

# A rare case of community-acquired native quadruple-valve endocarditis

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We report the case of a male patient with community-acquired quadruple-valve endocarditis on presumed normal native valves. This patient had originally presented elsewhere with generalized edema and malaise and had been diagnosed with suspicious endocarditis and renal dysfunction, for which he unfortunately received incomplete treatment. Transthoracic and transesophageal echocardiographic examinations confirmed quadruple-valve endocarditis and ventricular septal defect.

**Key words:** Echocardiography, endocarditis, multi-valvular

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## INTRODUCTION

Multi-valvular heart disease refers to a condition involving more than one of the heart valves. Multi-valvular endocarditis is a common occurrence, but it is exceedingly rare to come across the infection of all the cardiac valves.<sup>[1]</sup> Indeed, the majority of echocardiographically demonstrated cases of endocarditis occur on a single valve, and the involvement of two valves is much less frequent; triple or quadruple-valve involvement is, accordingly, extremely rare. To the best of our knowledge, a few cases of quadruple-valve community-acquired endocarditis were reported. Demonstration of multi-valvular involvement in patients with suspicious infective endocarditis is of vital importance.<sup>[1]</sup>

Multi-valvular endocarditis accounts for 15% of all cases of endocarditis. The mechanism of the spread of the infection differs, and it depends whether endocarditis is only left sided (involving both mitral and aortic valves) or bilateral. In left-sided bivalvular endocarditis, it is often a secondary mitral lesion following primary aortic endocarditis.<sup>[2]</sup> Multi-valvular endocarditis often results in severe and extensive cardiac lesion, well described at echocardiography and frequently responsible for severe heart failure.<sup>[2]</sup>

Multi-valvular endocarditis has specific characteristics, with *Staphylococcus aureus* often being singled out as the principal culprit,<sup>[2]</sup> and is associated with complications

that usually necessitate urgent radical debridement of the infected tissue in its entirety because of acute left-sided heart failure.<sup>[1-3]</sup>

## CASE REPORT

We herein report the case of a 58-year-old man who was relatively well and healthy up to 1 month prior to his admission to our hospital (Rajaie Heart Center, Tehran, Iran, 2011), when he developed generalized edema with malaise, dyspnea, anorexia, and vomiting without fever. He sought medical treatment elsewhere; and after incomplete treatment, he referred to Rajaie Cardiovascular, Medical and Research Center with renal dysfunction and suspicious infective endocarditis.

On admission, the initial vital sign assessment revealed a blood pressure of 147/90 mmHg, pulse rate of 84/min, respiratory rate of 16/min, and temperature of 37.1°C. The patient was then subjected to cardiorespiratory examination, which showed soft S1, systolic murmur III/VI at the left sternal border and left ventricular apex, and fine rales in the lower third of both lung fields. The EKG findings included left axis deviation, left atrial enlargement, incomplete right bundle branch block, and high voltage QRS with ST-T change, suggestive of left ventricular volume overload.

Admission laboratory findings demonstrated white blood cells = 12000/ml (4000-1,00,000),

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hemoglobin = 8.2 g/dl (12-16), platelets = 84,000/ml (150,000-450,000), creatinine = 3.4 mg/dl (0.5-1.4), serum sodium = 141 meq/l (132-145), and serum potassium = 3.4 meq/l (3.5-5.5). In addition, during the patient's stay in our center, his blood cultures were negative five times.

Imaging revealed splenomegaly and most probably paraneoplastic renal disease (abdominal sonography). Additionally, Doppler sonography of the renal arteries demonstrated atherosclerotic change without significant stenosis.

Transthoracic and transesophageal echocardiographic examinations [Figures 1-3] showed two highly mobile masses on both anterior and posterior mitral valve leaflets (max size = 0.5 × 1.5 cm<sup>2</sup>) with severe mitral regurgitation due to malcoapted mitral leaflets, three highly mobile masses on the ventricular side of the aortic cusps (max size = 1 × 0.5 cm<sup>2</sup>) with mild-to-moderate aortic regurgitation, highly mobile masses on all the three leaflets of the tricuspid valve (max size = 2.2 × 0.75 cm<sup>2</sup>) with mild tricuspid regurgitation, semi-mobile vegetation on the medial, and lateral pulmonary valve cusps (max size = 1.75 × 0.9 cm<sup>2</sup>) with mild-to-moderate pulmonary regurgitation, moderate-sized perimembranous ventricular septal defect (0.7 cm) with a left-to-right shunt (QP/QS = 1.5, peak pressure gradient = 188 mmHg, and mean pressure gradient = 88 mmHg) with large highly mobile vegetation in the orifice of the ventricular septal defect on the right ventricular side, and moderate pulmonary artery hypertension (pulmonary artery pressure = 50 mmHg).

The patient's antibiotic treatment for infective endocarditis<sup>[2]</sup> was continued for another 18 days, and he was dialyzed five times due to symptomatic uremia. He was also scheduled for surgery; however, his refusal to undergo operation and even to continue his treatment at the intensive care unit led to his consensual discharge from the hospital. We followed the patient through phone, and he told triple valve replacement was done for him in another center.

## DISCUSSION

Native valve endocarditis is the most common form of infective endocarditis. The existing literature, however, contains precious few cases of quadruple-valve endocarditis and there is a dearth of data on the outcomes of patients with multivalvular endocarditis. In a case-series study, the most common organisms found in multiple-valve endocarditis were methicillin-sensitive *Staphylococcus aureus* and *Streptococcus viridans*.<sup>[4-6]</sup> In contrast, our patient's blood cultures during his hospital stay were negative five times, which may have been in consequence of the incomplete

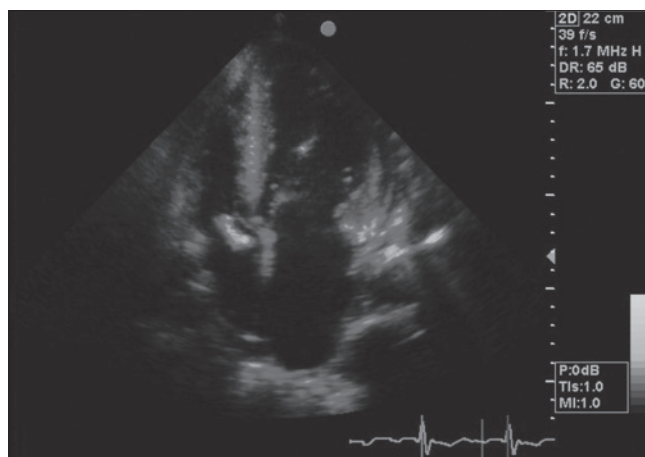


Figure 1: Apical four chamber view shows TV and MV vegetations

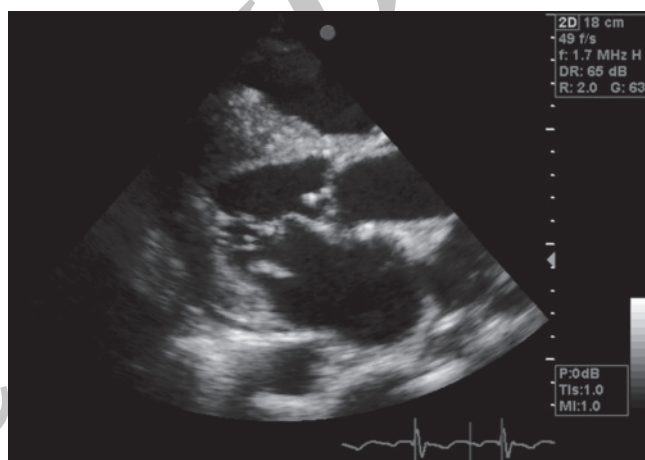


Figure 2: Parasternal long axis view shows vegetations on MV and AV

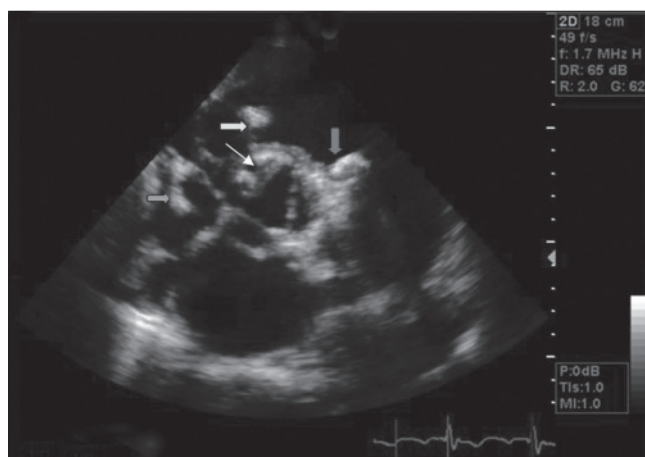


Figure 3: Parasternal short axis view shows multiple vegetations on TV (blue arrow), AV (white arrow), PV (red arrow), and RV side of VSD (yellow arrow)

antibiotic therapy that he had received prior to his referral to our center.

With respect to the clinical diagnosis of multi-valvular endocarditis, obtaining a complete history and performing

physical examination, laboratory tests, and transthoracic echocardiography are mandatory. However, transesophageal echocardiography could prove extremely helpful inasmuch as it enjoys approximate sensitivity and specificity of 90% as opposed to the sensitivity and specificity of 70% in transthoracic echocardiography. It should, therefore, come as no surprise that transesophageal echocardiography is deemed by many an indispensable tool for not only diagnosing the extent of cardiac involvement in patients with endocarditis, but also determining the optimal clinical management.<sup>[7-9]</sup>

A finding of multiple-valve lesions by any means can lead to the identification of patients who are at higher risk of complications such as heart failure and significant multi-valvular regurgitation. It is deserving of note that in addition to multi-valvular involvement, we incidentally detected the presence of further vegetation attached to the right ventricular wall near the ostium of the ventricular septal defect *via* transthoracic echocardiography. Needless to say, such an extent of involvement calls for well-thought-out management decisions, not least the decision to proceed to early and occasionally urgent surgery.<sup>[10]</sup>

As regards factors strongly associated with high mortality rates in patients with endocarditis, previous research has highlighted the role of old age, heart failure, multi-valvular involvement, cardiac abscess on echocardiography, extra-cardiac complications such renal involvement (as was the case in our patient), and higher levels of C-reactive protein.<sup>[8,10-12]</sup>

In summary, quadruple-valve endocarditis is a serious, albeit rare, illness. Transesophageal echocardiography is an indispensable and helpful tool for the diagnosis of the extent

of valvular involvement in patients with endocarditis and determination of the optimal management plan.

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