



## CARDIAC TAMPONADE BEYOND BECK'S TRIAD: A CASE HIGHLIGHTING THE ROLE OF EARLY ELECTROCARDIOGRAPHIC AND ECHOCARDIOGRAPHIC RECOGNITION

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### ABSTRACT

Cardiac tamponade is a rare but life-threatening condition caused by rapid or excessive accumulation of pericardial fluid, resulting in impaired ventricular filling and reduced cardiac output. Although Beck's triad classically describes its presentation, many patients exhibit incomplete or atypical features, posing diagnostic challenges. We report a case of cardiac tamponade in a 62-year-old female with respiratory symptoms and incomplete classical signs. Electrocardiographic findings and bedside echocardiography were pivotal in diagnosis. Prompt pericardial drainage led to rapid clinical improvement. This case underscores the importance of maintaining a high index of suspicion and utilizing early imaging in patients with suggestive clinical and electrocardiographic findings.

### KEYWORDS

Cardiac tamponade; Pericardial effusion; Electrical alternans; Hypothyroidism; Echocardiography

### INTRODUCTION

Cardiac tamponade is a medical emergency characterized by increased intrapericardial pressure due to fluid accumulation, which compromises cardiac filling and output. The classical description includes Beck's triad of hypotension, muffled heart sounds, and jugular venous distention; however, these findings are present in only a minority of patients. As a result, tamponade may be overlooked, especially when symptoms mimic pulmonary or systemic conditions.

Electrocardiography (ECG) and echocardiography are essential tools for rapid diagnosis. ECG findings such as low-voltage QRS complexes and electrical alternans

### Case Presentation

A 62-year-old female presented to the emergency department with progressively worsening shortness of breath over several days. She also reported wheezing and a productive cough with streaks of blood. There was no history of chest pain, fever, trauma, tuberculosis, or known malignancy. On physical examination, the patient was tachypneic but hemodynamically stable. Jugular venous distention was evident, and a marked pulsus paradoxus was noted. Blood pressure was within normal limits, and heart sounds were audible without muffling. There was no peripheral edema.

Laboratory investigations revealed a hemoglobin level of 11.4 g/dL, total leukocyte count of 9,500/ $\mu$ L, and platelet count of 6,00,000/ $\mu$ L. Renal function tests showed serum creatinine of 0.7 mg/dL and blood urea of 54 mg/dL. Liver function tests demonstrated SGOT of 53 U/L, SGPT of 17 U/L, and total bilirubin of 0.8 mg/dL. Thyroid function testing revealed a markedly elevated thyroid-stimulating hormone (TSH) level of 75  $\mu$ U/mL, consistent with severe hypothyroidism. Coagulation profile was normal (INR 1.1), and viral markers including HIV, HBsAg, and HCV were negative. Electrocardiography showed low-voltage QRS complexes and electrical alternans, raising strong suspicion for a large pericardial effusion. Bedside ultrasound followed by transthoracic echocardiography demonstrated a large circumferential pericardial effusion with right ventricular diastolic collapse, confirming the diagnosis of cardiac tamponade.

The patient underwent urgent pericardial drainage. Following the procedure, there was immediate improvement in respiratory distress and hemodynamic parameters. She was subsequently managed with appropriate thyroid hormone replacement therapy and monitored closely. Her clinical condition continued to improve, and no recurrence of effusion was noted during follow-up.

### DISCUSSION

This case highlights the diagnostic difficulty of cardiac tamponade when classical features are absent or incomplete. Despite the absence of hypotension and muffled heart sounds, the presence of jugular venous distention and significant pulsus paradoxus were important clinical clues. Respiratory symptoms, such as dyspnea and wheezing, can further obscure the diagnosis by mimicking pulmonary pathology.

ECG findings of low-voltage QRS complexes and electrical alternans are highly suggestive of large pericardial effusion and should prompt immediate echocardiographic evaluation. Echocardiography remains the cornerstone for diagnosing tamponade, with findings such as chamber collapse and exaggerated respiratory variation in ventricular filling.

Severe hypothyroidism is a known cause of pericardial effusion due to increased capillary permeability and reduced lymphatic drainage. Although such effusions are often slowly progressive, tamponade can occur, particularly if diagnosis is delayed. Recognition of hypothyroidism as an underlying and reversible cause is essential for long-term management and prevention of recurrence.

### CONCLUSION

Cardiac tamponade may present without the complete classical triad, making early diagnosis challenging. This case demonstrates that careful clinical examination, combined with characteristic ECG changes and prompt echocardiography, is critical for timely diagnosis. Early intervention with pericardial drainage can be lifesaving. Clinicians should also consider severe hypothyroidism as a potential reversible cause of pericardial effusion and tamponade.

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