Haemophilus influenzae purulent pericarditis in an immunocompetent individual

Smit Shah, Pooja Shah and Jared Green

Tower Health System, Reading Hospital, Reading, PA, USA

ABSTRACT

Purulent pericarditis is a rare bacterial illness in the post-antibiotic era that is defined as pericardial infection with gross or microscopic purulence in the pericardium. Common causes include nosocomial bloodstream infections, direct spread through thoracic surgery, or immunosuppression.

We present a case of a 66-year-old male with a history of mantle cell lymphoma status post chemotherapy, completed about 4 years before presentation, in general, good health presented with acute typical chest pain associated with dyspnea on exertion. 12-lead EKG demonstrated ST elevations in anterolateral and lateral leads. Patient was initially being managed as Acute Coronary Syndrome, though, preliminary bedside echocardiogram demonstrated a large pericardial effusion with peritamponade physiology, which was confirmed with a STAT transthoracic echocardiogram. He underwent an emergent pericardial window which drained 350–400 ml of yellow murky pericardial fluid. Blood cultures and pericardial fluid cultures grew Haemophilus influenzae (H. influenzae). Upon further history taking, patient revealed experiencing upper respiratory symptoms and being diagnosed with pansinusitis 2 months before his admission. He was treated with IV ceftriaxone for 4 weeks from the day of negative blood cultures.

H. influenzae upper respiratory infection is usually seen in the unvaccinated pediatric population, or in immunocompromised individuals; however, few cases in vaccinated adults have been reported, as in the above case. Sequelae from H. influenzae infection is usually limited to upper respiratory symptoms and mastoiditis, but rarely, pericarditis could occur. It is important to include pericarditis in the differential for chest pain in a patient with a recent history of upper respiratory symptoms. Pericarditis is a rare but potentially serious complication of recent upper respiratory tract infection, and needs to be promptly identified and treated to avoid further morbidity.

1. Intro

Purulent pericarditis is a rare bacterial illness in the post-antibiotic era that is defined as pericardial infection with gross or microscopic purulence in the pericardium [1]. Common causes include nosocomial bloodstream infections, direct spread through thoracic surgery, or immunosuppression. In the pre-antibiotic era, purulent pericarditis occurred primarily from a pulmonary focus, but since the introduction of antibiotics, it has become a rare finding [2].

H. influenzae is a gram-negative coccobacillus that is most frequently associated with childhood exanthema (otitis media, meningitis) and, less frequently, adult pneumonia. H. influenzae is not typically associated with causing purulent pericarditis. Haemophilus influenzae pericarditis, in particular, has a tendency to cause thick purulent pericardial fluid, leading to constrictive pathophysiology.

2. Case description

66-year-old male with past medical history of mantle cell lymphoma status post chemotherapy in 2016 with maintenance Rituxan therapy which was completed 8 months before presentation, hypercholesterolemia, and hypothyroidism who presented to an urgent care clinic complaining of sharp, left-sided chest pain, and progressively worsening dyspnea on exertion over 1 week. 12-lead EKG demonstrated ST elevations in anterolateral and lateral leads. Due to concerns for Acute Coronary Syndrome, patient was given 324 mg aspirin. EMS was called to transport the patient to an Emergency Department (ED) for further evaluation with a STEMI alert activated. Upon further assessment in the ED, patient was chest pain free. He denied worsening of pain with inspiration and movement. On examination, the patient was comfortable without being dyspneic at rest. Labile blood pressures with tachycardia were noted on telemetry. He was taken up to cardiac catheterization lab and was started on therapeutic IV Heparin. On further examination, obtaining a thorough history, and review of systems, he was chest pain free and his symptoms were not consistent with acute coronary syndrome. Bedside echocardiogram demonstrated a large pericardial effusion. STAT Transthoracic echocardiogram confirmed a large pericardial effusion with pre-tamponade physiology (end-
diastolic right atrial collapse). Meanwhile, patient was becoming increasingly dyspneic. CTA chest and abdomen showed no extravasation of contrast and no evidence of dissection. Cardiothoracic surgery physician performed an emergent pericardial window, which drained 350–400 ml of yellow murky pericardial fluid. The pericardium was noted to be thick with the myocardium being covered with a whitish rind. The patient became asymptomatic without any dyspnea and hemodynamically stable after the procedure. Pericardial fluid and blood cultures both grew Haemophilus influenzae. CT chest was obtained which ruled out pneumonia. He was treated with IV cefepime empirically and then narrowed down to IV ceftriaxone after the culture sensitivities revealed pan-sensitive nature of the organism. He was treated with IV ceftriaxone 2 g daily for 4 weeks from the day of negative blood cultures.

Further history was obtained from the patient by an Infectious Disease specialist, which revealed that over 2 months before his admission, the patient recalled eating ice cream from an ice cream truck in Philadelphia where he noted that hygiene of the ice cream machine was questionable. Due to upper respiratory infection symptoms, he visited his primary care physician who prescribed the patient doxycycline for 10 days duration for acute pansinusitis. Due to recurrent symptoms 6 weeks later, the patient was prescribed azithromycin (Z-pak) for recurrent pansinusitis. The patient saw an ENT-Otolaryngologist and was informed that he had a left ear infection, for which he was started on topical ear drops (name unknown). Temporal bone CT was performed that revealed findings suggestive of left otomastoiditis without bony destructive change, and also fluid and thickening in the right external auditory canal related to otitis externa. The patient stated that ENT-Otolaryngologist prescribed alternative ear drops (name unknown), but the patient had not started using the drops.

3. Discussion

Most reported cases of purulent pericarditis now occur in patients with history of recent thoracic surgery, history of pericardial disease, trauma to the chest, or in those who are immunocompromised from chronic renal failure, HIV, or malignancy. Common bacterial pathogens that are the cause of purulent pericarditis include Streptococcus pneumonia, Staphylococcus aureus, and gram-negative organisms such as Proteus, Escherichia coli, Pseudomonas, and Klebsiella [2].

H. influenzae is a gram-negative coccobacillus bacterium, most commonly associated with childhood otitis media and meningitis. Occasionally, it is seen in the adult population as a cause of pneumonia. Two strains of H. influenzae exist; the encapsulated or typeable bacterium is responsible for childhood illness. Non-typeable (non-encapsulated) H. influenzae is most often seen in chronic obstructive airway disease exacerbations. Regardless of subtype, bacterial pericarditis caused by H. influenzae is incredibly rare [3]. In a 2006 case report by Gupta et al., only 15 adult cases of purulent pericarditis due to H. influenzae had been reported in the medical literature, the majority of which were reported in the pre-antibiotic era. In 12 out of the 15 cases, the encapsulated strain of H. influenzae was cultured from pericardial fluid. An extensive literary search yielded only four published articles since the year 2000 with cases of H. influenzae causing purulent pericarditis.

One of these cases occurred in an intoxicated patient with forceful emesis causing microtears in the esophagus and ultimately causing bacterial translocation into the mediastinum. A second case occurred in a patient with systemic lupus erythematos. The third case occurred in an immunocompromised patient with a history of multiple myeloma status post two bone marrow transplants and on ongoing immunosuppressive therapy. Meanwhile, a fourth case by Kanelidis et al. in 2018 reported the first case of purulent pericarditis by H. influenza in an immunocompetent patient.

Although the number of purulent pericarditis cases is low, the prognosis remains poor. This is primarily due to the delay in recognition and prompt initiation of treatment. Despite appropriate therapy, the mortality rate of bacterial pericarditis is 30–50%, with cardiac tamponade being the leading cause of deaths [4]. Possible predisposing conditions that lead to tamponade include esophageal perforation, bacteremia, bacterial pneumonia, and infective endocarditis. These patients may ultimately require a pericardial window or complete pericardectomy for a permanent solution and to decrease the chances of re-accumulation of fluid [5].

4. Conclusion

Purulent pericarditis is rare in the post-antibiotic era, but health-care providers should be aware of this complication after an acute viral illness in the adult population. H. influenzae upper respiratory tract infection is usually seen in the pediatric population, especially in the unvaccinated population. Though as seen in this case, it can occur in vaccinated and immunocompetent adults. Sequelae from H. influenzae are usually limited to upper respiratory symptoms and mastoiditis, but providers should be aware that rarely, pericarditis has been shown to occur. Thorough history-taking is important to recognize any preceding acute upper respiratory symptoms in patients with new-onset chest pain.
and EKG changes. It is important to include pericarditis in the diagnostic differential for chest pain in a patient with a recent history of upper respiratory symptoms. Pericarditis is a rare but potentially serious complication of recent upper respiratory tract infection, and needs to be promptly identified and treated to avoid a rapidly progressive and highly fatal outcome.

Disclosure statement
The authors report no financial relationships or conflicts of interest regarding the content herein.

ORCID
Pooja Shah http://orcid.org/0000-0002-4458-6221

References
[1] Rubin RH, Moellering RC Jr. Clinical, microbiologic and therapeutic aspects purulent pericarditis. Am J Med. 1975;59(1):68–78.
[2] Varghese V, George JC. Purulent pericarditis caused by haemophilus influenzae type B. J Invasive Cardiol. 2011 May;23:5.
[3] Gupta R, Garg P, Szalados JE. Bacterial pericarditis and tamponade due to nonencapsulated Haemophilus influenzae complicating a case of adult community-acquired pneumonia. MedGenMed. 2006 Dec 7;8(4):48.
[4] Farhat-Sabet A, Hull R, Thomas D. Cardiac tamponade from purulent pericarditis due to cutibacterium acnes. Case Rep Cardiol. 2018:5 Article ID 4739830. DOI:10.1155/2018/4739830
[5] Kanelidis AJ, Oehler D, Oehler CL, et al. A binge and a breach: cardiac tamponade caused by Haemophilus influenzae. Am J Med. 2018 Aug 1;131(7):768–771.