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Acute Primary Pneumococcal Purulent Pericarditis With Cardiac Tamponade

A Case Report and Literature Review

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Abstract: Bacterial pericarditis is a rapidly progressive and highly fatal infection, and is often diagnosed postmortem in half of the cases. Even with drainage and antibiotics, the mortality rate is high. Gram-positive cocci, specifically *Streptococcus pneumoniae*, have been the most common cause of bacterial pericarditis with a preceding primary site of infection. Following the introduction of antibiotics in the 1940s and more recently the pneumococcal conjugate vaccine, the incidence has drastically decreased.

We describe an extremely rare case of primary *streptococcus pneumoniae* purulent pericarditis that presented with cardiac tamponade. The patient was successfully treated with broad-spectrum antibiotics and urgent pericardiocentesis.

Due to the high mortality rate with purulent pericarditis, a high index of suspicion is needed when acute pericarditis is suspected for early diagnosis to instate appropriate therapy with antibiotics and drainage.

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INTRODUCTION

Bacterial pericarditis with cardiac tamponade due purulent pericardial effusion is rare in the modern antibiotic era. It is a rapidly progressive and highly fatal infection, and is often diagnosed postmortem in half of the cases. Even with drainage and antibiotics, the mortality rate is high. Gram-positive cocci are the most common cause of bacterial pericarditis, specifically *Streptococcus pneumoniae*, in the setting of direct spread of infection from an intrathoracic focus. In this antibiotic era, the incidence of this infection has drastically dropped. Herein, we present an extremely rare case of primary *streptococcus pneumoniae* pericarditis with cardiac tamponade in a chronically

immunosuppressed patient with no obvious initial focus of infection successfully treated with early antibiotics and urgent pericardiocentesis.

CASE REPORT

A 49-year-old African-American female presented with 2 days of fever, worsening pleuritic substernal chest heaviness, and dyspnea. She has a history of hypertension and stage-IV lupus nephritis on chronic immunosuppressants (mycophenolate, prednisone, and hydroxychloroquine). On examination she appeared toxic with a low-grade fever, heart rate of 120 beats/min and 65/35 mm Hg blood pressure. Jugular venous distension was noted with distant heart sounds. Electrocardiogram showed sinus tachycardia. Chest x-ray revealed an enlarged cardiac silhouette. Due to concern for pericardial effusion, an urgent transthoracic echocardiogram was done demonstrating a large circumferential pericardial effusion with right atrial diastolic collapse suggesting cardiac tamponade (Fig. 1). Emergent pericardiocentesis was performed with 1 L of yellow purulent fluid drained (Fig. 1). Empiric broad-spectrum antibiotics with vancomycin, meropenem (choice due to penicillin allergy), and fluconazole were initiated. Eventually the blood and pericardial fluid cultures both grew *streptococcus pneumoniae* and the antibiotics were switched to only levofloxacin based on culture sensitivities. No other obvious primary source of infection was identified. She had complete resolution of her bacterial pericarditis after 4 weeks of antibiotics.

DISCUSSION

In this modern antibiotic era, bacterial pericarditis has become very rare with an incidence of 1/18,000.¹ It is a rapidly progressive and highly fatal infection with mortality rates reaching 100% if left untreated,² and is often diagnosed postmortem in half of the cases.¹⁻² The mortality rate remains high at 40% even with treatment, generally due to cardiac tamponade, constriction, and septic shock.¹

Clinical recognition of purulent pericarditis is challenging. Typically, patients present with nonspecific systemic inflammatory response syndrome, and often the classic signs of pericarditis (chest pain, pulsus paradoxus, pericardial friction rub, and electrocardiographic changes) may be absent.^{1,3} Nowadays due to infrequent occurrence, the clinical suspicion for purulent pericarditis is low. Following the introduction of antibiotics in the 1940s and more recently the pneumococcal-conjugate vaccine in 2000, the incidence has drastically decreased of the formerly most common cause of bacterial pericarditis, *streptococcus pneumoniae*.⁴ Since 1980, only less than 25 cases of pneumococcal pericarditis have been reported in the English literature.⁴

Transthoracic echocardiography shows the presence of pericardial fluid, especially life-threatening cardiac tamponade. Treatment includes prompt pericardial drainage combined with

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Ethical Review: Ethics committee approval is not included as it is commonly accepted that case reports do not require such approval. In our work, we did not use patient data that would allow identification of the patient.

Patient agreed to all above diagnostic tests and treatment that was used. Copyright © 2015 Wolters Kluwer Health, Inc. All rights reserved.

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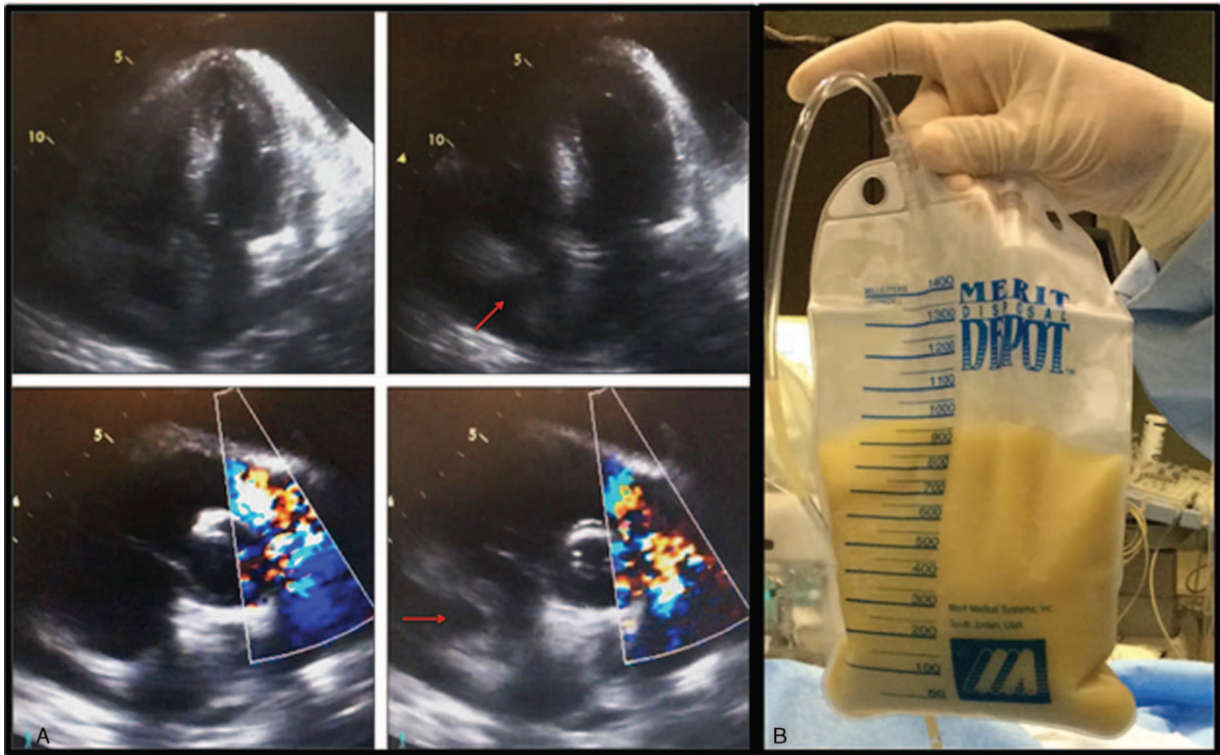


FIGURE 1. Transthoracic echocardiography and pericardial fluid. (A) Motion frames in an apical four-chamber view (top) and parasternal short axis view (bottom) of a transthoracic echocardiogram revealing circumferential pericardial effusion with right atrial diastolic wall collapse (red arrows) suggestive of cardiac tamponade. (B) Purulent appearing pericardial fluid.

empiric broad-spectrum antibiotics. Drained pericardial fluid should be analyzed with Gram staining and culture.³ There is a lack of definitive guidelines on the duration of the antibiotics, but it is reasonable to suggest 2- to 4-weeks of antibiotics tailored to causative organism until there is clinical improvement. Multiple methods are available for drainage of the pericardial fluid. Percutaneous pericardiocentesis is the simplest and fastest method, especially in emergent situations. Surgical pericardiectomy allows more complete and permanent drainage, and therefore is associated with higher success rates and lower incidence of constrictive pericarditis making it the preferred method.¹

This case reports an extremely rare occurrence of primary *streptococcus pneumoniae* pericarditis with no obvious focus of infection elsewhere. Usually, it arises from hematogenous dissemination or contiguous spread from an intrathoracic infection including extension from a myocardial or subdiaphragmatic site. Predisposing risk factors include immunosuppression, alcohol intake, and chest wall trauma.³ The patient presented in this case had a predisposing risk factor of being on chronic immunosuppressants, however had no obvious focus of infection. To our knowledge only 8 total cases of primary *streptococcus pneumoniae* pericarditis have been found on literature search.^{5–10} This indicates how rare the occurrence of this condition has become in the modern antibiotic era. Nevertheless, due to the high mortality rate with purulent pericarditis, a high index of suspicion is needed when acute pericarditis is suspected for early diagnosis to instate appropriate therapy with drainage and antibiotics.

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