

Clinical Case

Obstructive Shock Secondary to Pericardial Effusion in a Patient with Dextrocardia and Situs Inversus Totalis: When the Anatomical Variant Clashes with the Clinical Presentation

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Abstract: Situs inversus totalis is a rare congenital anomaly characterized by the mirror-image arrangement of the thoracic and abdominal viscera. Although most patients remain asymptomatic, this condition presents a diagnostic challenge in the presence of cardiovascular disease. In patients with chronic kidney disease on dialysis, pericardial effusion is a potentially serious complication that can progress to cardiac tamponade. The coexistence of both conditions necessitates timely diagnosis and an individualized therapeutic approach to improve prognosis.

Keywords: Situs inversus, Dextrocardia, Stroke, Renal, Pericardiocentesis.

INTRODUCTION

Situs inversus totalis is a rare congenital anomaly characterized by the mirror-image arrangement of the thoracic and abdominal viscera, with an estimated incidence between 1 in 8,000 and 1 in 25,000 births. Most patients remain asymptomatic throughout their lives; however, the presence of acute cardiovascular disease presents a diagnostic and therapeutic challenge due to anatomical variations.

Pericardial effusion is a relatively common complication in patients with advanced chronic kidney disease, particularly those undergoing dialysis. Its progression to cardiac tamponade can cause obstructive shock, a medical emergency requiring timely diagnosis and treatment with pericardial drainage.

We present the case of a young patient with situs inversus totalis and dextrocardia, suffering from chronic kidney disease on peritoneal dialysis, who developed a severe pericardial effusion with hemodynamic compromise. The case highlights the diagnostic and therapeutic challenges arising from unusual anatomy, as well as the importance of considering infectious etiologies in patients with advanced kidney disease.

CLINICAL CASE

A 19-year-old woman with a history of situs inversus totalis with dextrocardia and chronic kidney disease treated with peritoneal dialysis presented to the emergency department with progressive dyspnea on moderate exertion. On admission, she was hemodynamically unstable.

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During the physical examination, the presence of a pericardial friction rub was noted. The transthoracic echocardiogram (Image 1) revealed a severe pericardial effusion, estimated at approximately 800 cc, with data compatible with hemodynamic compromise.



Image 1: Transthoracic echocardiogram

Echocardiographic scan in a 4-chamber view where severe pericardial effusion was observed (red arrow) with an estimated volume of 800 cc using the cube technique.

Computed tomography (image 2) confirmed the presence of dextrocardia and situs inversus totalis, in addition to the significant pericardial effusion.



Image 2: Coronal view of chest CT scan

Simple chest CT scan in coronal section showing dextrocardia with situs inversus totalis, as well as partial thickening of the pericardium.

The patient recovered well after pericardiocentesis, with drainage of approximately 600 mL of pericardial fluid and clinical improvement of dyspnea. Microbiological analysis of the pericardial fluid revealed growth of *Streptococcus gallolyticus*, suggesting an infectious etiology for the pericardial effusion. Computed tomography confirmed the presence of dextrocardia with situs inversus totalis, without other significant structural abnormalities.

Clinical, echocardiographic, and microbiological findings allowed for the diagnosis of severe pericardial effusion in a patient with chronic kidney disease on peritoneal dialysis and situs inversus totalis, requiring pericardial drainage as

part of her treatment. An echocardiogram (Figure 3) and follow-up CT scan were performed, which revealed 50 cc of pericardial fluid.

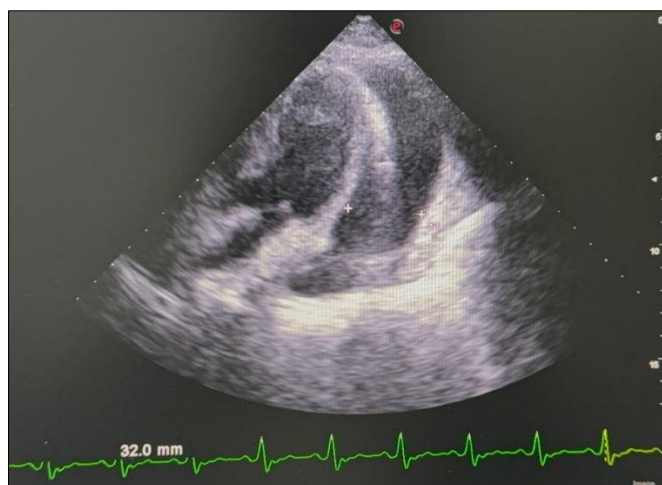


Image 3: Transthoracic echocardiogram

Echocardiographic tracing in a 4-chamber view where a mild pericardial effusion of 50 cc was observed using the cube technique, with an LVEF of 77%

Situs inversus totalis is a rare congenital anomaly characterized by the mirror-image arrangement of the thoracic and abdominal organs. Although most patients have a life expectancy similar to the general population, this anatomical variant can hinder the timely recognition of cardiovascular diseases and alter the interpretation of imaging and electrocardiographic studies.

RESULTS AND DISCUSSION

Cardiac tamponade is the most severe manifestation of pericardial effusion and represents a potentially fatal cause of obstructive shock. The progressive accumulation of fluid in the pericardial space increases intrapericardial pressure, limits ventricular filling, and decreases cardiac output, leading to systemic hypoperfusion. In this case, the patient's condition deteriorated during hospitalization, developing shock requiring dual vasopressor support, which necessitated the urgent performance of pericardiocentesis.

Patients with chronic kidney disease are at increased risk of developing pericardial effusion due to inflammatory mechanisms related to uremia and complications associated with dialysis therapy. However, the identification of *Streptococcus gallolyticus* in the pericardial fluid pointed to an infectious etiology, a rare finding that altered the therapeutic approach. Obtaining microbiological samples during pericardiocentesis allowed for targeted antimicrobial treatment.

The presence of dextrocardia with situs inversus totalis added complexity to the diagnostic and interventional process. These anatomical anomalies can complicate electrocardiogram interpretation, echocardiographic orientation, and the performance of invasive procedures; therefore, knowledge of these variants is essential to avoid diagnostic delays.

This case highlights the importance of maintaining a high index of suspicion for cardiac tamponade in patients with progressive dyspnea and pericardial effusion, as well as the need for a comprehensive etiological approach, especially in immunocompromised patients or those with chronic diseases.

CONCLUSIONS

Obstructive shock secondary to cardiac tamponade is a medical emergency requiring immediate diagnosis and treatment to reduce morbidity and mortality. In patients with chronic kidney disease, pericardial effusion should not be attributed solely to uremia, as infectious etiologies may coexist, altering treatment and prognosis.

The coexistence of dextrocardia and situs inversus totalis presents a diagnostic and interventional challenge, making the timely use of echocardiography essential to confirm the diagnosis and guide pericardiocentesis. The isolation of *Streptococcus gallolyticus* in the pericardial fluid underscores the importance of systematic microbiological examination of the effusion, allowing for targeted treatment.

This case provides evidence of an exceptional clinical presentation and highlights the need for a multidisciplinary approach in patients with unusual cardiac anatomy and hemodynamic compromise.

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