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Successful antibiotic therapy in early prosthetic valve endocarditis with large vegetation

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Abstract:

Prosthetic valve endocarditis (PVE) is a fearful complication of cardiac valve replacement surgery. Compared with the late presentation, early PVE is associated with higher rates of morbidity and mortality. Despite significant improvement in our understanding regarding the treatment of native valve endocarditis, the optimal treatment for PVE is still a matter of debate. There is still no clear agreement whether to choose surgery or medication as the best therapeutic option for PVE patient. Furthermore, the timing of surgery for PVE has not yet been defined.

Keywords:

Endocarditis, medication, prosthetic valve, surgery

Introduction

Infection of a heart valve prosthesis, or prosthetic valve endocarditis (PVE), is an uncommon but potentially lethal complication of heart valve replacement surgery (Rohmann *et al.*, 1997). It occurs in approximately 1%–6% of patients with valve prosthesis, with an incidence of 1%–2% per patient-year. PVE accounts for 20.1% of all endocarditis cases, and the cumulative risk of PVE seems to be similar in bioprosthetic and mechanical valves. Patients with PVE were more likely to develop complications such as abscess compared with native valve endocarditis (NVE) and had longer hospital stay. In terms of the onset, PVE is classified into early and late PVE. Early PVE is defined as that occurring within 1 year of surgery, and late PVE is defined as that occurring beyond 1 year of surgery. This classification was made on the basis of different microbiological profiles between the two. The optimal management of PVE is a subject of great debate as there have been

no randomized controlled trials comparing the efficacy of medical treatment with the combined medical–surgical approach.

Case Report

A 17-year-old female presented with worsening fatigue in the past 1 month before admission. She also complained of fever accompanied by shivers and joint pain especially in the elbow and knee. She mentioned about passing black stool infrequently, and the last occurrence was 3 days before admission. The patient had a prior history of aortic and mitral valve replacement (MVR) with bioprosthetics in September 2017. On physical examination, the blood pressure was 97/72 mmHg, heart rate was 87 bpm, and respiratory rate was 20x/min, with oxygen saturation 99% under room air. She was febrile with a temperature of 38.5°C. The conjunctiva was pale. Chest examination revealed pansystolic murmur grade 3/6 in the lower left sternal border and mid diastolic murmur grade 2/4 in the apex. Electrocardiography showed sinus rhythm with left ventricular hypertrophy. Chest X-ray showed increased cardiothoracic

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ratio. Laboratory results showed reduced hemoglobin level and increased level of infection markers such as leukocyte, C-reactive protein, and procalcitonin. Occult blood test showed positive result with normal international normalized ratio level. There was erythrocyte in urinalysis tests. Transthoracic echo revealed a large vegetation (12 mm × 18 mm) in the leaflet of mitral valve with moderate obstruction [Figure 1a]. Transesophageal echo (TEE) confirmed that there was large and mobile vegetation in mitral valve which could have caused significant obstruction of mitral inflow, with mild central leakage [Figure 1b]. A diagnosis of early PVE in mitral bioprosthetic valve was made. While waiting for the blood culture result, she was given vancomycin 2 × 1 g, gentamicin 1 × 120 mg, and rifampicin 2 × 450 mg. We also decided to perform urgent MVR. Result from the blood culture showed *Staphylococcus capitis* in all specimens, as such so antibiotic regimens were continued. While waiting for the surgery, 2 weeks after antibiotics, the TEE was performed again. The echo revealed no vegetation, with good function on both aortic and mitral valves [Figure 2]. The patient did not show any signs of embolism, and abdominal ultrasound also showed normal result. Blood culture was repeated, and two from three specimens gave negative results. Together with the improvement of clinical profile and infection marker, we decided not to perform the surgery. However, there was marked increase in creatinine level (from 0.53 to 3.86 mg/dl) which was caused by the use of antibiotics. Thus, it was decided to perform hemodialysis and discharge the patient afterward.

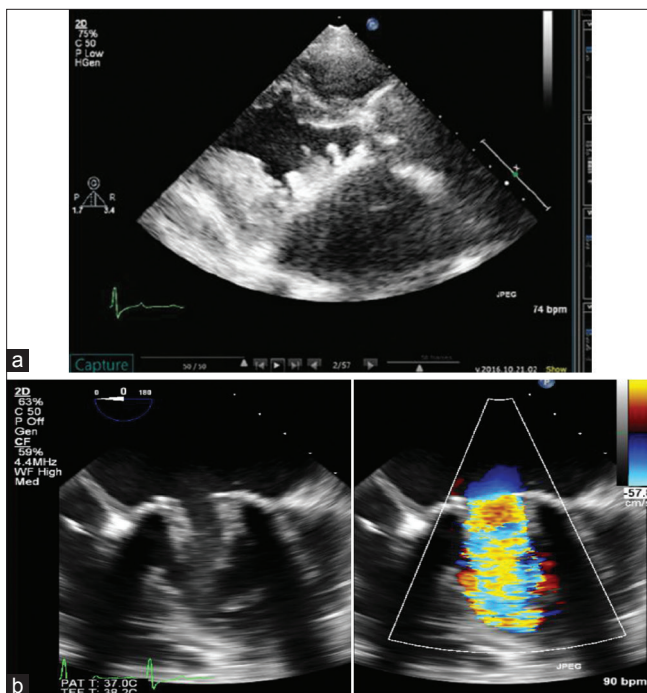


Figure 1: (a) Transthoracic echocardiography showing large vegetation in mitral valve. (b) Transesophageal echo confirmed large vegetation as shown in transthoracic echocardiography. There was also significant obstruction to mitral inflow

Discussion

General principles for the treatment of infective endocarditis (IE) are medical therapy with or without surgery (Rohmann *et al.*, 1997). Decisions on surgical intervention in IE are complex and involve many clinical and prognostic factors, such as presence of heart failure, infecting organisms, perivalvular infection, and embolism; vegetation size; and patient comorbidities. Above all, the timing of surgery is another problem to be considered. Guideline from the ESC defines early/urgent surgery when performed within a few days, while in American College of Cardiology/American Heart Association (ACC/AHA) when performed during initial hospitalization before completion of a full therapeutic course of antibiotics (Bonow *et al.*, 2014; Habib *et al.*, 2015). The effectiveness of early surgery for PVE is still unclear. A large study from Lalani *et al.* (2013) showed that early valve replacement was not associated with lower mortality compared with medical therapy. The benefit of early surgery only found in subgroups patients who had strong indications for surgery (valve regurgitation, vegetation, and dehiscence or paravalvular abscess/fistula). Indications for early surgery in PVE are also slightly different between ESC and ACC/AHA guidelines. The ESC and ACC/AHA scientific statement in 2015 stated that early surgery may be considered in PVE with vegetation size >15 and >10 mm accordingly. However, in the ACC/AHA guideline, 2017, vegetation size is not a consideration for early surgery in PVE. In our patient, the team decided to perform urgent surgery considering that the vegetation size is large (>10 mm) and mobile. After 2 weeks of antibiotic administration, the vegetation in our patient resolved with no sign of embolism. This brings into question whether surgery is really the optimal choice for PVE with considerably large vegetation. Moreover, a previous study showed that antibiotics have the ability to reduce vegetation by several mechanisms,

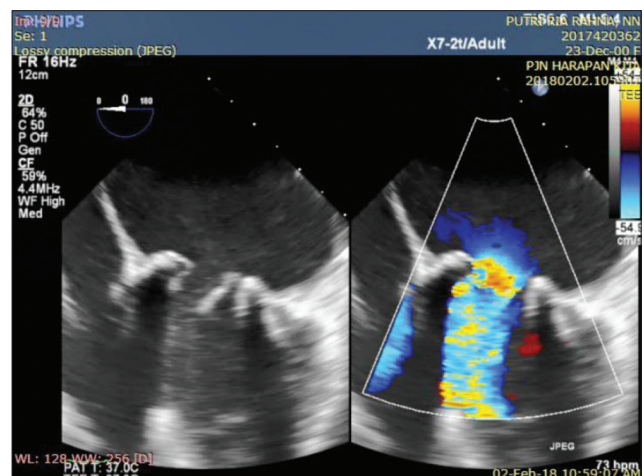


Figure 2: Transesophageal echo 2 weeks after antibiotic therapy. The vegetation seemed to disappear

which are altering platelet function and lowering titers of bacterial toxins, thereby reducing interaction between thrombus and bacteria in vegetation (Nagpal *et al.*, 2012). In conclusion, decision to do early surgery in patients with PVE, especially when considering only vegetation size, is still uncertain. The decision has to be carefully weighed against the risks and benefits in each individual case.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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