

# Large Mitral Valve Infective Endocarditis Missed on Initial Transthoracic Echocardiography in a Patient With Severe Aortic Stenosis and Complex Multisystem Comorbidities

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**Received:** 📅 2026 Apr 15

**Accepted:** 📅 2026 May 08

**Published:** 📅 2026 May 19

## Abstract

*Infective endocarditis is a life-threatening condition requiring early diagnosis and prompt management. Transthoracic echocardiography (TTE) is commonly used as an initial diagnostic tool; however, its sensitivity may be limited in patients with complex structural heart disease. We report a 57-year-old male with severe calcific aortic stenosis and multiple comorbidities who presented with persistent Staphylococcus aureus bacteremia. Initial TTE showed no evidence of vegetations despite high clinical suspicion. Due to ongoing clinical deterioration, transesophageal echocardiography (TEE), performed 20 days later, revealed large mitral valve vegetations measuring up to 22 × 12 mm, associated with progression to severe mitral regurgitation. This case highlights the limitations of TTE in high-risk patients and emphasizes the importance of early TEE, particularly in the presence of persistent bacteremia and clinical deterioration, to avoid delayed diagnosis and adverse outcomes.*

**Keywords:** Infective Endocarditis, Transesophageal Echocardiography, Transthoracic Echocardiograph, Mitral Valve Vegetation, Aortic Stenosis and Case Report

## 1. Introduction

Infective endocarditis remains a serious condition associated with substantial morbidity and mortality, with in-hospital mortality rates reported to range between 15% and 30% despite advances in diagnostic imaging and antimicrobial therapy. Early diagnosis is essential to prevent complications such as valvular destruction, systemic embolization, and heart failure. Echocardiography plays a central role in diagnosis. Transthoracic echocardiography (TTE) is typically used as a first-line modality; however, its sensitivity may be limited in patients with structural heart disease or extensive valvular calcification. Transesophageal echocardiography (TEE) provides superior spatial resolution and higher sensitivity for detecting vegetations and complications [10]. Current guidelines recommend TEE when clinical suspicion remains high despite negative TTE findings [1-5].

## 2. Case Presentation

A 57-year-old male with a complex medical history of hypertension, polycythemia vera complicated by Budd-Chiari syndrome (status post portocaval shunt), and severe anemia presented with progressive dyspnea and clinical features of acute decompensated heart failure. On admission, transthoracic echocardiography (TTE) demonstrated preserved left ventricular systolic function (LVEF 60–65%), severe concentric left ventricular hypertrophy, and a heavily calcified trileaflet aortic valve with severe aortic stenosis (peak/mean gradient 171/134 mmHg, aortic valve area ~0.8 cm<sup>2</sup>) [Figure 1]. Mild mitral regurgitation was noted, with no evidence of intracardiac masses or vegetations [Figure 2].



Figure 1: Transthoracic Echocardiography Demonstrating Severe Aortic Stenosis With Markedly Reduced Aortic Valve Area (AVA  $\approx$  0.8 cm<sup>2</sup>)

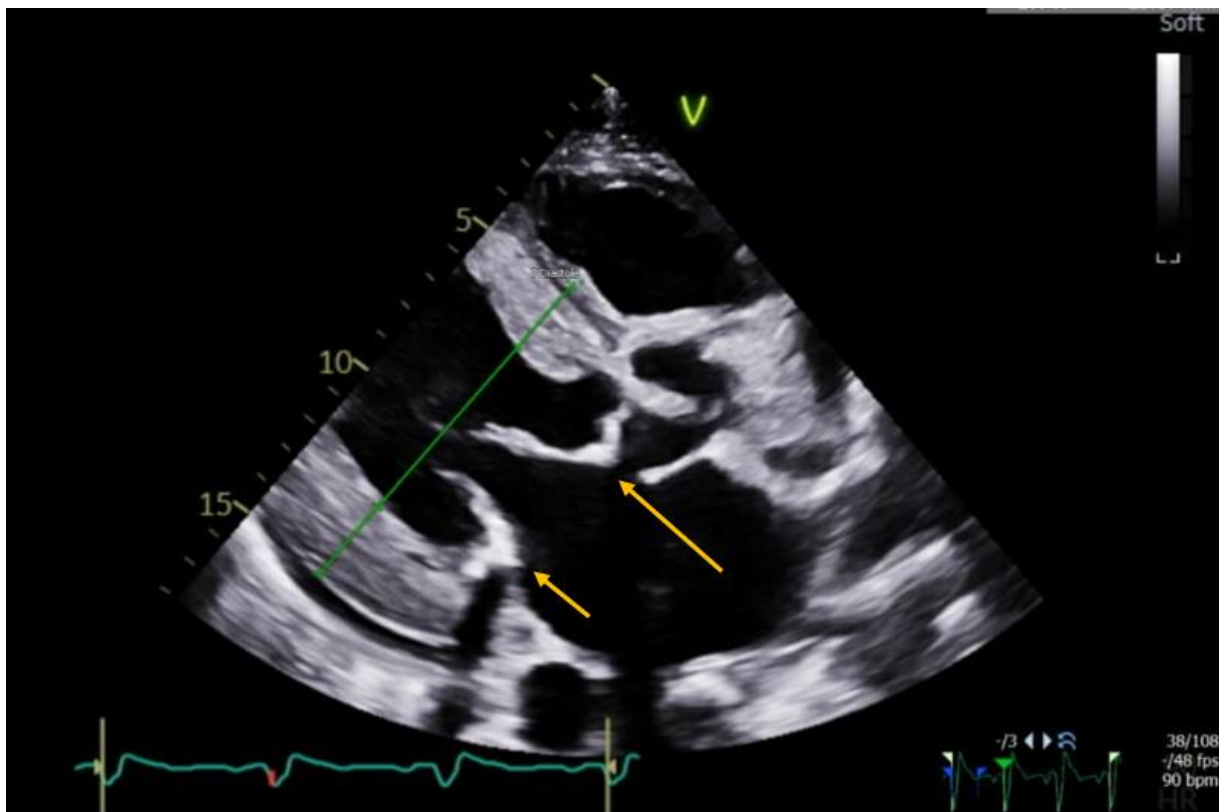
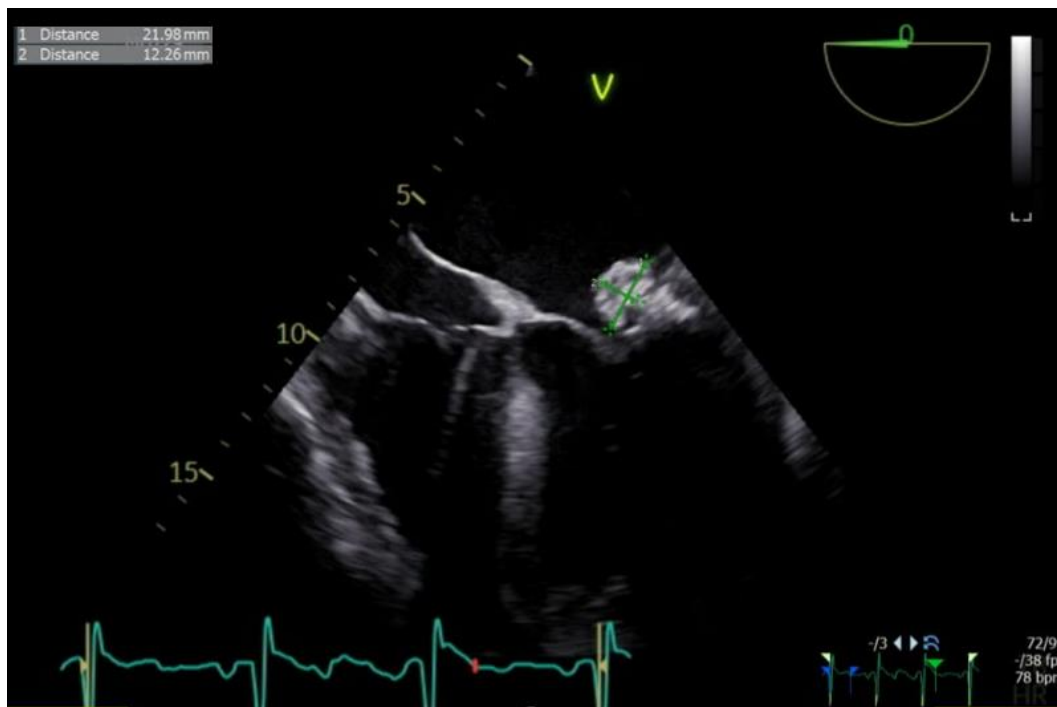


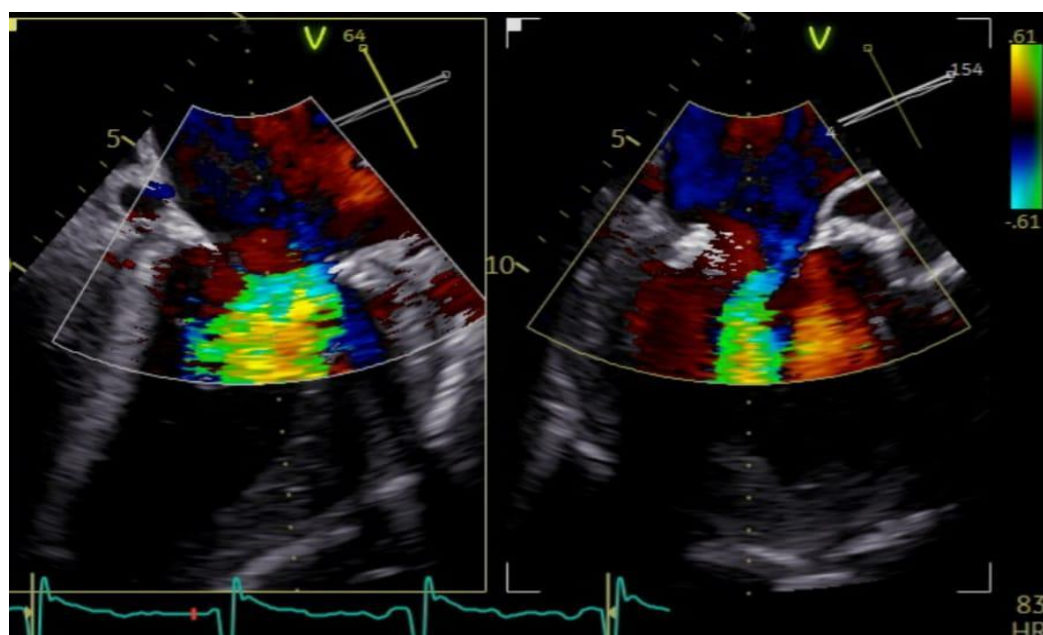
Figure 2: Initial Transthoracic Echocardiography With Arrows Indicating The Mitral Valve Leaflets No Definite Vegetation Was Visualized on the Initial Examination

The patient was noted to have severe transfusion-dependent anemia, requiring multiple packed red blood cell transfusions with minimal clinical improvement. Peripheral blood smear revealed tear-drop cells, suggestive of underlying myelofibrosis secondary to polycythemia vera. Massive splenomegaly was also present. During hospitalization, blood cultures grew *Staphylococcus aureus*, and intravenous cefazolin therapy was initiated. Despite appropriate antimicrobial treatment, the patient remained clinically unstable with persistent bacteremia and symptoms, raising high clinical suspicion for infective endocarditis. Transesophageal echocardiography (TEE) was initially planned but deferred due to significant clinical deterioration,

including severe respiratory distress requiring non-invasive ventilatory support. Over the subsequent days, the patient developed rapid clinical worsening, with progression of mitral regurgitation leading to recurrent pulmonary edema and severe orthopnea. A follow-up TEE performed approximately 20 days after the initial TTE revealed a large mobile vegetation measuring approximately 22 × 12 mm attached to the posterior mitral leaflet (P2) [Figure 3], along with an additional smaller mobile mass on the anterior leaflet. These findings were associated with severe eccentric mitral regurgitation, supported by systolic flow reversal in the pulmonary veins [Figure 4].



**Figure 3: Transesophageal Echocardiography Showing A Large Mobile Vegetation Attached to the Posterior Mitral Leaflet Measuring Approximately 22 × 12 mm**



**Figure 4: Color Doppler Imaging Demonstrating Severe Mitral Regurgitation With An Eccentric Regurgitant Jet**

The patient's condition continued to deteriorate with recurrent episodes of pulmonary edema. Surgical intervention was considered; however, it was deemed prohibitively high risk given his multiple comorbidities and clinical instability. He was subsequently referred to a tertiary cardiac center for further evaluation and advanced management.

### 3. Discussion

This case illustrates a clinically significant delay in the diagnosis of infective endocarditis in a high-risk patient with persistent *Staphylococcus aureus* bacteremia, complex structural heart disease, and systemic comorbidities. Despite a negative initial transthoracic echocardiography (TTE), clinical suspicion remained high due to persistent bacteremia, emphasizing the importance of integrating microbiological and clinical findings rather than relying solely on imaging [1,2].

Transthoracic echocardiography (TTE) has well-recognized limitations in detecting vegetations, with reported sensitivity ranging between 50% and 70%, particularly in patients with poor acoustic windows or heavily calcified valves. In this case, severe calcific aortic stenosis likely impaired visualization and contributed to the failure to detect early vegetations. In contrast, transesophageal echocardiography (TEE) offers superior sensitivity exceeding 90% and remains the gold standard in cases with high clinical suspicion [3]. According to current ESC guidelines, persistent *Staphylococcus aureus* bacteremia constitutes a major diagnostic criterion and should prompt early transesophageal echocardiography even when initial transthoracic imaging is negative [4].

An important learning point from this case is the presence of persistent *Staphylococcus aureus* bacteremia, which is strongly associated with aggressive infective endocarditis and rapid valvular destruction. Current evidence suggests that in such high-risk scenarios, early TEE should be strongly considered even in the presence of an initially negative TTE [5].

Additionally, this case demonstrates a significant progression in disease severity within a relatively short time interval. The development of large vegetations measuring up to 22 × 12 mm, along with progression to severe mitral regurgitation, raises the possibility of either rapid disease progression or initial under-detection. This finding reinforces the importance of early repeat imaging and timely escalation to TEE in high-risk patients. From a clinical perspective, the delay in performing TEE due to patient instability reflects a common real-world challenge. However, earlier utilization may have facilitated earlier diagnosis and potentially altered management decisions, including earlier surgical evaluation. Vegetation size is a critical prognostic factor in infective endocarditis. Vegetations larger than 10 mm are associated with an increased risk of embolic events and adverse outcomes. In this patient, the large vegetation burden further supports the need for early recognition and consideration of surgical intervention in accordance with current guidelines [6].

Overall, this case underscores the limitations of TTE in high-risk patients and highlights the necessity of early TEE when clinical suspicion remains high, particularly in the context of persistent bacteremia and complex structural heart disease [7].

### 4. Conclusion

This case emphasizes that a negative transthoracic echocardiogram does not exclude infective endocarditis in high-risk patients. Early transesophageal echocardiography should be strongly considered in cases of persistent clinical suspicion, particularly in the presence of *Staphylococcus aureus* bacteremia and complex structural heart disease.

### Patient Consent

Patient consent was obtained for publication of this case report and accompanying images.

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