Acute Purulent Staphylococcal Pericarditis with Cardiac Tamponade in a Hemodialysis Patient

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Purulent pericarditis is a rare disease in both end-stage renal disease (ESRD) patients and the general population. We report herein a case of acute purulent staphylococcal pericarditis with cardiac tamponade managed by intravenous antibiotics and pericardiocentesis with drainage. A 54-year-old man with ESRD, who had been on hemodialysis (HD) for the previous six months, was admitted to the hospital because of fever. He had a history of a recent episode of staphylococcal bacteremia associated with venography for arteriovenous fistula (AVF) malfunction. On the sixth day after admission, severe intradialytic hypotension arose during HD. Echocardiography showed a large pericardial effusion with hemodynamic significance. Emergency pericardiocentesis with drainage was performed. Acute purulent staphylococcal pericarditis with cardiac tamponade was diagnosed and intravenous vancomycin was administered for four weeks. On the 23rd day, the patient was discharged from the hospital after the drainage catheter's removal. Ten days after discharge, however, he was re-admitted because of dyspnea on exertion. Eventually, the patient expired because of heart failure caused by progressive constrictive pericarditis. We suggest that acute purulent pericarditis should be considered in dialysis patients who develop fever and severe hypotension during HD, especially after known staphylococcal infections.

Key Words: Hemodialysis, Pericarditis, Pericardiocentesis, Staphylococcal infections

INTRODUCTION

End-stage renal disease (ESRD) patients on maintenance HD endure several intercurrent illnesses. Uremic and dialysis pericarditis are the major pericardial diseases associated with ESRD, but their incidence, which was around 12% to 21%, 20–35 years ago1, has declined to around 5% in patients starting

dialysis2). Purulent pericarditis is a rare infection in both ESRD patients and otherwise healthy people, and has been reported infrequently in previous literature. It is caused mainly by direct invasion of an infection from an adjacent pneumonia or empyema and sometimes from the hematogenous spread of distant infections3). We report an unusual presentation of acute purulent staphylococcal pericarditis with cardiac tamponade managed by pericardiocentesis with drainage in a HD patient, who developed fever and severe hypotension during HD after known staphylococcal bacteremia.

CASE REPORT

A 54-year-old man with ESRD secondary to dia-
Diabetic nephropathy on HD was admitted to the hospital with fever and arteriovenous fistula (AVF) malfunction. He had undergone an autologous arteriovenous fistula operation six months earlier and received HD thrice weekly at our dialysis unit. His medications included prednisolone (5 mg per day), which had been maintained for three months because of probable temporal arteritis. A week before admission, he noticed a febrile sensation and mild upper respiratory infection symptoms. His temperature was 37.6°C. No swelling, redness or tenderness was observed at the AVF site. Two blood cultures were obtained. He was treated with oral amoxicillin/clavulanic acid empirically. Persistent fever lasted for a week. Blood cultures were positive for methicillin-resistant *Staphylococcus aureus* (MRSA), and vancomycin was administered. He was noted to have AVF dysfunction during HD and venography showed a narrowed superficial vein in the cephalic area.

On admission day, a tunneled cuffed catheter for HD was inserted into his right internal jugular vein. He noticed a mild chilly sensation and chest discomfort. His temperature was 36.0°C, blood pressure was 104/54 mmHg, and heart rate 98 beats per minute. His usual average systolic blood pressure was about 160 mmHg during HD. Physical examination noted crackles in the right lower lung field. An examination of the heart showed distant heart sounds, but no murmur or pericardial rub or knock.

Hematologic investigations showed a white blood cell count of 18,000/μL with 93% neutrophils, hematocrit of 25.8%, and platelet count of 360×10^3/μL. Blood chemical analyses showed the following: serum creatinine 4.3 mg/dL, blood urea nitrogen 51.0 mg/dL, sodium 138 mEq/L, potassium 3.7 mEq/L, calcium 7.9 mg/dL, AST/ALT 159/336 IU/L, serum albumin 2.4 g/dL, alkaline phosphatase 1,284 IU/L, gamma-glutamyl transferase 539 IU/L, and CRP 225 mg/L. Brain natriuretic peptide level was 746 pg/mL. Cardiac enzyme levels were normal. A test of arterial blood gases while he was breathing in room air revealed a pH of 7.44, a partial carbon dioxide pressure of 19.6 mmHg, a partial oxygen pressure of 85.6 mmHg, and a bicarbonate level of 15.7 mmol/L. A chest X-ray disclosed an enlarged cardiac silhouette (Fig. 1A). Electrocardiography showed a normal sinus rhythm and the low voltage complexes of the limb leads (Fig. 2). Abdominal sonography revealed unremarkable findings. On the third day, he became afebrile.

On the sixth day, intradialytic hypotension arose. His blood pressure was 58/46 mmHg but he reported no symptoms such as dyspnea or dizziness. After dopamine was administered intravenously, his blood pressure rose to 107/77 mmHg. Echocardiography showed a large, circumferential pericardial effusion with late diastolic right atrial inversion and diastolic 

![Fig. 1. Chest X-ray on the 1st admission day shows a tunneled catheter placed in the right internal jugular vein and marked cardiomegaly (A). Chest X-ray after pericardiocentesis on the 6th day shows a drainage catheter located in the baseline of the left side of the heart (B). Chest X-ray on the 14th hospital day reveals more decreased heart size after removal of the drainage catheter (C).](image-url)