

Hemorrhagic pericardial tamponade in a peritoneal dialysis patient

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Abstract: Uremic pericarditis and pericardial effusion are possible complications among patients with end-stage renal disease. The accumulation of toxic metabolites may contribute to the pathogenesis of uremic pericarditis. Bleeding diathesis in peritoneal dialysis patients raises the risk of hemorrhagic pericardial tamponade, which is a fatal complication of peritoneal dialysis. We report a case of hemorrhagic pericardial tamponade who was nonadherent to peritoneal dialysis with initial presentation of hypotension and syncope. Transthoracic echocardiogram revealed septated, fibrinoid pericardial effusion and right ventricular diastolic compression. A massive bloody pericardial effusion was drained when he underwent the pericardial window procedure. There was a significant improvement both in his clinical condition and in the echocardiogram images after the procedure. Hemorrhagic pericardial tamponade occurs in uremic patients but is rarely seen in those undergoing peritoneal dialysis. Early diagnosis, immediate surgical drainage, and regular follow-up with echocardiography are crucial to achieve better prognoses in future similar clinical scenarios.

Keywords: End-stage renal disease; Hemorrhagic pericardial effusion; Pericardial tamponade; Peritoneal dialysis

1. INTRODUCTION

The prevalence of the end-stage renal disease is increasing worldwide. Consequently, the associated complications such as uremic pericarditis and pericardial effusion are also increasing. Although the incidence of uremic pericarditis has decreased to <5% due to improved dialysis techniques, especially in patients with hemodialysis,¹ patients with asymptomatic pericardial effusion may not be immediately identified until the lesions become large enough and have considerable influence on the hemodynamics in patients.² The following is a case of a nonadherent peritoneal dialysis patient with an initial presentation of hypotension and syncope.

2. CASE REPORT

A 46-year-old uremic patient under peritoneal dialysis for 4 years was hospitalized due to syncope, dyspnea on exertion, and hypotension (<90 mmHg). He had high levels of blood urea nitrogen (\approx 90 mg/dL) and creatinine (\approx 20 mg/dL) within the past year. Laboratory data revealed hemoglobin of 7.9 g/dL. Furthermore,

the chest radiograph revealed cardiomegaly in a round-head boot shape (Fig. 1). The echocardiogram revealed septated massive pericardial effusion with fibrinoid materials (Fig. 2A and B) and diastolic collapse of the right ventricle (Fig. 2C), which was difficult for echo-guided pericardiocentesis. The inferior vena cava diameter was 24.54 mm, which is consistent with the inferior vena cava plethora as an echocardiographic sign of cardiac tamponade (Fig. 2D). Therefore, he underwent a pericardial window procedure where there was more than 600 mL of bloody drainage. The

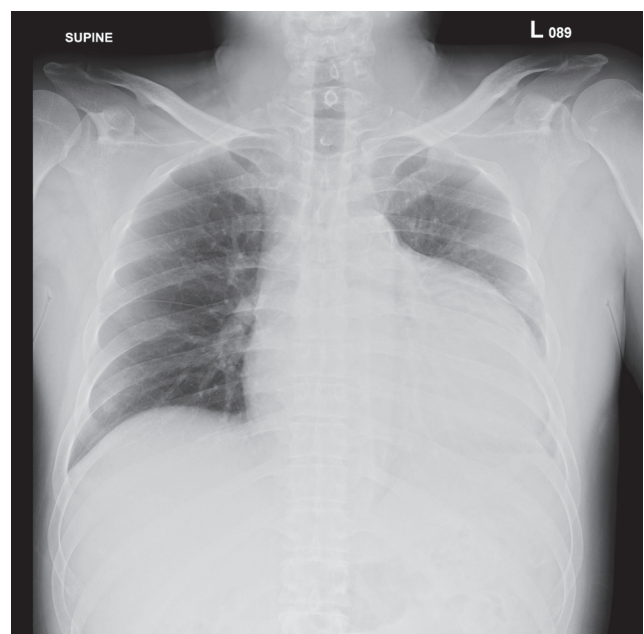


Fig. 1 Chest radiograph revealed cardiomegaly in a round-head boot shape.

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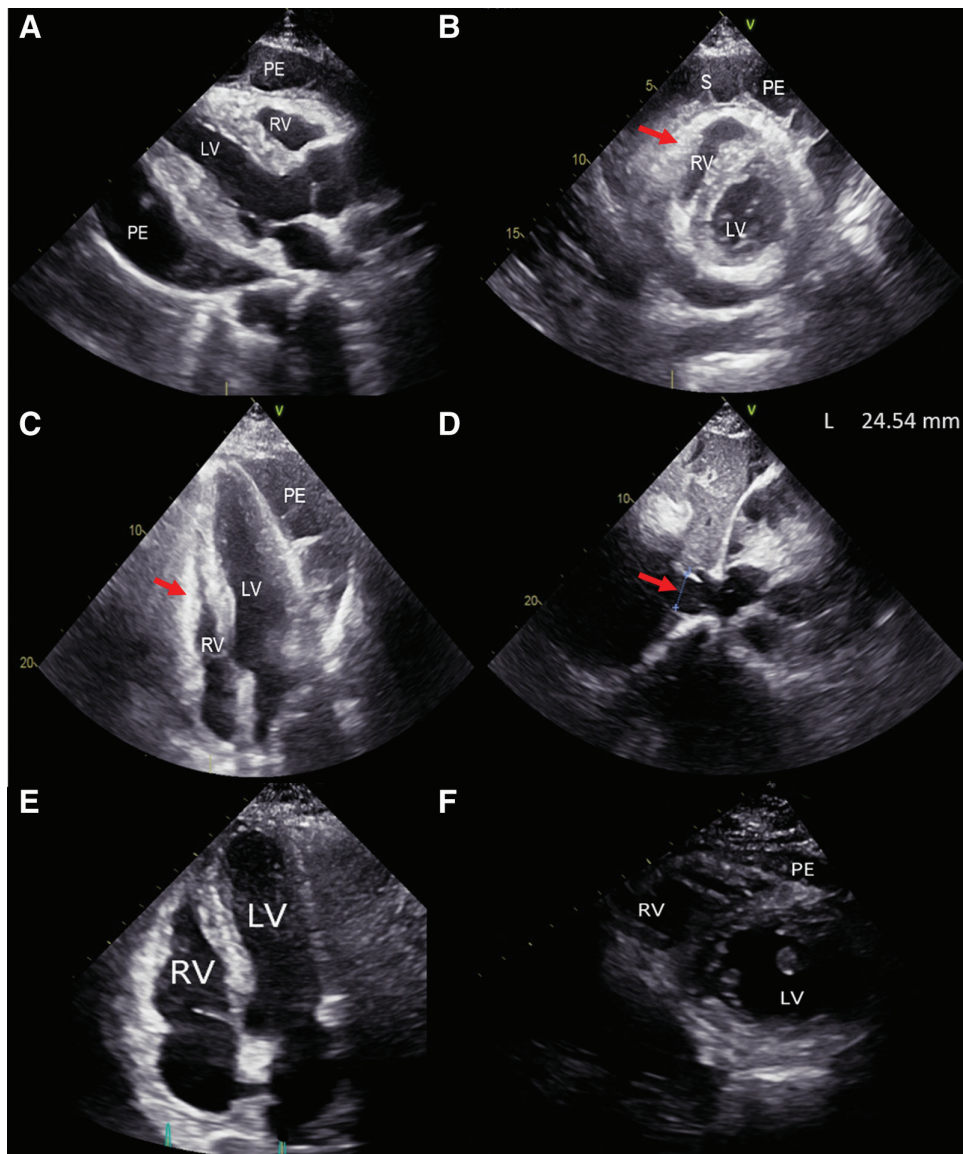


Fig. 2 Transthoracic echocardiogram revealed septated, fibrinoid pericardial effusion and right ventricular diastolic compression. Images after the pericardial window procedure revealed minimal residual pericardial effusion and resolution of right ventricular compression. A comparison of images before and after the procedure can be seen as follows: (A) parasternal long-axis view in end-diastolic phase; (B) right ventricle compression in diastole in parasternal short-axis view; (C) right ventricle compression and indentation in late diastole in apical four-chamber view; (D) inferior vena cava diameter = 24.54 mm, consistent with inferior vena cava plethora; (E) apical four-chamber view after pericardial window; and (F) parasternal short-axis view after pericardial window.

pathology report revealed chronic fibrinoid pericarditis. The effusion analysis revealed a hematocrit level of 30.9% and an albumin level of 3.61 g/dL, which resembled the hematocrit and albumin levels in his blood, which suggested acute bleeding; thus a diagnosis of pericardial hemorrhage was made. After the procedure, the patient's blood pressure increased from 90/60 mmHg to 130/100 mmHg. The follow-up transthoracic echocardiogram revealed a significant resolution of pericardial effusion and improvement of right ventricle compression (Figs. 2E and F).

3. DISCUSSION

The traditional definition of uremic pericarditis is the onset of clinical symptoms and signs before or within eight weeks of a renal replacement therapy.³ However, the unusual onset of uremic pericarditis occurred in the patient after prolonged inadequate

peritoneal dialysis. Uremic pericarditis may develop in nonadherent and under-dialyzed patients with higher levels of toxic metabolites, nitrogenous metabolic end products, free radicals, and increased endothelial permeability even in a low inflammatory state, which may contribute to the pathogenesis of uremic pericarditis. In addition, uremic patients have a higher bleeding tendency due to platelet dysfunction caused by uremic toxins, anemia, and von Willebrand factor dysfunction.² The patient presented with syncope, which is an atypical manifestation of hemorrhagic uremic pericarditis, compared with typical symptoms such as anterior chest pain and fever. It may be explained by acute uremic bleeding in a chronic inflammatory pericardial space resulting in a rapid accumulation of fluid and impedance to cardiac filling, eventually leading to a decrease in cardiac output. The patient's echocardiogram demonstrated the diastolic collapse of the right ventricle (Fig. 2C). This echocardiographic feature

has a sensitivity of 90%-95% and specificity of 95%-100% for suspicion of cardiac tamponade.⁴ Inferior vena cava plethora (24mm dilation) was also established. Therefore, the diagnosis of incipient cardiac tamponade is reasonable. Cardiac tamponade includes a hemodynamic spectrum ranging from incipient or preclinical tamponade to hemodynamic shock with a significant reduction of stroke volume, blood pressure, and evident pulsus paradoxus.⁵

In this case, surgical drainage was a necessary and effective treatment for hemorrhagic uremic pericarditis with ventricle compression. In patients with end-stage renal disease, uremic pericardial effusion or pericarditis is often a sign for initiating dialysis, but it can also be a sign to remind the clinician to re-evaluate the patient's dialysis adequacy before any catastrophic complication such as cardiac tamponade occurs.

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