Blood Culture-Negative Prosthetic Aortic Valve Endocarditis Causing Dehiscence and Dislodgement with Severe Regurgitation and Acute Heart Failure: Case Report

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Abstract

Objective: To present a case with late aortic valve mechno-prosthesis dislodgement due to blood culture-negative bacterial endocarditis.

Clinical Presentation: A 62-year-old man with a prior history of bileaflet aortic valve mechno-prosthesis 24 months earlier due to stenotic congenital bicuspid valve. He presented with signs and symptoms of acute heart failure. Inflammatory markers were raised. Radiological and echocardiographic examinations revealed pulmonary venous congestion, severe aortic regurgitation and mechanical valve dislodge-ment. Prosthetic valve endocarditis was anticipated. Serial blood cultures were negative but tissue culture grew Propionibacterium acnes.

Conclusion: A redo procedure was successfully performed by implanting a new mechanical prosthesis in the aortic position

Keywords: Prosthetic Valve Endocarditis, Propionibacterium Acnes Endocarditis, Prosthetic Valve Dehiscence, Prosthetic Valve Dislodge-ment, Aortic Regurgitation, Congestive Heart Failure, Reoperation

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Introduction

Prosthetic valve endocarditis (PVE) is a life-threatening condition that is associated with considerable morbidity and mortality\(^1\). PVE is most commonly caused by Staphylococci and Enterococci\(^2,3\) infection. Dehiscence, detachment and leakage of the mechanical aortic valve may occur following PVE causing acute heart failure necessitating emergent surgical intervention. Favorable outcome is dependent on early diagnosis with non-invasive diagnostic tools and rapid therapeutic intervention. A patient is presented with prosthetic aortic valve “blood culture-negative” endocarditis causing dislodgement of the mechanical valve, severe aortic regurgitation and acute congestive heart failure requiring emergent reoperation. Tissue cultures grew Propionibacterium acnes. This case report reviews PVE as the aetiology of a mechanical valve detachment.

Case Report

A 62-year-old man was admitted to the pulmonary disease department because of progressive dyspnea (NYHA class III), cough, weight loss of 4kg/4weeks, general malaise and raised inflammatory parameters and anaemia. He was recently treated, by his general practitioner, with a course of antibiotics for presumed respiratory tract infection. In 2012, he underwent mechanical (Carbomedics Reduced 25 mm) prosthetic aortic valve replacement (AVR) (Figure 1A and 1B) for treatment of congenital bicuspid aortic valve stenosis. In addition, he had a medical history of well controlled arterial hypertension. On admission in 2014, he developed acute congestive heart failure (CHF), had no fever with an arterial blood pressure of 116/51 mmHg and regular pulse rate of 90 bpm. Clear mechanical valve clicks were heard. Crackles were audible in the lower 2/3 of the pulmonary fields. A 12-lead ECG depicted sinus rhythm with first degree AV block, left axis deviation and voltage criteria of left ventricular hypertrophy. Inflammatory parameters were raised (CRP 103 (N= <10), leukocytosis 12.6 10/l (N=4-10), with anaemia (Hb 6.4 mmol/l (N=8.5-11)), elevated brain natriuretic peptide (NT-proBNP) level (850 pmol/l (N=<19)) and lacto-dehydrogenase (LD 717 U/l (N=<250)). All serial blood cultures that were taken were sterile. Culture-negative infective endocarditis was highly suspected. Transthoracic echocardiography (TTE) revealed normal left and right ventricular function, rocking valve motion without visible vegetations, severe aortic regurgitation and aortic paravalvular leakage. Antibiotic treatment with flucloxacilin, clindamycin and rifampicine was initiated.

**Fig.1 a and b:** Initial chest X-ray demonstrating normal roentegenographic position of the mechanical aortic valve prosthesis (arrow).
During an emergent operation a redo was undertaken with re-implantation of a mechanical prosthetic valve. At surgery, the infected prosthetic valve was completely dehiscent which could be removed from the annulus by light traction. Tissue cultures were taken and grew Propionibacteria acnes. There was no active infection or inflammatory signs. The annulus was dehiscent creating a distance of 2 cm between the left ventricle outflow tract and the beginning of the ascending aorta. Approximation with Ticron 2-0 mattress sutures was performed with insertion and fixation of Carbomedics Reduced 23 mm mechanical valve. The ostia of the coronary arteries were clear. Postoperative transesophageal echocardiography showed normal LV function, a 16 mmHg gradient over the mechanical valve with moderate AR. In addition, postoperatively, antibiotics (fluoxacillin, clindamycine and rifampicine) were continued for 4 more weeks. The recovery was uneventful. The patient remains free of symptoms two years after redo surgery.

**Discussion**

Dehiscence and dislodgement of the mechanical AV prostheses was initially seen on serial chest X-ray. The patient presented with symptoms of acute heart failure. Echocardiography demonstrated severe aortic regurgitation and rocking movement of the mechanical AV. Culture-negative infective endocarditis was highly suspected. Serial blood cultures were negative but tissue cultures obtained during redo surgery were positive for Propionibacterium acnes. Redo aortic valve surgery is the most frequent reoperation among all valve procedures. Infective endocarditis is one of the most important indications for redo aortic valve surgery. Prosthetic valve endocarditis (PVE) is a life-threatening condition that is associated with considerable morbidity and mortality, accounting for in-hospital death in 22.8% of subjects. Early mechanical PVE is responsible for 30% of PVE cases which is caused by Staphylococcus Aureus infection while bioprosthetic valves are less prone to early infection. In the presented case, PVE of the mechanical AV occurred late after first implantation. Dehiscence of mechanical prosthetic valves may be due to infective endocarditis, as was the case in our current patient.

Diagnosis of IE is based on clinical, echocardiographic and microbiological grounds. Dehiscence and/or dislodgement of mechanical valve prosthesis may be suspected on chest X-ray, detected by echocardiography (rocking valve motion), proven during surgery - all were present in our patient- or documented at necropsy. In the current case, both chest X-ray and TTE gave the clue for early diagnosis and sufficient images. There was no need for transesophageal echocardiography. If the echocardiography is inconclusive, 18F-fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (18F-FDG PET-CT) may prove to have potential benefits in the diagnosis of PVE.

In the current case, although serial blood cultures were sterile, culture-negative PVE was anticipated and diagnosed based on clinical, laboratory (anaemia and raised inflammatory markers), chest X-ray and transthoracic echocardiographic findings. The reason for sterile blood culture may be attributed to the recent treatment with a course of antibiotics for presumed respiratory tract infection. The most commonly involved microorganisms in PVE are Staphylococci and Enterococci, though in our current case, tissue cultures were taken during redo surgery and grew Propionibacterium acnes. Anaerobic bacteria are rarely associated with IE. Propionibacterium acnes is an anaerobic gram-positive bacteria with low virulence which is part of the normal flora of the human derm. However, serious infections of prosthetic valves may rarely occur and case series have reported sporadically in the literature.

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Generally, the management of PVE is a combination of aggressive medical treatment with appropriate sensitivity-guided antibiotics and tailored (complete removal or conservative management) surgical interventions which is considered the treatment of choice. Our patient responded well to anti heart failure treatment as well as to antibiotic therapy. In a retrospective study by Truninger et al, it was highlighted that in selected patients, non-staphylococcal PVE with prudent supervision may be managed with antibiotics without further sequelae [5]. Chest X-ray as an initial diagnostic tool may be of value, as was the case in the current patient, in prosthetic valve dislocation due to endocarditis caused by Propionibacterium acnes. Rapid examination using echocardiography will establish the etiology and prolonged blood culture is required to grow anaerobic gram-positive bacterial species. Prompt treatment with effective antibiotics should be initiated.

Conclusion
This case report demonstrates that late mechanical valve dislodgement due to, blood culture-negative but culture positive Propionibacterium acnes, prosthetic aortic valve endocarditis may be early seen on serial chest X-ray imaging and confirmed by echocardiography. A redo procedure was successfully performed by implanting a new mechanical prosthesis in the aortic position.

Reference