Persistent bacteremia in a patient with a prosthetic valve warrants further investigations. We would like to notify that pseudomonal endocarditis with prosthetic or foreign material could not be eradicated without surgical removal. Surgical intervention is recommended in those if

Bacteremia persists for more than two weeks despite adequate courses of antibiotics. Valve replacement is recommended for curative treatment of left-sided endocarditis. Furthermore, early surgery is inversely associated with mortality. Even after surgical removal, anti-pseudomonal therapy should be prolonged to prevent relapses. In our case, the importance of surgical intervention and the significance of extension the anti-pseudomonal combination therapy in case of *Pseudomonas endocarditis* in emphasized [2,10-12].

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