CASE REPORT

Cardiac tamponade caused by polymicrobial Gram-negative organisms

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Introduction

Purulent pericarditis is a very serious condition that is fatal if left untreated. Patients should undergo an emergency pericardiocentesis and sometimes a pericardiectomy to avoid cardiac decompensation and tamponade. Empiric broad-spectrum antibiotics are indicated to cover the variety of organisms that cause purulent pericarditis. Even with adequate treatment, the mortality rate ranges between 40% and 75%.1 We report a very unusual case of an unstable cardiac tamponade caused by a polymicrobial Gram-negative infection.

Case report

A 52-year-old, diabetic, hypertensive woman with bipolar disorder experienced a sudden onset of nausea, vomiting, and near syncope while waiting seated at the psychiatrist clinic. There was no history of chest pain, dyspnea, palpitation, cough, or fever. She was rushed to the emergency department where she was found to have marked jugular venous distension, severe pallor, and a systolic blood pressure of 70 mmHg, with a paradoxical pulse. Laboratory data showed significant leukocytosis, creatinine of 1.0 mg/dl, and normal thyroid stimulating hormone (TSH), liver enzymes, and electrolytes. Her troponin was also negative. Urinalysis showed numerous white blood cells (WBC) with positive leukocyte esterase.

An electrocardiogram showed electrical alternans. Echocardiography confirmed the presence of pericardial tamponade caused by Citrobacter diversus and Proteus mirabilis.

Summary

Polymicrobial Gram-negative pericarditis is a rare entity. We describe the first case of suppurative pericarditis with Citrobacter diversus and Proteus mirabilis.
nade with a marked restrictive pattern. Pericardiocentesis yielded 300 ml of turbid fluid with the following characteristics consistent with exudative pericardial effusion: WBC count of $4.16 \times 10^9 /l$ (92% neutrophils), protein 60 g/dl, albumin 33 g/dl, lactate dehydrogenase (LDH) 235 mg/dl, and glucose 160 mg/dl. A concomitant blood sample showed a WBC count of $18.70 \times 10^9 /l$. There were no units for the WBC counts in the original text. Also, Journal style requires units of $10^9 /l$. I have made the necessary changes — please confirm that these counts are correct. (75% neutrophils), total serum protein 80 g/dl with albumin 43 g/dl, LDH 277 mg/dl, and glucose 277 mg/dl.

Culture of the pericardial fluid grew Proteus mirabilis and Citrobacter diversus. Cytology showed numerous inflammatory reactive cells with no malignant cells. A urine culture taken after one dose of antibiotics yielded no growth.

She received a course of ciprofloxacin intravenously for 8 days and was then switched to oral therapy to complete a 3-week course. However 5 days after discharge, she was readmitted with progressive dyspnea. A chest X-ray showed bilateral pleural effusion. A repeat echo Doppler showed findings of tamponade. She underwent an urgent pericardiotomy. Pathology of the pericardium showed non-specific acute and chronic inflammation. Bacterial, fungal, and mycobacterial cultures were all negative.

**Discussion**

We have described an unusual case of suppurative pericarditis complicated by cardiac tamponade. In the past, infectious pericarditis has mostly affected children and young adults secondary to pneumococcal pneumonia. In current times, it more often affects critically ill individuals on dialysis and immunocompromised patients. This shift parallels the widespread use of antibacterial agents to treat pneumonia and bacteremia and the emergence of the AIDS epidemic.\(^1\)\(^2\)

Bacterial involvement in the pericardium most commonly arises from hematogenous spread, direct extension from an adjacent infectious focus like pneumonia and empyema, extension from myocardiitis or endocarditis, or direct inoculation during thoracic surgery or following catheter drainage of pericardial effusion. Rare cases of bacterial pericarditis occur secondary to esophageal cancer, mycotic pseudoaneurysm, and following percutaneous transluminal coronary angioplasty and lumbar puncture.\(^3\)\(^4\)

Over the last decades, we have witnessed a change in the infectious etiology of bacterial pericarditis.\(^5\) Previously, most of the cases were caused by Gram-positive organisms, notably Streptococcus pneumoniae and Staphylococcus aureus. In one large review, Gram-positive organisms were identified in 40% to 45% of patients, with Staphylococcus spp being the most common organism.\(^6\) More recently, Gram-negative organisms such as Salmonella spp, Campylobacter spp, and Escherichia coli have also been reported as causative agents.\(^7\) There has also been an increase in the reporting of suppurative pericarditis secondary to Gram-negative sepsis.

The increasing incidence of HIV infection has also changed the epidemiology of suppurative pericarditis. HIV-infected patients are prone to develop fungal pericarditis with Candida spp. Other unusual microorganisms such as mycobacteria and anaerobic organisms like Peptostreptococcus and Prevotella species\(^8\)–\(^10\) have also been reported in pericarditis in HIV patients.

Our case is unusual in many respects. First, the patient did not have fever, which is classically present in all patients with purulent pericarditis.\(^11\) Second, she had a Gram-negative infection, which is less common than a Gram-positive infection. In addition she had a polymicrobial infection, which has only rarely been documented in the literature. Parsons et al. reported a mixed bacterial infection of the pericardium with aerobic Gram-negative bacilli and an anaerobic organism in a patient with esophageal cancer.\(^12\)

Furthermore, the Gram-negative organisms involved in our case are rarely causative agents of pericarditis. C. diversus and P. mirabilis are normal inhabitants of the gastrointestinal flora and are known for causing infections of the genitourinary tract. To our knowledge, they have not been previously cultured from pericardial fluid. This patient had an abnormal urinalysis with WBCs and leukocyte esterase suggestive of a urinary tract infection. However, the urine culture was likely negative because of prior antibiotic administration before obtaining the urine culture.

We have described what we believe is the first case of suppurative pericarditis caused by two Gram-negative urinary pathogens, C. diversus and P. mirabilis.

**Conflict of interest:** No conflict of interest to declare.

**References**