



Case report

Methicillin-resistant *Staphylococcus aureus* pericarditis causing cardiac tamponade

Maedeh Ganji^a, Jose Ruiz^a, William Kogler^{b,*}, Joshua Lung^b, Jarelys Hernandez^b, Carmen Isache^b

^a University of Florida-COM, Division of Cardiology, Jacksonville, FL, USA

^b University of Florida-COM, Division of Internal Medicine, Jacksonville, FL, USA

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ABSTRACT

Community acquired methicillin-resistant *Staphylococcus aureus* (MRSA) is an organism that can cause life threatening injuries with 6 cases of purulent pericarditis secondary to MRSA being reported so far. We report a 66 year-old -female who presented to our hospital with a two-week history of worsening shortness of breath, associated with pleuritic chest pain and chills. Patient was found to be positive for influenza type A virus two weeks prior to this presentation, but was never treated. Physical exam upon arrival showed muffled heart sounds and jugular venous distention. Electrocardiogram showed diffuse ST segment elevations along with PR segment depressions in anterolateral leads. She underwent emergent transthoracic echocardiogram that demonstrated a large pericardial effusion most noticeable around the right ventricle with impedance of right ventricle filling. Patient had a pericardial window performed and purulent fluid was drained. Pericardial fluid cultures grew MRSA. Patient was started on vancomycin along with colchicine for MRSA pericarditis and became hemodynamically stable. Pericarditis due to MRSA is extremely rare, especially in the antimicrobial era and in the absence of prior surgical interventions.

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Introduction

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a pervasive organism that can cause life-threatening illnesses. It was initially reported in 1960s, and has been predominantly associated with health-care-associated infections. However, in more recent years, MRSA infections began to be detected also in persons who did not have contact with the health care system. This organism is usually found in skin infections, however it can also cause pneumonia, bacteremia, endocarditis and osteomyelitis. MRSA has been reported as one of the most frequent pathogens causing post-viral bacterial pneumonia especially in patients with influenza type A viral infection. However, only a half dozen cases of purulent pericarditis secondary to MRSA have been reported in literature so far. We present here a case of MRSA pericarditis presenting as cardiac tamponade, in a patient with recent history of influenza type A viral infection.

Case report

A 66 year-old female with medical history of breast cancer, status post radiation and mastectomy 10 years prior, diabetes mellitus and hypertension, presented to our hospital with a two-week history of worsening shortness of breath associated with pleuritic chest pain and chills. The patient had been diagnosed with influenza type A viral infection just two weeks prior, but did not receive any treatment. Pertinent vitals upon arrival included tachycardia 110 beats/minute, oxygen saturation 84% on room air and hyperthermia 39.4 degrees C. Physical exam revealed muffled heart sounds and jugular venous distention. Laboratory findings were significant for 28,500 WBC/uL. Patient underwent chest x-ray which was remarkable for cardiomegaly and bilateral pleural effusion. Electrocardiogram showed diffused ST segment elevations along with PR segment depressions in anterolateral leads (Fig. 1). Computer-tomography imaging of chest revealed a moderate to large pericardial effusion with suggestion of right heart compromise (Fig. 2). She underwent emergent transthoracic echocardiogram that demonstrated a large pericardial effusion, most noticeable at right ventricle, with impedance of right ventricle filling. Cardiothoracic surgery team was consulted and a pericardial window was performed. Purulent fluid was drained from the pericardium and cultures along with

* Corresponding author.

E-mail address: william.kogler@jax.ufl.edu (W. Kogler).

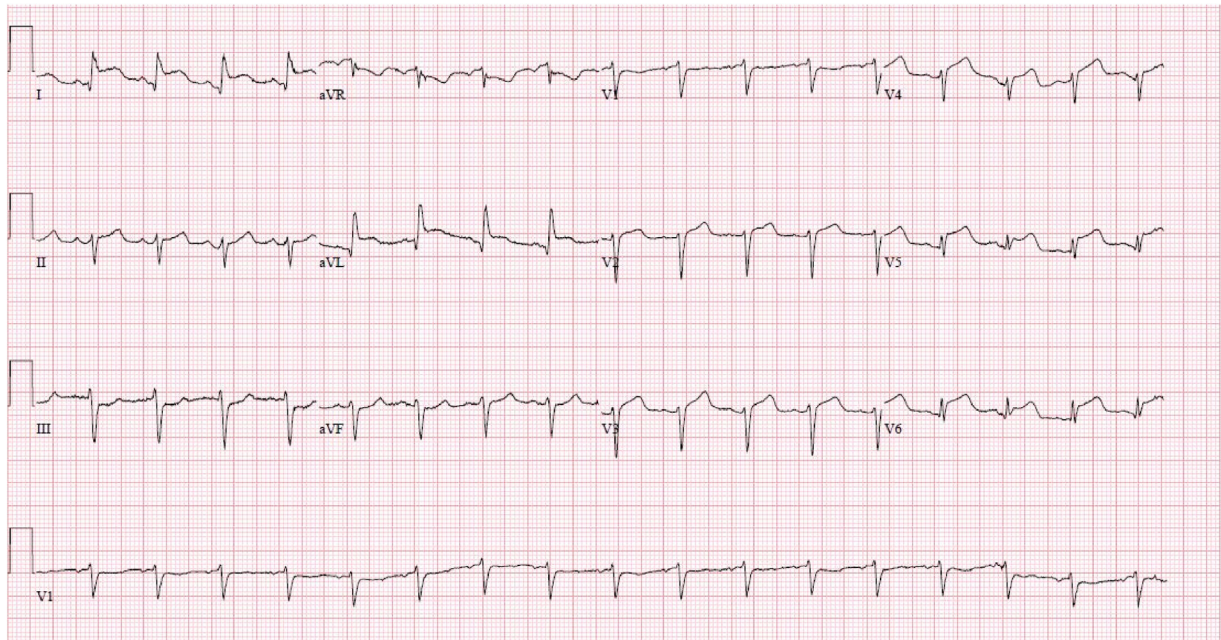


Fig. 1. EKG showing diffuse ST elevations with PR depression in anterolateral leads.

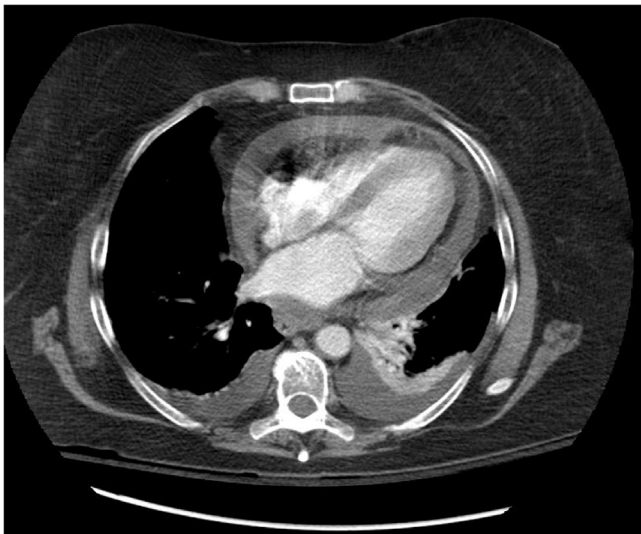


Fig. 2. CT Chest showing large pericardial effusion with suggestion of right heart compromise.

concurrent blood cultures where all positive for MRSA. Cultures were sensitive to vancomycin and clindamycin, suggestive of a community acquired strain of methicillin-resistant *Staphylococcus aureus* (MRSA). She was started on vancomycin along with colchicine for MRSA pericarditis and became hemodynamically stable soon after starting antimicrobials.

Discussion

Pericarditis can present as an isolated condition or in association with a systemic disorder. It is suggested that 80–90% of pericarditis cases are either idiopathic or caused by a viral infection, whereas bacterial purulent pericarditis is rare event, encompassing less than 1% of total cases of pericardial disease. In terms of bacterial etiology, tuberculosis remains the major causative factor of pericarditis in developing countries. In the antimicrobial era many patients who

develop purulent pericarditis usually have a pre-existing pericardial injury due to uremic, neoplastic, or collagen vascular disease. Our patient probably had pre-existing pericardial disease secondary to radiation therapy exposure.

Pericarditis due to MRSA is extremely rare, especially in the antimicrobial era and in the absence of prior surgical interventions. Of note, only 6 cases have been reported in the literature around the world [1–6]. This condition carries significant morbidity and mortality, with the mortality rate reaching up to 60%, mostly because of cardiac tamponade, toxicity and constriction. It is thought that up to 42–77% of patients develop cardiac tamponade [1–6].

Purulent pericarditis typically presents with high fever and chest pain present in 25–37% of patients. Mechanisms of disease dissemination include contiguous extension of intrathoracic processes, hematogenous spread, penetrating chest wall injury, surgical wounds, esophageal rupture with fistula formation, retropharyngeal abscess, and seeding from hepatic or subdiaphragmatic abscess. Previous cases of purulent MRSA pericarditis describe patients with ages 19–60 years, and with predisposing conditions including pseudoaneurysm, obesity, diabetes mellitus, cocaine use, malignancy and DRESS syndrome [1–6]. Our patient was a diabetic with history of malignancy.

Diagnosis of pericarditis can be made with two dimensional echocardiography and computer tomography. Primary source control is key, as survival relies on early empiric antimicrobial therapy and pericardial drainage. Adequate drainage of purulent pericarditis is vital in order to normalize hemodynamics and achieve source control. This can be done via pericardiocentesis, pericardial window or pericardiectomy. The latter is of particular importance in cases of constrictive pericarditis. Percutaneous catheter drainage is the most commonly performed technique. In a case report, Terada et al suggest that daily intrapericardial instillation of physiologic saline is an effective and safe adjunct in preventing constriction and avoiding an open surgical approach [4]. Another effective adjunctive therapy includes intrapericardial infusion of a fibrinolytic agent, such as streptokinase or urokinase. These are shown to lyse loculated effusions and effectively accelerate its drainage, thus avoid extensive pericardiectomy. Adding systemic corticosteroids may also bring benefit in some cases. NSAIDs with or without colchicine have also been used to reduce inflammation. In this case, our patient had a

history of severe peptic ulcer disease so colchicine was initiated without NSAIDs. As far as antibiotic therapy, cases of purulent MRSA pericarditis have successfully been managed with vancomycin, daptomycin or ceftaroline, based on review of other cases reported so far [5,6]. Our patient was successfully managed with vancomycin and drainage.

Conclusion

Purulent pericarditis due to MRSA is extremely rare, especially in the antimicrobial era and in the absence of prior surgical interventions. It carries a very high morbidity and mortality rate due to its possible complications, such as cardiac tamponade. Community-acquired MRSA has not been traditionally associated with sepsis and severe disease, however, as its incidence continues to grow, we need to recognize its virulence and changing spectrum.

Author contribution

Primary author- Maedeh Ganji. All other authors contributed by providing resources, literature review, proofreading, and editing.

Declaration of Competing Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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