Presentation of Acute Viral Myocarditis in a Young Adult: A Case Report

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Introduction:
Myocarditis affects 1.5 million people worldwide and in chronic forms can lead to heart failure. This inflammatory disorder is a primary cause of dilated cardiomyopathy globally and is frequently a complication of viral infections. Although Coxsackievirus B3 continues to be a prominent causative agent, further exploration has discovered a number of Coxsackie serotypes responsible for myocarditis. Despite being a well-known contributor to congestive heart failure, there is a lack of conventional techniques available to aid in diagnosis, making diagnosing acute viral myocarditis a complex and tedious process. We discuss the case of a 25 year old woman presenting with acute viral myocarditis complicated with gastroenteritis and congestive hepatopathy. This case highlights the ways in which the virus can manifest itself and emphasizes the importance of early clinical suspicion, diagnosis, and management.

Case Report:
A 25-year-old female with no significant past medical history presented to the emergency department for new onset shortness of breath after a one-week history of progressively worsening abdominal bloating and diarrhea. She was a recent immigrant from Cuba, having emigrated over one year ago, crossing through multiple countries in Central America. She reported a previously active lifestyle without any complaints of shortness of breath, dyspnea on exertion, or palpitations during physical activities. No history of illicit drug use. Physical exam pertinent for decreased breath sounds in the lung bases bilaterally, a 2/6 systolic murmur at the left sternal border, mild upper and lower extremity edema.

On presentation, the patient was found to have severely elevated Pro-BNP (7,270), elevated liver enzymes (AST 656, ALT 711), low serum albumin (2.9), prolonged PT/INR (19.5, 1.7 respectively), elevated CRP, and elevated LDH. The patient met severe sepsis criteria and was subsequently admitted.

A CT scan revealed findings suggestive of hepatitis and small-volume abdominal ascites. Chest X-ray showed bilateral pleural effusions, with the right side greater than the left. Thoracocentesis was performed, revealing exudative effusion. Electrocardiogram revealed right axis deviation, nonspecific T wave abnormalities and a nonspecific interventricular block with QRS duration of 138 ms. Transthoracic echocardiogram was performed which revealed an ejection fraction (EF) estimated between 20% to 25% with mild dilation of the left and right ventricles and mild tricuspid regurgitation.

Hepatitis A, B, C, HIV, COVID-19, ANA, and anti-smooth muscle antibodies were negative. Ceruloplasmin and ferritin levels were within normal limits.

The patient underwent cardiac catheterization, which revealed nonobstructive disease and non-ischemic dilated cardiomyopathy with an estimated EF of 15-25%. Cardiac MRA was consistent with acute myocarditis. Chlamydia trachomatis IgG 1.28 (range 0.000-0.904), Adenovirus Ab titer 1:8, Coxsackie Type B(4) 1:8, Coxsackie Type B5 1:16, and Coxsackie Type B6 1:16.
Discussion:

In the spectrum of inflammatory cardiomyopathies, virus induced myocarditis is a predominant subtype, especially in developing countries where there is a broad spectrum of parasitic and bacterial etiologies. Early signs of myocarditis may include non-specific symptoms such as dyspnea, chest pain, fatigue, and, in the majority of cases, a recent history of upper respiratory symptoms. Incidence of myocarditis is estimated to be about 6.1 cases per 100,000 men and 4.4 per 100,000 in women aged 35 to 39. However, this diagnosis is frequently missed due to the constellation of symptoms patients may present with and there are no noninvasive diagnostic modalities available.

Although short-term outlook for acute myocarditis is generally favorable, there is markedly increased morbidity in the age bracket mentioned above. Patients who initially recover may develop recurrent dilated cardiomyopathy and heart failure, which can occur years later. Cardiac MRI and endomyocardial biopsy are valuable tools for diagnosing myocarditis, assessing the risk of cardiovascular events, and guiding treatment, however are not common practices. Finding effective treatments has proven to be a challenge due to the complex nature of chronic dilated cardiomyopathy following viral myocarditis, which is influenced by factors like the patient's genetic makeup, viral genetics, and environmental conditions.

The significance of taking viral infections into account as potential causes when dealing with hepatitis and myocarditis in a patient is one important aspect that should not be overlooked. Although Coxsackievirus is the most likely cause of myocarditis, we could not rule out the involvement of adenovirus. Studies have found that a receptor termed CAR (Coxsackie B-adenovirus receptor) is responsible for viral infection in cardiac tissue for both Coxsackie B and adenovirus. Coxsackievirus Type B is known to cause a wide range of clinical manifestations, and its potential involvement in this case underscores the importance of thorough diagnostic investigations.

The gastroenteritis associated with viral infections is not uncommon, and it is important to also consider these symptoms as part of other differential diagnoses. The involvement of the liver and the presence of abdominal ascites add complexity to the case, emphasizing the need for a comprehensive evaluation.

In addition to the cardiac abnormalities, the patient presented with abdominal bloating, elevated liver enzymes, and abnormal liver function, suggesting congestive hepatopathy. Despite the modest decline in liver function, early recognition and treatment of the underlying cause is crucial to reduce the risk of the patient developing cirrhosis. In the case of this patient, optimization of her cardiomyopathy with guideline-directed medical therapy was the treatment of choice.

Dilated cardiomyopathy as a consequence of myocarditis can cause congestive hepatopathy as a consequence of right heart failure. The liver is impacted by the increased central venous pressure and the blood becomes congested in the portal system. This elevated pressure disrupts normal blood flow within the liver, creating congestion within the sinusoidal network. As a result, stress is placed on hepatocytes, blood flow becomes impaired impacting oxygen and nutrient delivery to the liver, and thrombi form within the sinusoids. Collectively, these mechanisms contribute to liver damage and can consequently lead to liver cirrhosis.
Conclusion:
In summary, this case report illustrates the complexity of diagnosing and managing a patient with hepatitis, myocarditis, and gastroenteritis, related to a viral infection. It highlights the importance of a multidisciplinary approach, comprehensive diagnostic evaluations, and close follow-up to provide the best possible care for patients with such challenging presentations. Additionally, it emphasizes the significance of keeping viral infections in the differential when confronted with a presentation like this in clinical practice.

Myocarditis is a relatively rare disease process that can go undiagnosed due to being subclinical or presenting with nonspecific symptoms. Even in cases where myocarditis is suspected, diagnosis is rarely confirmed due to the difficulty utilizing diagnostic modalities, such as cardiac MRI or endomyocardial biopsy. Therefore, having high clinical suspicion is critical in cases that are more severe. A high level of suspicion is necessary to quickly identify myocarditis presentations in the acute setting, as delays in diagnosis can correlate with worsening clinical outcomes.

References:

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