

Original article:

Dengue fever with myocarditis – a case series

Dr. Mahalingeshwara Bhat ¹, *Dr Akhil Rahman²

¹Assistant Professor, ²Post Graduate

Department of General Medicine, K S Hegde Medical Academy, Mangaluru

Corresponding author*

ABSTRACT

Dengue fever is one of the most important mosquito – borne diseases in coastal Karnataka . A variety of complications are associated with dengue fever and causes multisystem involvement. Cardiac complications like myocarditis are occasionally associated with the fever and can be life-threatening. Further understanding of myocarditis with dengue fever is therefore needed. Here is a case series comprising 11 cases of Dengue fever with myocarditis treated at a tertiary care teaching hospital in south western coast of India. Majority of patients had sinus bradycardia and reduced left ventricular ejection fraction .The duration of hospital stay was around 5-7 days for most of the patients. Four patients received a trial of corticosteroids ,which did not reduce the duration of hospital stay but interestingly there was no mortality among these 4 patients .Eight patients recovered completely with treatment and two cases mortality were there, both being cases of Dengue Shock Syndrome. We conclude that myocarditis is a fatal but mostly missed complication of dengue fever which when intervened early can have a good outcome in the patient.

Introduction

Dengue fever , a febrile illness caused by four closely related dengue virus serotypes (designated DENV-1, DENV-2, DENV-3, and DENV-4) of the genus Flavivirus, family Flaviviridae. The clinical severity of disease has a wide spectrum. World Health Organization (WHO) dengue classification scheme, includes four grades ranging from uncomplicated dengue fever (DF) to dengue hemorrhagic fever (DHF) and devastating dengue shock syndrome (DSS). Dengue is one of the most important mosquito-borne (by *Aedes aegyptii*) disease in coastal Karnataka .Major outbreaks of dengue occur mainly due to the presence of all four viral serotypes¹. DENV-2 and DENV-3 have been the common serotypes during last few years². Infection by one serotype produces lifelong immunity to that specific serotype but only a few months of immunity to the others. A variety of cardiac complications have been reported in dengue-affected patients, which include atrioventricular conduction disorders, supraventricular arrhythmia, and myocarditis. A better understanding of Myocarditis or inflammation of the myocardium associated with infectious diseases especially dengue and Chikungunya fever is well recognised but is a very rare manifestation of the disease. Rhythm disturbances manifesting as sinus tachycardia, sinus bradycardia, atrioventricular conduction disturbances, atrial fibrillation along with atrial and ventricular ectopic beats are the most common presentation during the acute and convalescence phase. Acute myocarditis presenting as acute myocardial infarction has also been reported. In most of the reported cases, there were no documented electrolyte disturbance³.Pericardial involvement has also been attributed to dengue infection along with myocarditis. Pathological mechanism and the incidence of myocardial manifestations is obscure.

Post mortem autopsies conducted revealed distinct histological changes in the myocardium showing interstitial oedema with inflammatory cell infiltration and necrosis of myocardial fibres. Significant histo-pathological changes were also seen in the lungs, liver, brain, and spleen ⁴. Derangement of calcium storage in the infected cells also contributes to the myocardial damage ⁵. Another study demonstrated presence of dengue viral antigen in the liver, spleen, lungs, kidneys, and peripheral blood leucocytes, but not in thymus, lymph nodes, thyroid, pancreas, heart, adrenal gland, skeletal muscles, intestine, and brain ⁶. This property of the dengue virus needs to be further evaluated.

Methods

We reviewed eleven cases of patients diagnosed Dengue fever with myocarditis who were admitted in Justice KS Hegde Charitable Hospital, A tertiary care hospital in Mangalore, a south western coastal town in India from May 2016 to June 2017.

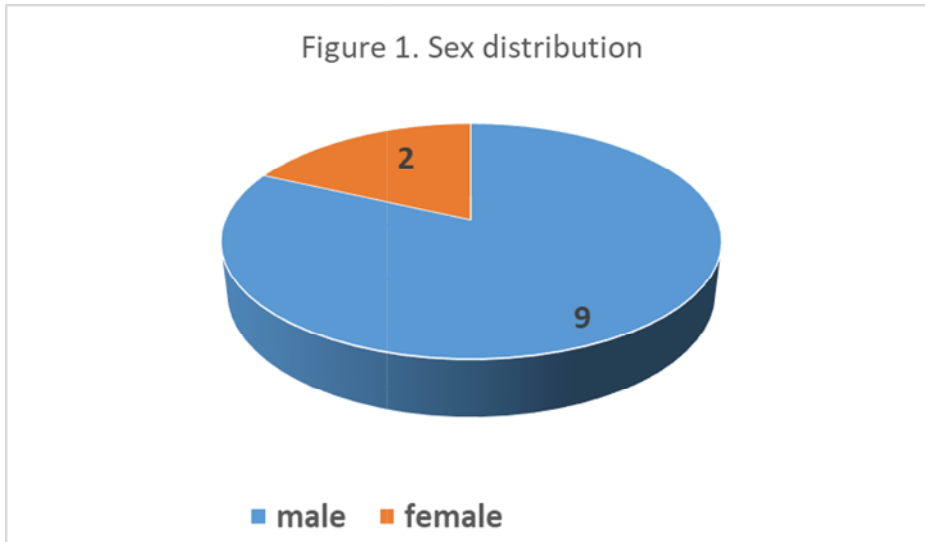
All the patients were diagnosed to have dengue fever based on the dengue card test being reactive for Dengue NS1 Ag. The diagnosis of myocarditis were made based on ECG findings and clinical evaluation.

Results

Among the 11 patients, the youngest was 23 years and the eldest patient was 70 years old. The mean age was 36 years. Nine among eleven were male patients.

Age group (years)	Number of patients
20-29	4
30-39	4
40-49	1
>50	2

Table 1. Age distribution



Fever, myalgia, headache, vomiting, breathlessness, decreased urine output or bleeding manifestations were the presenting symptoms of the patients. All patients had presented within 1 week of onset of symptoms. 4 patients were diagnosed Dengue fever at peripheral health centres and were referred here for further management.

Symptoms	Number of patients
Fever	11
Myalgia	9
Headache	9
Vomiting	4
Breathlessness	3
Decreased urine output	2
Bleeding manifestations	3

Table 2. Clinical presentation

One of the patient was a known case of Type 2 Diabetes Mellitus and one patient was a known case of Thalassemia intermedia, none of them had a previous history of dengue fever or any heart disease.

All eleven patients on admission had either bradycardia or tachycardia. Two patients had hypotension on admission and one patient was in respiratory distress.

Heart rate (per minute)	Number of patients
<60	7
60-100	0
>100	4

Table 3. Heart rate variation in patients

Laboratory parameters were suggestive haemoconcentration, thrombocytopenia in most cases ,few patients had deranged renal function test and elevated liver enzymes

Laboratory parameters	Number of patients
Haemoglobin (>17g/dl- males ,>15 g/dl -females)	5
Haemoglobin (<13g/dl- males ,<12 g/dl -females)	1
Platelet count >1.5 lakh cells/mm ³	1
Platelet count 75,000-1.5 lakh cells/mm ³	2
Platelet count 50,000-75,000 cells/mm ³	2
Platelet count 25,000-50,000 cells/mm ³	2
Platelet count <25,000 cells/mm ³	3
ALT,AST > 120 IU/L	3
Creatine > 1.4 mg/dl	1

Table 4. Laboratory parameters on admission

ECG changes	Number of patients
Sinus Bradycardia	7
Sinus Tachycardia	4
ST-T changes	5 (3 patients had sinus tachycardia and 2 patients had sinus bradycardia)
Incomplete RBBB	1 (sinus bradycardia)

Table 5. ECG changes on admission

Transthoracic echocardiography was done for all patients, 1 patient had severe LV dysfunction with ejection fraction of 20%, 4 out of 7 patients with bradycardia had reduced Left Ventricular ejection fraction-varying from 40-50%.

Other complications seen includes Dengue shock syndrome, thrombocytopenia, hepatitis, acute kidney injury and ARDS. The most common complication seen was thrombocytopenia however only three among them had any bleeding manifestations. Three patients had hepatitis , one patient with Acute kidney injury and one with ARDS.

Complications	Number of patients
Thrombocytopenia	10
Bleeding manifestations	3
Hepatitis	3
Dengue shock syndrome	3
Acute Kidney Injury	1
ARDS	1

Table 6. Other complications of Dengue fever with myocarditis, ARDS- Acute Respiratory Distress Syndrome

All the patients were initially admitted in the intensive care unit ,the main stay of treatment was adequate hydration. However three patients requires platelet transfusion in view of bleeding manifestations, a trial of IV corticosteroids were tried in 4 patients. 2 cases needed mechanical ventilation , 3 patients required inotropic support and 5 patients with bradycardia required atropine injections.

Treatment	n
Intravenous fluids	11
ionotropes	3
Mechanical ventilation	2
Intravenous corticosteroids	4
Platelet concentrate transfusion	3
Atropine	5
Diuretics	1

Table 7. Treatment given for the patients with Dengue fever with myocarditis

There were 2 mortality among 11 cases admitted ,1 patient was discharged against medical advise. 8 patients were discharged after complete recovery. The duration of hospital stay varied from 4 days to 14 days. The maximum hospital stay was for a patient with Dengue shock syndrome with ARDS.

Outcome	n
Recovered	8
Mortality	2
Discharge Against Medical Advise	1

Table 8. Treatment outcome of cases with Dengue fever- myocarditis

Discussion

Dengue fever with myocarditis can be seen any age group ,in our study majority of patient were middle aged, male predominance was noticed in the study. It is interesting that none of the patients who presented to us had history of fever for more than a week, and some of them had already been diagnosed with dengue fever at rural health centres ,this is a definite positive point that most of the cases are being diagnosed early but none of the 4 patients were checked for myocarditis at the peripheral health centres. Acute myocarditis is an often neglected complication of dengue fever, most of the clinicians stress more on dengue shock syndrome or dengue haemorrhagic fever and the very fatal myocarditis might be missed. Majority of patients had presented with bradycardia and ST-T changes in ECG, most of the patients with sinus bradycardia had reduced Left ventricular ejection fraction in echocardiography. Thrombocytopenia being the most common complication in the study ,it is important to note only 3 patients had bleeding manifestation and required platelet transfusion. The mortality was just 2 patients among 11, which shows that there is a good chance of recovery even when the patient develops Multi Organ Dysfunction Syndrome (MODS) if intervened aptly. Both the mortality cases had Dengue shock syndrome with MODS. There was not much variation in the duration of hospital stay among the patients, most of them requiring 5-7 days of in hospital stay. Use of steroids did not effect the duration in hospital stay in these patients. It was interesting to note there was no mortality among the patients who received trial of Intravenous corticosteroids. However development of MODS can prolong the hospital stay and increases the chance for mortality. The limitations in this case series is that diagnosis of myocarditis was made based on ECG changes and clinical symptoms histological studies could not be conducted.

Conclusion

Dengue fever can have varied and multisystemic presentation with typical and atypical manifestations. Atypical presentation includes myocarditis which sometimes is difficult to distinguish from Dengue Shock Syndrome or respiratory distress, primarily due to increased fluid permeability and leak from alveolar capillary membrane. The early recognition of myocarditis as atypical presentation is of utmost importance in the management of dengue fever. Patients with myocarditis may present with sinus bradycardia, tachycardia, ST-T changes or heart blocks in ECG, echocardiography might be normal but majority of cases with sinus bradycardia has reduced left ventricular ejection fraction. It is necessary to check for myocarditis in all patients with dengue fever and intervene early which can significantly improve the outcome in the patients.

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