Acute Influenza Infection Presenting with Cardiac Tamponade: A Case Report and Review of Literature

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ABSTRACT

Introduction: Cardiac complications associated with influenza infection can occur either via a direct effect of the virus on the heart or through exacerbation of preexisting cardiovascular disease. We present a case of a 57-year-old man with acute influenza infection complicated by pericardial effusion and cardiac tamponade.

Case Presentation: A 57-year-old white man presented to the Emergency Department with sudden onset of severe, nonexertional, retrosternal, pressure-like chest pain for a few hours and with fever and muscle aches for 2 days. The patient was initially admitted because of suspected acute coronary syndrome. The next morning, he complained of acute-onset shortness of breath and had hypotension and tachycardia. On examination, his peripheral extremities were cold and heart sounds were distant. Pulsus paradoxus was 20 mmHg. The electrocardiogram showed low-voltage QRS complex with electrical alternans. An urgently performed bedside echocardiogram showed moderate pericardial effusion with a small right ventricular cavity with diastolic collapse. Emergent pericardiocentesis was performed, with removal of 250 mL of fluid from the pericardial space. The patient’s hemodynamic status immediately improved. Analyses of pericardial fluid demonstrated no bacteria, acid-fast bacilli, or malignant cells. The result of a rapid influenza diagnostic test with polymerase chain reaction was positive for influenza A virus, with other viral panels yielding normal results. The patient was treated with oseltamivir for 5 days.

Discussion: Pericardial involvement is a rare and perhaps underreported complication of influenza infection. Early recognition of cardiac symptoms and appropriate diagnostic workup in a patient presenting with influenza-like symptoms is important to avoid life-threatening complications.

INTRODUCTION

Acute respiratory illness caused by influenza A or B virus occurs in outbreaks, mostly during the winter season, presenting with upper and/or lower respiratory tract infection along with signs and symptoms of systemic illness such as fever, headache, myalgia, and weakness. Cardiac complications associated with acute influenza infection can involve the pericardium, myocardium, and coronary arteries, resulting in worsening ischemic heart disease. The association between influenza epidemics and increased rates of acute coronary syndrome, especially non-ST-elevation myocardial infarction, is well established. Pericardial syndrome with pericarditis complicated by cardiac tamponade is a rare complication of acute influenza infection.

We present a case of a 57-year-old man with acute influenza infection who presented with pericardial effusion and cardiac tamponade.

CASE PRESENTATION

Presenting Concerns

A 57-year-old white man presented to our Emergency Department with sudden onset of severe, nonexertional, retrosternal, pressure-like chest pain for the last 24 hours. The pain was nonradiating but associated with numbness in his left arm. The patient also reported 2 days of fever with muscle aches. He had hypertension but no history of pedal edema, palpitations, orthopnea, or syncope. He reported current tobacco use and occasional alcohol use but no use of illicit drugs. On presentation, he was afebrile and had a blood pressure of 120/70 mmHg, heart rate of 87 beats/min, respiration rate of 18 breaths/min, and oxygen saturation of 97% on room air. Results of the physical examination were unremarkable.

Initial laboratory findings showed an elevated hemoglobin level of 17.1 g/L with a normal white blood cell count and platelet count. Results of a basic metabolic panel showed hypotension (sodium level of 130 mEq/L), but potassium level and renal function were normal. An electrocardiogram showed sinus tachycardia, and the initial troponin measurement was slightly elevated at 0.06 ng/mL (normal is < 0.04). A chest radiograph was normal. A repeat troponin level was 0.12 mg/mL after 6 hours.

Therapeutic Intervention and Treatment

Because of his presentation and risk factors for coronary artery disease, a decision was made to admit the patient to the hospital for management of acute coronary syndrome. The patient received aspirin, nitroglycerin, and a therapeutic dose of enoxaparin. His chest pain was relieved after a few hours.

The next day, the patient complained of acute onset of shortness of breath. He became hypotensive (blood pressure of 100/60 mmHg) and tachycardic (heart rate of 110/min). His peripheral extremities were cold, and heart sounds were distant. Pulsus paradoxus was 20 mmHg.

Repeat electrocardiogram showed low-voltage QRS complex with electrical alternans along with sinus tachycardia (Figure 1). An echocardiogram was urgently obtained at the bedside and showed moderate pericardial effusion with a small right ventricular cavity with diastolic collapse (Figure 2). Shortly thereafter, the patient’s condition became unstable. He had severe dyspnea

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and clinically significant hypotension with systolic blood pressure dropping to the 80 mmHg range. An emergent pericardiocentesis was performed, with removal of 250 mL of serosanguinous fluid from the pericardial space. The patient experienced immediate improvement of hemodynamic status. A repeat echocardiogram performed the next day showed resolution of pericardial effusion and no signs of right ventricular collapse.

Analysis of pericardial fluid showed leukocytosis with lymphocytic predominance (748/µL with 65% lymphocytes, 20% macrophages, 4% monocytes, and 4% neutrophils), and a culture was negative for bacteria. Cytologic results showed no malignant cells, acid-fast bacilli stain and culture were negative, HIV 1 and 2 antibodies along with HIV-1 p24 antigen were negative, and the hepatitis screen had normal results. The result of a rapid influenza diagnostic test with polymerase chain reaction was positive for influenza A virus, and other viral studies (cytomegalovirus, Epstein-Barr virus, coxsackievirus, parvovirus, and paramyxovirus) yielded normal results.

Follow-up and Outcomes

After the pericardiocentesis, the patient recovered well without any recurrences. Treatment with ibuprofen and colchicine was initiated. With the diagnosis of influenza, the patient was treated with oseltamivir for 5 days.

DISCUSSION

Every year, influenza infection places a substantial burden on health care services worldwide. The US Centers for Disease Control and Prevention estimated that in the US influenza infection has caused between 9.2 million and 35.6 million illnesses, 140,000 to 710,000 hospitalizations, and 12,000 to 56,000 deaths annually since 2010. Although acutely debilitating, influenza is a self-limited infection in the general population, meaning that it usually resolves without intervention. However, it is associated with increased morbidity and mortality in certain high-risk populations.

Although the respiratory system is most commonly affected during influenza infection, cardiac involvement is also known to occur. This can occur either due to direct effect of the virus on the heart or through exacerbation of preexisting cardiovascular disease. Direct myocardial involvement presenting as myocarditis can present in a range from self-limiting pericarditis to acute pericardial effusion and cardiac tamponade requiring emergent pericardiocentesis have been reported. A case report of chronic pericardial effusion requiring pericardectomy has also been described. In the recently reported case of cardiac tamponade secondary to influenza infection, a 22-year-old woman with no known cardiac history but with preceding symptoms of influenza-like illness presented with tachycardia, hypotension, and jugular venous distension requiring emergent pericardiocentesis. In our case, the patient initially presented with pericardial chest pain and experienced pericardial effusion leading to cardiac tamponade overnight.

Unlike in chronic pericardial effusion, rapid accumulation of pericardial fluid in the inelastic pericardial sac can lead to cardiac tamponade even with a minimal amount of fluid. Cardiac tamponade occurs when intrapericardial pressure exceeds intracardiac pressure. The rapidity of fluid accumulation is a greater factor in the development of tamponade than is the amount of fluid accumulation. Some authors describe cardiac tamponade as a continuum of severity ranging from asymptomatic intrapericardial pressure elevation to clinical tamponade with signs and symptoms of dyspnea, tachycardia, jugular venous distension, pulsus paradoxus, and right ventricular diastolic collapse on echocardiography with hypotension and shock in severe cases. The echocardiographic sign of right ventricular diastolic collapse has been shown to occur early in the course of cardiac tamponade, which demonstrates the importance of bedside ultrasonography in the early detection of cardiac tamponade. The mechanism of pericardial effusion in influenza infection is not well known. Research findings have shown that there is elevation of vascular endothelial growth factor and basic fibroblast growth factor 2.
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7. Oseltamivir and zanamivir are antiviral agents that are recommended for the treatment and prophylaxis of influenza infection. 18-20 Oseltamivir and zanamivir have been shown to reduce the duration of uncomplicated influenza A and B virus illness by approximately 1 day, when used within the 48-hour window from the onset of symptoms. 25-27 There are limited data regarding use of neuraminidase inhibitors in preventing serious influenza-related complications, 24 and there are no data available, of which we are aware, regarding the use of neuraminidase inhibitors in the prevention and treatment of influenza-related cardiac complications. Although initiation of antiviral agents after 48 hours of illness has shown minimal or no benefit in uncomplicated influenza, 25 oseltamivir has been shown to reduce severe clinical outcomes in patients hospitalized with influenza. Benefit was observed even after 48 hours of initiation of antiviral agents. 24 Antiviral treatment with oseltamivir or zanamivir has been recommended for all eligible individuals with suspected or confirmed influenza requiring hospitalization regardless of previous health or vaccination status. 18-21

CONCLUSION

Our case presents one of the rare and probably underreported complications of influenza infection. Early recognition of cardiac symptoms and appropriate diagnostic workup in a patient presenting with influenzalike symptoms is important to avoid life-threatening complications. Our case also highlights the importance of bedside echocardiography in the early recognition of clinically significant cardiac tamponade.

Disclosure Statement
The author(s) have no conflicts of interest to disclose.

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