Dengue Myocarditis Presenting as ST Segment Elevation MI

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Abstract
Dengue myocarditis masquerading as ST segment elevation myocardial infarction and was thrombolysed is being discussed.

Introduction
Dengue is the most common arthropod-borne viral (arboviral) illness in humans. Globally, 2.5-3 billion individuals live in approximately 112 countries that experience dengue transmission. Annually, approximately 50-100 million individuals are infected. The incidence has increased manifold in India due to unplanned urbanization and migration of population to urban areas. Although initially reported from urban locales, dengue is now being reported from urban and rural backgrounds alike. Clinically, a non-specific afebrile illness, a mild-form dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS) are commonly encountered in dengue epidemics. Of note, a variety of cardiac complications have been reported in dengue-affected patients, which include atrioventricular conduction disorders, supraventricular arrhythmia, and myocarditis.

We report a case who presented with ST segment elevation myocardial infarction, was thrombolysed and latter diagnosed as dengue myocarditis.

Case Report
A 50 years old female presented to the emergency department of our hospital with history of left sided chest pain, epigastric pain and vomiting of 4 hours duration. Her pulse rate was 56/min, regular and BP was 70/40 mm Hg. Electrocardiogram done in casualty showed ST segment elevation in leads II, III and aVF (Figure 1). She was thrombolysed with alteplase and admitted to cardiac care unit. She was started on dopamine infusion to maintain her cardiac output and blood pressure. She was also prescribed antiplatelets and other supportive drugs. Her blood urea nitrogen and serum creatinine on admission were documented to be 34 mg/dl and 0.8 mg/dl, serum aspartate transaminase (AST) 339 U/L, serum alanine aminotransferase (ALT) 774 U/L. Her platelet count was 2,14,000/cumm. Troponin T was positive, creatinine kinase (MB fraction) was 42 µg/L (1.0-6.0 µg/L). Over the next 3 days her urine output dropped to 200 ml in 24 hours, she had azotemia (Serum creatinine 5.6 mg/dl). She was given hemodialysis after nephrologist’s advise. Echocardiography showed global hypokinesia and ejection fraction of 52%. Her platelet count had dropped to 81,000/cumm when she came out of cardiology unit to general ward.

A detailed and meticulous history elicited in the ward revealed that the patient had history of fever, headache, body ache and joint pains for 4 days prior to presentation to the hospital. She also divulged history of itching over palmar and plantar aspects of souls. She denied any significant past history. She persistently complained of distension of abdomen. Clinical examination revealed a maculopapular erythematous rash over the face and the trunk. She also had facial puffiness, bilateral pedal edema, and ascites. Her chest radiographs revealed minimal pleural fluid bilaterally. Ultrasound abdomen had revealed moderate free fluid in peritoneal cavity, pericholecystic fluid, peri-hepatic fluid and gall bladder wall edema. Her IgM for dengue was sent and it was reported as positive.

History of fever, headache, bodyache, joint pains, erythematous rash over body, itching, thrombocytopenia, polyserositis, gall bladder wall edema and positive dengue serology clinched the diagnosis in favour of dengue infection. She had dengue induced myocarditis masquerading as acute inferior wall myocardial infarction and acute kidney failure. She was managed on lines of dengue, over next 4 days her urine output progressively improved and azotemia settled.

Discussion
Myocardial involvement in dengue may result either from direct viral invasion of cardiac muscles or cytokine-induced immune damage, or both. Increased levels of serum tumor necrosis factor-α, interleukins 6, 13 and 18, and cytotoxic factors in patients with dengue illness lead to increased vascular permeability and shock. Whether these cytokines play a role in the development of myocardial cell injury is uncertain. Cardiac involvement, although often mild, can be severe enough to result in progressive and intractable acute heart failure with global hypokinesia and acute cardiac dilatation. Lactic acidosis, which occurs as a result of the sluggish circulation, possibly contributes to myocardial depression in severe cases. Dengue virus subtype 2(DENV2) is associated with unusual manifestations of dengue and asymptomatic myocarditis, and has also been shown to cause myocardial dysfunction in children who had dengue hemorrhagic syndrome (DHF) or dengue shock syndrome (DSS) in a series of 17 patients. Kularatne et al
described three cases of myocarditis caused by DENV3 in Sri Lanka. Although there are no reports of cardiac involvement in DENV1 or DENV4, there is inadequate evidence to determine whether a particular serotype is preferentially associated with cardiac involvement. A diverse range of ECG abnormalities have been reported with dengue, including rate and rhythm abnormalities, heart block, wave form abnormalities, and voltage abnormalities. Reported rhythm abnormalities include relative bradycardia, sinoatrial block, disorders of atrioventricular conduction (junctional rhythm, second-degree and complete heart block, and monomorphic premature ventricular contractions on a background of heart block), atrial flutter, transient and persistent atrial fibrillation, self-limiting tachy-brady arrhythmia, sinoatrial block, and uniform ventricular ectopics progressing to ventricular bigemini. Electrocardiographic features mimicking acute myocardial infarction as in our patient have also been reported. Clinical manifestations suggesting cardiac involvement in dengue are diverse and include chest pain, palpitations, pleurisy, irregularities of pulse, bradycardia, hypotension, pulmonary edema, and features of shock. Our case showed chest pain, bradycardia, hypotension and shock. Cardiac biomarkers may indicate the presence of cardiac involvement in dengue. A prospective study in Sri Lanka evaluated several cardiac biomarkers (myoglobin, creatine kinase-muscle brain-type, N-terminal pro-brain natriuretic peptide, heart-type fatty acid-binding protein, troponin T) in patients with dengue; 25% of patients had abnormal results in one or more biomarkers. However, the correlation between biomarkers and cardiac function has not been clearly demonstrated; troponin T was shown to correlate poorly with left ventricular function. Our patient was troponin T positive with reduced left ventricular ejection fraction (52%). Constantine et al described echocardiographic features of myocarditis in 8 out of 37 adult and pediatric patients with dengue, and all of these patients belonged to the category of DHF. Reduced LVEF below 60% was noted only in four patients. Wali et al assessed cardiac function using echocardiography and radionuclide ventriculography in 17 patients with severe dengue. LVEF less than 40% was detected in 7 patients, and global hypokinesia in 12 patients.

Much of the evidence suggests that myocarditis is transient and self-limiting. A case of dramatic recovery following a single dose of intravenous methyl prednisolone in a 14-year-old with dengue complicated by myocarditis was reported by Premaratna et al. However, the current evidence base does not support the use of corticosteroids or immunoglobulins in treating severe dengue. Correction of serum calcium derangements to optimize cardiac status is usually carried out, especially in the presence of myocarditis. However, there is currently no evidence of its benefit.

The incidence of acute kidney injury (AKI) in dengue has ranged from 10.8% to 14.2% in various studies. AKI in our patient was part of multi organ dysfunction in dengue and was probably exacerbated by lack of appropriate hydration, restriction of fluids and use of inotropes in cardiac care unit.

Conclusion

Dengue myocarditis should be kept in mind in a patient, presenting with acute chest pain and electrocardiographic features suggestive of acute myocardial infarction, who has had the history and clinical features suggestive of dengue virus infection. Timely diagnosis can prevent an unnecessary cardiac intervention and results in a more favourable outcome.

References