

Successful surgical treatment of aggressive right-sided infective endocarditis in a chronic hemodialysis patient

Kronik hemodiyaliz hastasında agresif sağ taraf infeksiyeli endokarditinin başarılı cerrahi tedavisi

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Right-sided infective endocarditis is rare. In this article, we presented successful urgent surgical management of aggressive tricuspid valve infective endocarditis with recurrent pulmonary embolism in a chronic hemodialysis patient.

Keywords: Endocarditis; renal failure; tricuspid valve.

Sağ taraf infeksiyeli endokarditi nadirdir. Bu yazıda, kronik hemodiyaliz hastasında, tekrarlayıcı pulmoner embolizm ile birlikte, agresif bir triküspit kapak endokarditinin başarılı acil cerrahi tedavisi sunuldu.

Anahtar sözcükler: Endokardit; böbrek yetmezliği; triküspit kapak.

Right-sided infective endocarditis (IE) is rare and accounts for 5-10% of all cases of IE.^[1] It is usually associated with intravenous drug use (IDU), the utilization of a central catheter, or inserted intravascular devices, with *Staphylococcus aureus* (*S. aureus*) being the most common infectious agent. In addition, right-sided IE frequently involves the tricuspid valve and has an especially high incidence rate among patients with renal failure who are receiving hemodialysis (HD).^[2] Herein, we present the case of a chronic HD patient with aggressive tricuspid valve IE caused by methicillin-resistant *Staphylococcus haemolyticus* (*S. haemolyticus*) who required urgent surgical management.

CASE REPORT

A 62-year-old male HD patient was referred to our out-patient clinic with a high fever, general fatigue, and a seven-day history of dyspnea. On admission, his blood pressure was 90/60 mmHg (systolic/diastolic), and his body temperature was 38 °C. A grade 3/6 pansystolic murmur was heard

on the lower left sternal border, but the rest of the physical examination results were normal. A surface electrocardiogram also revealed sinus rhythm and signs of left ventricular (LV) hypertrophy. In addition, laboratory examinations showed leukocytosis and increased acute phase reactants, but the blood urea nitrogen (BUN), creatinine, and urine parameters were normal. Transthoracic echocardiography (TTE) demonstrated a mobile, hyperechogenic mass measuring 22 mm in length along with vegetation that was causing severe tricuspid regurgitation. The mass extended from the tricuspid leaflets to the right ventricle (RV) and continued into the right atrium (RA), with the 18x5 mm RV component being larger than the RA component (Figure 1). The patient's pulmonary, aortic, and mitral valves were normal, but we observed dilation in the right heart chambers, right ventricular dysfunction, pulmonary hypertension (HT) (pulmonary artery systolic pressure of 90 mmHg), mild mitral regurgitation and LV global hypokinesis [ejection fraction (EF) of 35%]. The patient was then diagnosed with tricuspid valve IE.



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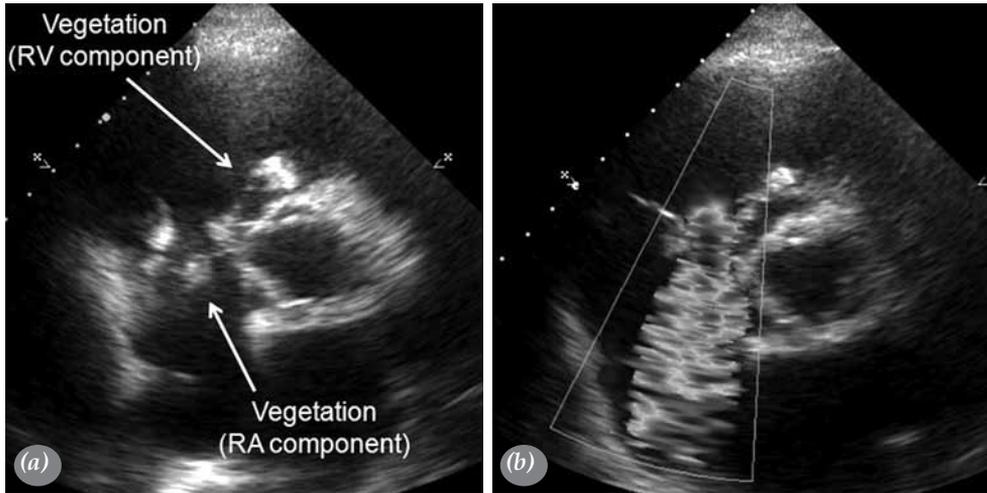


Figure 1. (a) Transthoracic echocardiography showing a long, mobile, hyperechogenic mass consistent with vegetation extending from the tricuspid leaflets to the right ventricle (RV) and continuing into the right atrium (RA) (left side). (b) The mass was causing severe tricuspid regurgitation (right side). The right ventricular (RV) component of the vegetation was larger than the RA component.

After collecting blood cultures, an empirical antimicrobial therapy was initiated (daptomycin 6 mg/kg every 48 hours plus meropenem 500 mg every day). Because of the right heart dysfunction and severe pulmonary HT, thoracic computed tomography (CT) was also performed, which showed triangular consolidations and moderate pleural effusion in both lung fields that suggested multiple pulmonary infarctions. The right subclavian dialysis catheter was then removed, and a fresh triple-lumen dialysis catheter was inserted into the left internal jugular vein. Because of the large, mobile vegetation and repeated occurrence of a pulmonary embolism, urgent surgical therapy was planned.

Preoperative coronary angiography exhibited noncritical plaques without any significant stenosis, indicating non-ischemic dilated cardiomyopathy. When the RA was opened, large vegetations and even local perforation areas were observed on the leaflets; thus, valve repair was not possible (Figure 2). Therefore, the tricuspid valve was replaced using a 31 mm Carpentier-Edwards bioprosthetic valved conduit (Edwards Life Sciences Corp., Irvine, CA, USA) after the vegetations and tricuspid valve were totally resected (Figures 3 and 4).

The patient's postoperative course was uneventful. The HD catheter was removed postoperatively, and an arteriovenous (AV) fistula was created to provide vascular access for HD. Both the blood cultures drawn at admission and the cultures of the excised valve tissue grew methicillin-resistant *S. haemolyticus*.

Antibiotherapy with daptomycin alone was continued for six weeks, and warfarin was administered at an international normalized ratio (INR) of between 2 and 3 for the first three months after the surgery. Control echocardiographic examinations at one week and one month postoperatively revealed that the bioprosthetic tricuspid valve was functioning well and that the left ventricular ejection fraction remained unchanged.

DISCUSSION

Right-sided IE accounts for 5-10% of all cases of IE^[1] and mostly involves the tricuspid valve. Although IDU is the main predisposing factor, right-sided

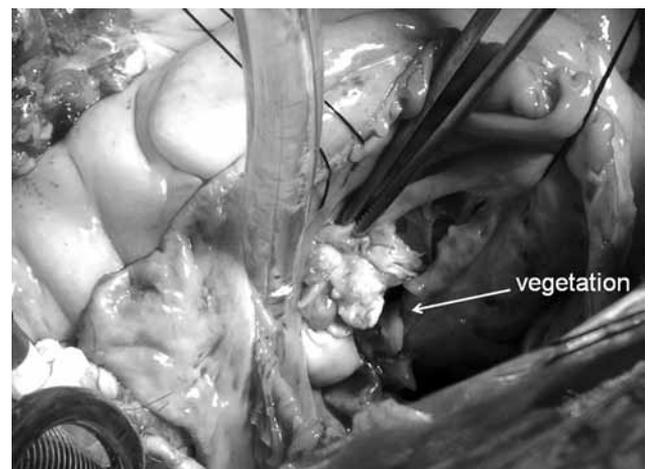


Figure 2. Intraoperative view of the vegetation attached to the tricuspid valve.



Figure 3. Tricuspid valve replacement was performed using a 31 mm Carpentier-Edwards bioprosthesis valved conduit after the total resection of the vegetation and tricuspid valve.

IE in non-IDU patients accounts for 9% of all IE cases, with intravascular catheters (i.e. catheters for HD), pacemaker wires, and intracardiac devices being the most common causes in these patients.^[3-5] *Staphylococcus aureus* is the most common pathogen of IE,^[6] but in our case, methicillin-resistant *S. haemolyticus*, a rare cause of tricuspid valve IE, was the responsible microorganism.

Any patients receiving HD who have symptoms of IE should be evaluated by TTE or, if necessary, by transoesophageal echocardiography (TEE).^[7] The presence of a pulmonary embolism or infarction that has been documented by CT often indicates the presence of right-sided IE, but a ventilation/perfusion scan of the lungs can also aid in the diagnosis. Curing right-sided IE requires the eradication of all microorganisms from the vegetation. Therefore, using appropriate antibiotics and performing aggressive surgical debridement are crucial.

Catheter-related bacteremia requires the removal of the catheter, and antimicrobial therapy should be initiated immediately after the diagnosis of this infection. In addition, empirical therapy should consist of a combination of an anti-staphylococcal agent to combat the methicillin-resistant *S. aureus* and an agent to fight against gram-negative bacteria. The antibiotic therapy, which can be modified after obtaining the culture results, can last for up to six weeks.^[8] In our case, we chose daptomycin because of its active nature against most aerobic gram-positive pathogens, including staphylococci resistant to methicillin and vancomycin. Due to our patient's history of HD and

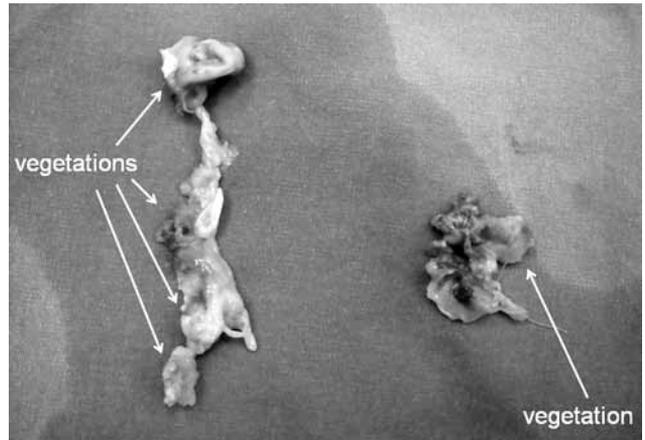


Figure 4. Gross pathological examination of the resected tricuspid leaflets and vegetations.

recurrent hospitalization, we combined the daptomycin with meropenem because it has a broad antibacterial spectrum that includes gram-negative pathogens. We discontinued the meropenem after receiving the culture results, but the patient continued taking the daptomycin for a total of six weeks.

Fortunately, many patients with right-sided IE benefit from conservative therapy with antibiotics; however, approximately 20-25% require surgery.^[2] The operative indications are the following: (i) intractable right heart failure secondary to severe tricuspid regurgitation with a poor response to diuretic therapy; (ii) microorganisms which are difficult to eradicate (e.g., persistent fungal infections) or bacteremia for more than seven days despite adequate antimicrobial therapy; (iii) tricuspid valve vegetations that exceed 20 mm; and (iv) the repeated occurrence of a pulmonary embolism.^[8] The choice of valve type (mechanical or biological) should be influenced by whether or not the patient is expected to have a long life expectancy. Chronic renal failure is a known primary risk factor for major bleeding in patients treated with warfarin, making the use of mechanical valves less desirable. However, these valves can be used in young, healthy HD patients. Older patients with a relatively short life expectancy (i.e., most patients with chronic renal failure) are good candidates for bioprosthetic valves.^[9]

In conclusion, we presented successful surgical treatment of tricuspid valve IE with bioprosthetic valve replacement in a chronic hemodialysis patient. The fact that methicillin-resistant *S. haemolyticus* is a rare cause of IE, and the presence of aggressive clinical course requiring urgent surgery, were unusual features of our case, making it interesting.

Declaration of conflicting interests

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