

Viral Myocarditis - A Case Report

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Abstract

Viral myocarditis is an inflammatory disorder of the myocardium, which occurs following a viral infection. The most common agent of infection is Coxsackievirus B2 followed by adenovirus. Here, we present a case of a three and a half year old male child brought to the Emergency Room of Paediatric Unit II at the Abbasi Shaheed Hospital, with complaint of cough and fever since three days, associated with difficulty in breathing and irritability. The patient was managed with antibiotics initially; however, soon he had severe tachycardia, tachypnea, and hepatomegaly. His elevated cardiac enzymes and symptoms confirmed the diagnosis of viral myocarditis. He was managed with ACE inhibitor and inotropic agent, and echocardiography done later revealing a clear report confirmed resolution of the infection and healed myocarditis. This case is notable as its complications are a threat to life, thus an emphasis on early and correct diagnostic tools is necessary to proper management.

Keywords: Myocarditis, diagnostic tool, infection.

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Introduction

Myocarditis is the infiltration of the myocardium with inflammatory cells - mononuclear cells focally or diffused in the myocardium - with necrosis of the myocyte after infection with virus¹. The most common pathogen is Coxsackievirus B2 followed by adenovirus². However, it may also result from bacterial infections, immune-mediated and toxic/hypersensitivity reactions. The World Health Organization (WHO) reports that the incidence of cardiovascular involvement after enteroviral infection is 1-4%, depending on the causative organism³. It is amongst the most significant cause of morbidity and mortality in the paediatric population and is labeled as the most common cause of cardiac failure

in a healthy child. The incidence of viral myocarditis has been reported to be 1 per 100 000⁴, according to some studies.

Acute viral myocarditis in children displays non-specific viral symptoms, associated with abdominal pain, nausea and vomiting. Cardiovascular associations include tachycardia, mild hypotension, metabolic acidosis, syncope, chest pain in adults, pulmonary edema and heart failure⁵.

Several new diagnostic methods, such as cardiac magnetic resonance imaging, are useful for diagnosing myocarditis⁶. Endomyocardial biopsy, however, remains the goldstandard especially in patients who do not respond to conventional supportive therapy⁷. We present this case report to highlight the importance of appropriate diagnostic tools and understanding its clinical features for the timely management of viral myocarditis.

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Case report

A three and a half year old male child weighing 11 kgs, incompletely vaccinated, was brought to the Emergency Room (ER) of Paediatric Unit II at the Abbasi Shaheed Hospital, with complain of cough and fever since 3 days, difficulty in breathing, and swelling in right eye associated with history of fixed gaze for seconds and irritability. Patient also had severe pallor. Initially he was treated for anaemia and orbital cellulitis with suspected meningitis. Blood transfusion was done twice, and antibiotic Ceftriaxone and Vancomycin were prescribed during his initial stay in the hospital. During this time, he had severe tachycardia, tachypnea, hypertension, hepatomegaly, and raised jugular venous pressure (JVP). His cardiac enzymes were also raised for which tablet Digoxin and Capoten (captopril) were added to his regime. The dose of Capoten was gradually raised to 3mg/kg when the blood pressure failed to return to normal on initial dose of 1mg/kg. His urinary output was seen to fall gradually with the minimum reading being 25cc (2cc/kg/hr). His Glasgow Coma Scale (GCS) was also seen to deteriorate. There was persistent fever, and brown colored gastric aspirate. Fresh frozen plasma was transfused at this stage of treatment.

Lab investigations revealed Total Leukocyte Count $15.8 \times 10^9/L$, haemoglobin 8.1g/dL, and hematocrit 29%. His UCE levels were: urea 109mmol/L, creatinine 0.74 mg/dL, sodium 170 mmol/L, Potassium 3.6 mmol/L, and bicarbonate 21mmol/L. Cardiac enzymes revealed LDH 1384 U/L, CPK 1088 U/L, SGOT 97 U/L, CK-MB 3.4 ng/mL. Urine D/R revealed proteins and WBC 4-6/hpf. Patient's condition, i.e., his signs and symptoms and raised level of cardiac enzymes suggested a diagnosis of viral myocarditis. Echocardiography done the after stabilization of the condition came out normal, revealing healed myocarditis. The patient was discharged on medications. Follow up in outpatient department was satisfactory.

Discussion

Viral myocarditis is labeled as amongst one of the important causes of morbidity and mortality in children. Most commonly, Parvovirus B19 and Coxsackievirus type B are the two most common agents of viral myocarditis⁸. Apart from these two viruses, the paediatric population is also susceptible to infection by CMV, HSV, influenza, EBV, HIV, etc.

Even though the pathogenic role of enteroviruses in myocarditis is well established, the role of parvovirus B19 as being incidental or pathogenic in acute myocarditis is still a mystery. In Japan, Hepatitis C is seen to be associated with myocarditis, and cytomegalovirus, influenza virus, and Epstein-Barr virus have been reported in some cases of acute and chronic myocarditis⁶.

Disease progression of viral myocarditis is best explained by Murine models. According to this, three phases can be recognized: an acute phase resulting from direct cellular damage by the infectious agent; a sub-acute phase involving an innate host immune response against virus infested cells; and chronic phase which leads to dilated cardiomyopathy. Our patient presented with the sub-acute phase which registered him as a case of this disease.

The acute phase of viral myocarditis that presents itself in 1-3 days after infection is represented by focal myofibrillary necrosis and direct viral cytopathy⁸. The coxsackie virus-adeno receptor is seen to act in the attachment and internalization of the virus. Moreover, the Decay Accelerating Factor CD-55 and other cell adhesion molecule help in the pathogenesis. This explains the differences in developing susceptibilities to these viruses⁹. Once the cytokines and cell adhesion molecules allow for the lymphocytes play their part. This leads to autoantibody formation. As a result of this, myocyte damage and inflammatory reaction ensues, that results in loss of myocyte, and fibrous tissue formation, thus altering the contractility of the myocardium⁸. This explains the raised cardiac enzymes

levels observed in myocarditis, as also seen in this patient, thus confirming diagnosis.

Viral myocarditis presents itself with a variety of symptoms. It is based upon the age of the child and the severity of the disease. It may range from being asymptomatic to expressing malaise and lethargy⁹. Our patient came with initial symptoms of viral illness that included cough and fever, difficulty in breathing, swelling in right eye associated with history of fixed gaze for seconds and irritability. Non-specific symptoms such as lethargy and poor feeding were also seen. The child also revealed pallor and dusky appearance on examination. Severe tachycardia, tachypnea, which is the next common sign after tachycardia⁸, hypertension, hepatomegaly, raised JVP was later seen along with persistent fever, and brown coloured gastric aspirate.

The management of viral myocarditis has been successful along the lines of immunotherapy. Immunoglobulins and agents such as methylprednisolone, prednisone, etc have been reported to potentiate clearance of the causative virus and also to limit inflammation. Paediatric cases report benefit with multiple immunosuppressive agents. In fact, no class I study gives a confirmation of efficacy of this mode of treatment¹⁰. Our patient was seen to respond well to ACE inhibitor and cardiac glycoside, which became his main treatment. His echocardiograph confirmed clearance of the agent healed myocarditis. Previous cases have also shown remarkable success to supportive care⁹, inotropic support, and diuresis.

Conclusion

Viral myocarditis is a serious issue, the complications of which are likely to result in mortality. Therefore, correct early diagnosis and management is necessary to prevent fatalities.

Conflict of Interest

Authors have no conflict of interests and no grant/ funding from any organization.

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