Eustachian Valve Endocarditis: Detection with Multiplane Transesophageal Echocardiography

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Summary: Right-sided involvement is fairly common in infective endocarditis, but involvement of the eustachian valve is distinctly rare. We present the case of a 36-year-old intravenous drug user with staphylococcal bacteremia and septic pulmonary emboli. Transthoracic echocardiography was normal, but transesophageal echocardiography revealed a large eustachian valve vegetation. This case illustrates the utility of multiplane transesophageal echocardiography in the evaluation of eustachian valve pathology.

Key words: endocarditis, eustachian valve, transesophageal echocardiography

Introduction

Right-sided valvular involvement in infective endocarditis has been well described, but lesions affecting the eustachian valve are distinctly rare. In 1986, the entity of eustachian valve endocarditis was first described in an autopsy study of a patient with overwhelming staphylococcal sepsis.¹ Several years later, an antemortem diagnosis was reported by transthoracic echocardiography.² We now report the diagnosis of eustachian valve endocarditis by multiplane transesophageal echocardiography (TEE) in a patient with a normal transthoracic echocardiographic examination. This case illustrates the utility of multiplane TEE in the evaluation of suspected right-sided endocarditis and eustachian valve pathology.

Case Report

A 36-year-old male intravenous drug user presented with 3 weeks of fevers, chills, cough, and pleuritic chest pain. Two weeks prior to admission, he took several doses of amoxicillin without symptomatic improvement. There was no history of HIV infection, rheumatic fever, congestive heart failure, or prior endocarditis.

On physical examination, the patient's temperature was 102.9° F, blood pressure 114/84 mmHg, pulse 122/min, and respiratory rate 24/min. In general, the patient looked cachectic and moderately ill. There were signs of intravenous drug use in the upper extremities but no peripheral or ocular stigmata of endocarditis. Auscultation of the chest demonstrated scattered rales and rhonchi without signs of consolidation. Cardiac examination revealed normal heart sounds, no gallops, and a I/VI systolic flow murmur along the left lower sternal border. Abdominal examination was benign.

The white blood cell count was 18,800/mm³, hematocrit 29.7%, and platelet count 491,000/mm³. Inspection of the leukocytes was notable for toxic granulation with 52% segmented forms and 22% band forms. Remaining blood tests, urinalysis, and electrocardiography were all normal. Chest radiography revealed a normal cardiac silhouette with multiple bilateral pulmonary cavitory nodules consistent with septic pulmonary emboli.

The patient was admitted with a presumptive diagnosis of right-sided infective endocarditis. Multiple blood cultures subsequently grew *Staphylococcus aureus*. Sputum gram stain revealed many polymorphonuclear cells and heavy gram-positive cocci, and cultures grew *S. aureus* as well.

Soon after admission, transthoracic echocardiography was performed. Image quality was satisfactory in all transducer positions (including subcostal) and revealed no evidence of vegetations (Fig. 1). The following day, multiplane TEE was performed. Imaging in a modified longitudinal plane revealed a 1.8 × by 1.0 cm mobile, irregular echodensity attached to the eustachian valve which protruded into the right atrium (Fig. 2). All other cardiac valves were normal, and valvular regurgitation was not present.

Eustachian valve endocarditis was diagnosed and the patient was treated with a 6-week course of parenteral nafcillin. He did well, and repeat chest radiography several weeks after admission showed resolution of the septic pulmonary emboli.

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FIG. 1 Transthoracic image (apical 4-chamber view). No abnormalities are seen in the right atrium (RA). RV: right ventricle, LA: left atrium, LV: left ventricle.

FIG. 2 Transesophageal echocardiography image demonstrating the eustachian valve (EV) at the inferior aspect of the right atrium (RA). A large vegetation (V) is attached to the valve.

Discussion

In the fetal circulation, the eustachian valve performs the important function of directing oxygenated blood from the inferior vena cava through the foramen ovale into the left atrium. Although the size of the valve varies in adults, it is usually vestigial. Its echocardiographic features are well described.³ Edwards *et al.* first reported the entity of eustachian valve endocarditis in a patient who died with staphylococcal septicemia and lung abscesses.¹ The diagnosis was made post-mortem, and premortem transthoracic echocardiography was unrevealing. Vilacosta *et al.* reported the transthoracic echocardiographic diagnosis of eustachian valve endocarditis in an intravenous drug user with septic pulmonary emboli and blood cultures positive for *Staphylococcus aureus*.² In the present case, transthoracic echocardiography was unrevealing and falsely normal. Multiplane TEE, however, correctly identified the source of the patient's bacteremia.

Recent studies of TEE in right-sided endocarditis have yielded conflicting results. A report by San Roman *et al.* suggested little incremental value of TEE over transthoracic echocardiography in right-sided endocarditis.⁴ The investigators used single-plane TEE, however, and this may have limited visualization of right-sided cardiac structures in some cases.⁵ A study of transthoracic echocardiography versus biplane TEE by Herrera *et al.* concluded that TEE improved diagnostic accuracy in detecting right-sided infective vegetations and associated lesions.⁶

This case illustrates the potential usefulness of multiplane TEE for detecting vegetations of the eustachian valve. As this cardiac structure is situated posteriorly, the superiority of TEE over transthoracic imaging is not surprising. Although eustachian valve endocarditis is rare, it may be unwise to exclude this diagnosis based solely on transthoracic echocardiography, especially in the setting of persistent bacteremia and septic pulmonary emboli.

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