

## Chamber-Made: Mural Endocarditis

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### PRESENTATION

The patient began to feel better 2 days into an intravenous course of antibiotics, but this was deceptive. A 25-year-old woman with a history of polysubstance abuse and recent tick exposure presented after 10 days of fever, myalgia, and shortness of breath without cough. She used intranasal cocaine 1 day before admission, and her last use of an intravenous substance occurred 6 months earlier. She had no recent travel history.

### ASSESSMENT

Upon presentation, the patient was tachycardic and tachypneic. Her physical examination was significant for diffuse muscular tenderness to palpation. Her lungs were clear to auscultation, and she had no cardiac murmurs, hepatosplenomegaly, skin rash, or joint swelling. She had a white blood cell count of 9880 cells/ $\mu$ L, a hemoglobin level of 15.8 g/dL, and a platelet count of 33,000 platelets/ $\mu$ L. An electrocardiogram (ECG) showed sinus tachycardia with first-degree atrioventricular block. A serum troponin I level was 0.14 ng/mL (95% confidence interval, >0.03 ng/mL). Chest radiography was free of abnormalities.

### DIAGNOSIS

The differential diagnosis for a patient with fever and heart block is broad, including infective endocarditis, tickborne illnesses such as Lyme disease, dengue fever, acute rheumatic fever, and typhoid, and noninfectious conditions, such as systemic lupus erythematosus. Our patient's history and geographic location pointed toward tickborne illness and

infective endocarditis as the most likely of the potential diagnoses.

First-degree atrioventricular block combined with thrombocytopenia supported the possibility of a tickborne illness. The patient's troponin levels were consistent with a viral myocarditis or cocaine-mediated myocardial damage. Infective endocarditis was a reasonable conclusion, because she had a history of intravenous drug use. In that scenario, thrombocytopenia suggested severe sepsis. A broad-spectrum regimen, consisting of cefepime, doxycycline, and vancomycin, was initiated after samples were obtained for blood cultures and serological tests. The ECG was repeated, and this confirmed first-degree atrioventricular block.

A good-quality transthoracic echocardiogram (TTE) showed trivial tricuspid regurgitation and no evidence of valvular vegetations (**Figure 1A and B**). Forty-eight hours later, the patient was symptomatically better but had developed a new 3/6 holosystolic murmur at the left lower sternal border. Blood cultures were positive for oxacillin-resistant *Staphylococcus aureus*. Another ECG, obtained 48 hours after the second one, disclosed Mobitz type I second-degree atrioventricular block. A repeat TTE revealed a spherical, nonoscillating, 9  $\times$  10-mm echodensity on the tricuspid valve (**Figure 2A and B**) with severe, eccentric tricuspid regurgitation.

The patient then underwent a transesophageal echocardiogram (TEE). A large mural vegetation was identified on the right ventricular aspect of the interventricular septum. It extended superiorly, eroding into the tricuspid valve so that a leaflet abscess formed (**Figure 3**). The final diagnosis was mural endocarditis with a myocardial and tricuspid leaflet abscess.

Because of the patient's geographic location, Lyme disease, caused by *Borrelia burgdorferi*, was unlikely, and serology for *Ehrlichia* species, which are endemic to the region, proved negative. A clinical diagnosis of endocarditis was made despite the first negative TTE, and the patient appeared to improve with administration of broad-spectrum antibiotics. However, the occurrence of second-degree atrioventricular block and a new systolic heart murmur indicated a worsening intracardiac infection.

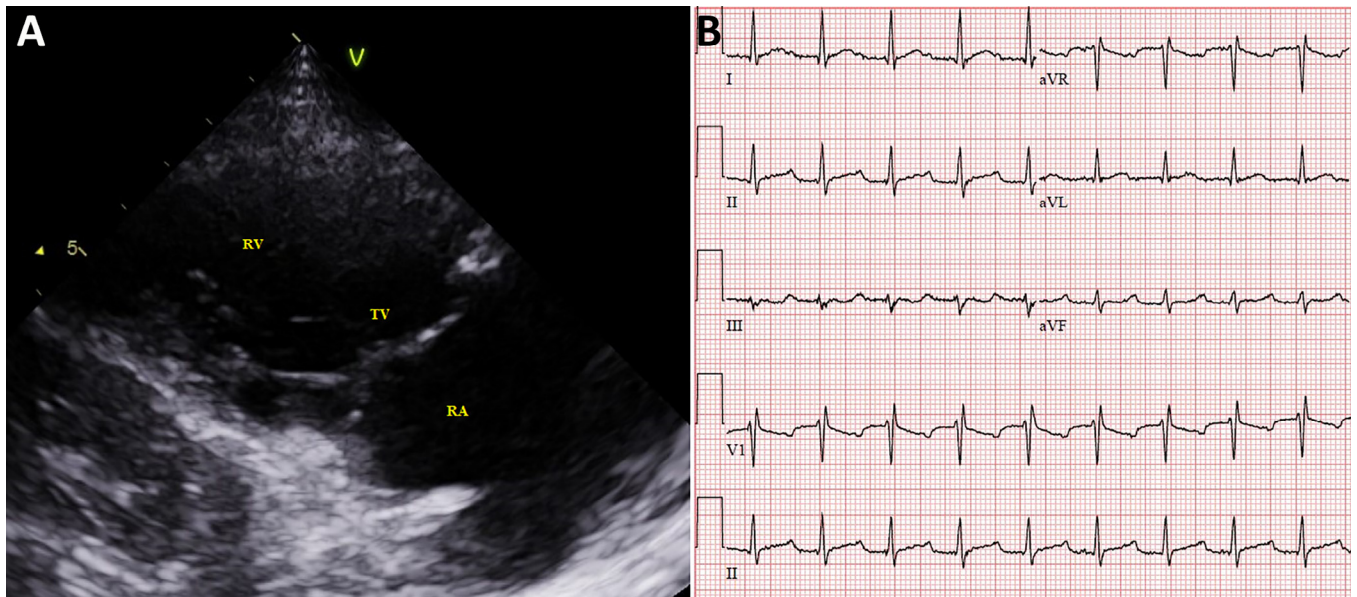
**Funding:** None.

**Conflict of Interest:** None.

**Authorship:** Both authors had access to the data and played a role in writing this manuscript.

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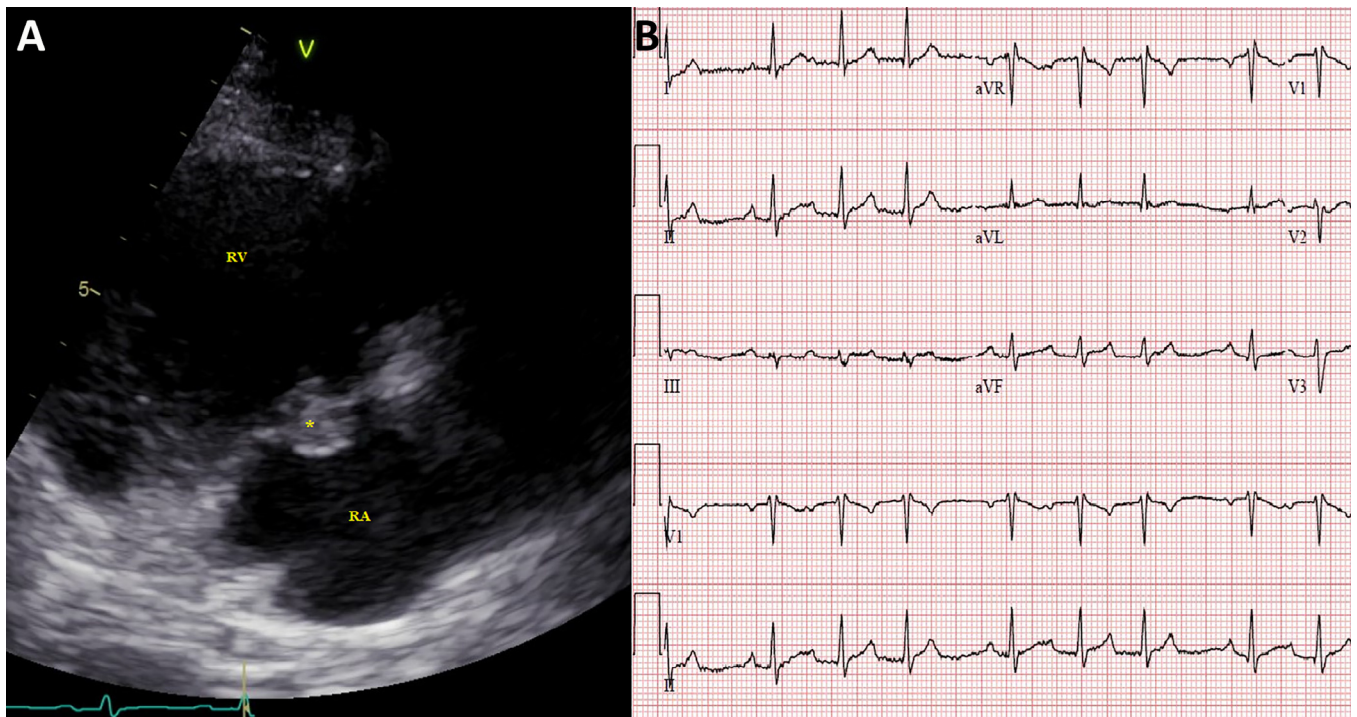
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**Figure 1** (A) A transthoracic echocardiogram (TTE) was ordered upon the patient's presentation. In this right ventricular inflow view, the tricuspid valve is normal. (B) An electrocardiogram (ECG) was also performed at presentation. Sinus tachycardia with first-degree atrioventricular block was noted. RA = right atrium; RV = right ventricle; TV = tricuspid valve.

The tricuspid valve is the most common site of endocarditis among patients who use intravenous drugs.<sup>1</sup> Its anterior location usually allows TTE to detect tricuspid valve endocarditis with good sensitivity and specificity. In our patient's case, the initial TTE showed a normal tricuspid valve with trivial regurgitation. Either the sensitivity of

TTE was reduced or the infection started in the ventricular wall as mural endocarditis and later extended into the leaflet. The presence of first-degree atrioventricular block implies the latter. Mural endocarditis is a rare entity and can precede valvular involvement or remain contained within the wall.<sup>2</sup> The diagnosis should be considered in a patient



**Figure 2** (A) A similar view from a subsequent TTE showed a large spherical echodensity (\*) on the tricuspid valve. (B) The accompanying ECG shows Mobitz type I second-degree atrioventricular block. RA = right atrium; RV = right ventricle; TV = tricuspid valve.

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