Dengue Fever and Takotsubo Cardiomyopathy

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Abstract
A young male admitted for dengue fever and systemic involvement developed ECG abnormalities on third day, in the form of prolonged QT interval and deep and symmetrical inversion of T wave. Echocardiography revealed akinesia of mid and apical segments and well contracting basal segments, typical of Takotsubo cardiomyopathy or stress cardiomyopathy. These changes were transient and echocardiography findings reverted to normal kinesis of left ventricle without any treatment or without any residual left ventricle dysfunction.

Introduction
Takotsubo cardiomyopathy or stress cardiomyopathy, also called ‘transient left ventricular apical ballooning syndrome’ or ‘broken heart syndrome’ was first described in Japan in 1991 and named as ‘Takatsubo’ as it resembles an octopus trap. Pathogenesis postulated are catecholamine excess, coronary artery spasm or microvascular spasm, focal myocytolysis and myocarditis. It is usually seen in elderly and postmenopausal women and seen after acute emotional stress. It is also mentioned after an acute medical conditions such as septicaemia, lactic acidosis, acute abdominal surgery, hypoglycemia, pneumonia and adult respiratory distress syndrome. Electrocardiogram may reveal ST segment elevation or depression, T wave changes, prolonged QT interval and abnormal Q waves. Cardiac enzymes may be mildly elevated. Transthoracic echocardiogram may reveal ST segment elevation or depression, T wave changes, prolonged QT interval and abnormal Q waves. Cardiac enzymes may be mildly elevated. Transthoracic echocardiogram typically shows akinesia of apical and distal anterior wall, left ventricular apical ballooning and hypercontractile basal walls giving typical shape of Takatsubo. Coronary arteries are normal on angiography. These echocardiographic changes show complete resolution of apical wall motion abnormality and also resolution of impaired systolic function.

Case Report
An 11 years old boy was admitted with history of fever, headache, vomiting of 4 days duration. There was history of reddish urine once prior to admission.

On admission, his temperature was normal, pulse 70/min, BP 80 mm Hg systolic, no lymphadenopathy, no icterus, hydration normal and normal systemic examination. He did not have any bleeding manifestations. No petechiae, gum bleeding, hematuria or malena were seen.

Laboratory reports were as follows:
- Hemoglobin 16.5 gm%, WBC 6200/cmm, platelet count 10,000/cmm, peripheral smear for malarial parasite negative.
- Test for dengue fever NS 1 was positive.
- Blood urea 22 mg%, serum creatinine 0.9 mg%, liver function tests were normal. His chest x-ray was normal.
- Abdominal sonography showed nonspecific thick-walled gall bladder, mild ascites and minimal left-sided plural effusion.

CT scan of head performed because of persistent headache and vomiting revealed mild cerebral edema.

He was treated with IV fluids, noradrenaline for hypotension and one unit of platelet transfusion was given for thrombocytopenia and supportive treatment. As his test was positive for dengue, he was not given any antibacterials, antimalarials, antivirals or antifungal agents.

Gradually, his fever and headache subsided, vomiting stopped, appetite improved. Blood pressure 100/80 mm Hg. Platelet count improved to 34,000/cmm on day 2 and to 45,000/cmm on day 3.

On day 3, electrocardiogram showed prolonged QT interval and deep and symmetrical T wave inversion in all leads (Figure 1). His serum sodium was 134 mEq/L and potassium 3.9 mEq/L. His Trop-T was negative. Patient was asymptomatic at this stage.

Transthoracic echocardiogram showed akinesia of mid and apical segments, akinesia of left ventricular apex and normally contracting basal segments (Figure 2). These signs were interpreted as stress cardiomyopathy or of myocarditis. The shape of left ventricle was typical of Takotsubo.

He remained symptom-free; no headache or vomiting and appetite and oral intake improved. Platelet count on day 5 was 143,000/cmm and on day 8 was 203,000/cmm.

Repeat electrocardiogram on day 8 showed normal QT interval, but T wave inversion was persistent (Figure 3). Repeat echocardiography on day 8 done,
which showed normally contracting all segments, with normal systolic and diastolic functions (Figure 4).

**Discussion**

This was a case of dengue fever with thrombocytopenia, hypotension, mild cerebral edema and transient regional left ventricular wall motion abnormality that normalized without any specific treatment as the patient improved.

The literature search showed varied cardiac involvement in severe dengue fever. Many case reports are of severe myocarditis and cardiogenic shock. There are reports of elevation of cardiac enzymes, myocarditis, segmental wall motion abnormalities, pericardial effusion and tamponade, systolic and diastolic function impairment with predominant involvement of septal and right ventricular wall. Wali et al from India reported series of 17 cases of dengue fever with low ejection fraction, global hypokinesia and ECG changes, that reverted back to normal after recovery. There are reports of fulminant myocarditis with ECG changes mimicking acute myocardial infarction. Also cardiac involvement in the form of noncompaction myocarditis and transient ventricular arrhythmias in dengue hemorrhagic fever are reported.

The patient under discussion had acute changes of left ventricular wall motion abnormality typical of Takotsubo cardiomyopathy, which reverted to normal contractility without any specific treatment. The condition occurred after dengue fever with systemic involvement. In the literature, association of dengue fever is mentioned with myocarditis and cardiomyopathy, but not with stress cardiomyopathy. This patient showed QT interval prolongation and T wave changes on electrocardiogram without elevation of cardiac enzymes. His echocardiogram revealed akinesia of apical segments that resolved completely without any treatment. In dengue fever, cardiac involvement in the form of myocarditis indicates bad prognosis. But stress cardiomyopathy should be kept in mind, which has good prognosis and changes revert to normal
without any specific measures as in this patient.

References


