Case Report

Antibiotic management of native mitral valve infectious endocarditis in patient with unaffected prosthetic aortic valve: A case report

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ABSTRACT

Infectious endocarditis is a rare but feared condition, most frequently caused by *Staphylococcus aureus*. We describe the case of an 81-year-old male patient presenting with intermittent fever and dyspnea. Cardiac evaluation with transthoracic echocardiogram showed the presence of heart failure with suspicion of endocarditis. Consequently, a transesophageal echocardiogram demonstrated vegetation on the native mitral valve with an unaffected prosthetic aortic valve. Blood cultures were positive for *S. aureus*. Literature concerning endocarditis originating from a native valve in patients with a prosthetic valve is limited. We applied a new treatment scheme consisting of intravenous floxapen 12 g/24 h in a continuous infusion combined with intravenous rifampicin 2×300 mg daily for a duration of 6 weeks resulting in complete regression of the vegetation. In addition, we were successful in preventing disease propagation to the prosthetic valve. There is a need for more adequate research to prove the prophylactic benefit of this treatment.

Keywords: Antibiotic treatment, Native valve endocarditis, Prosthetic aortic valve

Infective endocarditis (IE) is a rare but severe disease with an incidence that varies according to region. High-income countries report an incidence of approximately 1–9.6/100,000 people [1]. Despite improvements in the management of endocarditis, the incidence has not decreased over the years [1]. IE is additionally one of the most dreaded complications of staphylococcal bacteremia (6–31%) [2]. The most frequently seen pathogen is *Staphylococcus aureus* (31–48%) followed by coagulase-negative *Staphylococci* (31.6–36%). Less common microorganisms are *Enterococci*, *viridians Streptococci*, and gram-negative bacteria. Predisposing risk factors of IE are age, male sex, injection drug use, prior history of IE, poor dental hygiene, structural, valvular and congenital heart disease, human immunodeficiency virus, and chronic hemodialysis [3]. The mitral valve is the most frequently involved valve in IE [4].

In this case report, we present the case of an 81-year-old male patient who presents with native mitral valve endocarditis while having an unaffected prosthetic aortic valve. Guidelines and literature concerning the difference in the treatment of native valve endocarditis (NVE) versus prosthetic valve endocarditis (PVE) are readily available. However, the literature concerning the management of NVE in patients with an unaffected prosthetic valve is very limited. With this case report, we aim to provide a new treatment scheme for the prevention of disease propagation from the native to the prosthetic valve.

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CASE REPORT

An asymptomatic 81-year-old Caucasian male was admitted to the hospital after a cardiologic check-up for suspected endocarditis. He has a medical history of arterial hypertension, unilateral hip prosthesis, neurogenic claudication, infrarenal aortic aneurysm of 46 mm, acute left cardiac failure with permanent atrial fibrillation, chronic kidney disease, and hyperthyroidism. In addition, the patient had a prosthetic mechanic saint-Jude aortic valve implanted 20 years ago due to significant aortic valve stenosis.

One month before admission, the patient presented to the emergency room with symptoms of severe dyspnea and thoracal pressure. He was then hospitalized for a complete cardiac checkup with a transthoracic echocardiogram which showed heart decompensation with an ejection fraction of 48% (heart failure with mid-range ejection fraction, HFmEF) and grade II mitral insufficiency with a slight prolapse of the anterior leaflet. Consequently, a transesophageal echocardiogram (TEE) was recommended for further evaluation. Echocardiography additionally showed hypokinesia of the anteroseptal region which resulted in the execution of a single-photon emission computerized tomography scan. The latter ruled out ischemic heart disease.

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Therapy for the diagnosed HFmEF consisted of burinex alternating 1 and 2 mg, spironolactone 25 mg, bisoprolol 2.5 mg, and entresto 24 mg. However, a week into hospitalization, the patient developed an intermittent fever with a C-reactive protein (CRP) of 73 mg/dL. Blood cultures were therefore drawn that tested positive for omni-sensitive *S. aureus*. Flucloxacillin 4×500 mg was administered daily. CRP declined adequately with the absence of fever after which the patient was discharged.

There was an ambulant TEE planned a week post-discharge. The TEE was done with a short narcosis with 100 mg propofol. The echocardiogram showed a vegetation of 52 mm possibly originating at the annulus of the native mitral valve toward the anterior leaflet. This caused severe mitral insufficiency (grade III-IV) with an eccentric jet. The heart auricle was free from thrombus material. The mechanical aortic valve appeared normal, like the native tricuspid and pulmonalis valves. The Duke criteria were achieved resulting in the diagnosis of native mitral valve endocarditis. The patient was therefore rehospitalized with the initiation of endocarditis antibiotic treatment. Clinical evaluation showed a blood pressure of 153/71 mmHg, a regular pulse of 58 bpm, a saturation of 96%, and a body temperature of 36°C. Heart auscultation revealed a systolic murmur in the mitral area. Lung auscultation was normal and there were no signs of peripheral edema. Laboratory work showed a hemoglobin of 13.4 g/dL, a hematocrit of 41%, a red blood count of 4.35×10^12/L, no leukocytosis, a CRP of 19.8 mg/L, K 3.39 of mmoL/L, creatinine of v 1.98 mg/dL, urea of 47.2 mg/dL, and a Glomerular filtration rate of 31 ml/min.

As the role of adequate antibiotic management for native mitral valve endocarditis in a patient with an unaffected prosthetic aortic valve is very important, we decided to give the following antibiotic regimen. The regimen constituted of intravenous floxapen 12 g/24 h in a continuous infusion combined with intravenous rifampicin 2×300 mg daily. Nineteen days later, a repeat TEE was conducted with 70 mg propofol which showed a significant reduction of the vegetation on the mitral valve. However, the leaflet prolapse and the grade II mitral insufficiency were still present. The mechanical aortic valve stayed untouched. The antibiotic treatment, therefore, remained the same. 2 weeks later another TEE was conducted with 60 mg propofol. This examination showed complete regression of the vegetation on the mitral valve with a remaining intact prosthetic aortic valve. The antibiotics were administered for 6 weeks in total until discharge.

DISCUSSION

The patient presented in this case was diagnosed with native mitral valve endocarditis while having an unaffected prosthetic aortic valve. However, literature concerning the management of NVE in patients with an unaffected prosthetic valve is very limited.

Guidelines and literature concerning the difference in treatment of NVE versus PVE are readily available. According to the European Society of Cardiology (ESC) guidelines, antibiotic treatment for methicillin-susceptible staphylococcal NVE consists of (flu) cloxacillin or oxacillin 12 g/day i.v. in 4–6 doses for a duration of 4–6 weeks. In case of a prosthetic valve infection, a more extensive regimen is recommended consisting of a triple therapy of (flu) cloxacillin or oxacillin with rifampin and gentamicin at a dose of 12 g/day i.v. in 4–6 doses for more than 6 weeks, 900–1200 mg i.v. or orally in 2–3 doses for more than 6 weeks, and 3 mg/kg/day i.v. or i.m. in 1–2 doses for 2 weeks respectively [5].

With the anatomical proximity of the mitral and aortic valves, there is a risk for the propagation of the infection toward the prosthesis causing multivalve endocarditis. Literature concerning the etiology and incidence of propagation of univalve endocarditis is not available, therefore making the statement merely a hypothetical fear. PVE results more frequently and more rapidly in the need for valve replacement than NVE due to higher mortality rates of more than 45% [5]. According to a study by Guerrero *et al*., PVE showed more complications resulting in the need for surgery, to which cardiac failure, prosthetic dehiscence, and myocardial abscess contribute to the most frequent indications. Moreover, multiple-valve endocarditis results in poor clinical outcomes in comparison to NVE [4]. A prospective observational study by López *et al*. shows that as compared to single-valve endocarditis, the multi-valve disease was significantly associated with increased rates of heart failure (65% vs. 50%) [6], need for heart surgery (70% vs. 54%) [6], perivalvular complications (41% vs. 21%) [6], as well as, more renal (43%) [4] and neurological events (35%) [4]. Although the mortality rate was similar (28% vs. 30%), there was no statistically significant difference between the two [6].

Our team decided to follow the ESC treatment guidelines for NVE. Since *S. aureus* PVE has a high mortality rate and often requires early surgery for valve replacement combined with the risk of an expansion to multi-valve disease, we decided on the addition of rifampin from the PVE scheme as a form of prophylaxis. In comparison to an infection concerning one valve, the addition of Gentamycin to NVE is not recommended due to lack of clinical benefit and increased renal toxicity, with our patient having underlying chronic kidney disease, gentamicin was excluded from the applied regimen [1,7]. Due to the resolution of the vegetation within the 6-week period of recommended antibiotic treatment, we consider our applied regimen to be successful for this patient. However, to scientifically prove the effectiveness of this treatment plan, additional research, preferably randomized controlled trials, is necessary particularly for this limited patient population.

CONCLUSION

We showed successful treatment with the combination of flucloxacillin and rifampicin for native mitral valve endocarditis in a patient with an unaffected prosthetic aortic valve.

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