



Does Dengue Fever Affect Heart? – Our Experience

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Abstract

Background: *Dengue fever is one of the common viral fever in tropical countries. It has many systemic complications, But the effects of Dengue fever on Heart is not clearly studied in literature. In this study we are evaluating whether there were any cardiac manifestations in patients affected with dengue fever.*

Aims and Objectives: *To study the cardiac manifestations in dengue fever.*

Method: *This one and half year descriptive study was undertaken at Kempegowda Institute of Medical Sciences and Research Center, Bengaluru in the Department of Medicine. A total of 60 patients with dengue NS1Ag and/ IgM were studied cardiac manifestations in dengue was assessed based on electrocardiogram, 2D echocardiography and cardiac enzymes*

Results: *A total of 60 patients were included in the study out of which 41(68%) male and 19(32%) female patients and the male to female ratio was 2.1:1. Minimum age was 18 years and maximum age was 78 years. The mean age of the patients was 36.8 years. The commonest clinical presentation was retro orbital pain (85%) followed by fever (76.6%). CK-MB was elevated in 2 cases (3.3%) and Troponin I was elevated in 2 cases (3.3%). Most common cardiac abnormalities noted was sinus bradycardia, found in 53.33 percent. Cardiac manifestation in the form of myocarditis was observed in 2 patients (3.3%)*

Conclusion: *The most common cardiac manifestations noted were sinus bradycardia and was transient. There were 2 cases with myocarditis, 1 case with first degree AV block, 1 case with LBBB, 1 case with Atrial fibrillation, 1 case with complete heart block. Patients with dengue fever are at high risk of cardiac manifestations including myocarditis and heart blocks. Therefore, require a close cardiac monitoring.*

Keywords: *Dengue, Heart, Myocarditis, Complications, AV Block, Cardiac manifestations.*

Background

Dengue virus infection is a serious cause of morbidity and mortality in most countries in the tropical and subtropical areas of the world and is considered to be one of the most important infectious diseases in these regions.¹ It is a major and important public health problem in many

South East Asian countries and also in more than hundred countries of tropical and subtropical region.²

The global prevalence of dengue infection has increased dramatically in the recent decades.³

Dengue virus and its vectors have now become widely distributed throughout tropical and

subtropical regions of the world, particularly over the last half-century. Two-fifths of the world's population or 2500 million people are now at risk for dengue, and every year approximately 50 million new cases occur worldwide³

Dengue is the most common arboviral disease transmitted globally, is caused by four antigenically distinct dengue virus serotypes (DENV 1, DENV 2, DENV 3 and DENV 4).⁴ Dengue infection of classical type has been endemic in India for many years⁴. Recently an increasing trend of outbreaks of dengue infections and its severe forms have been reported in India⁴. Factors responsible for dengue's spread include explosive population growth, unplanned urban overpopulation with inadequate public health systems, poor vector control and increased international travel to endemic areas. Indeed, Dengue without or with warning signs is a fast-emerging global health problem.^{3,4}

Unusual manifestations of dengue infections such as encephalitis, Guillain Barre syndrome, hemolytic uremic syndrome, dengue hepatitis, myocarditis, acute respiratory distress syndrome is recognized and they have become more common in recent years^{5,6}

It is postulated that; dengue rarely affects the heart.

Medical literature has reports of isolated cases of atrioventricular conduction disorders (junctional rhythm and atrioventricular block), arrhythmias, and myocarditis.

On the other hand, the ventricular dysfunction associated with the acute phase of dengue hemorrhagic fever has been described by several authors and is probably under diagnosed in clinical practice

Although cardiac manifestations specific to dengue are rare, depression of myocardial function is frequent in the severe dengue

To-date very few studies have addressed the issues of cardiac manifestation in dengue fever.

Hence the present study was planned to assess the cardiac manifestations of dengue fever and to identify subclinical/latent cardiac involvement.

Material and Methods

This was an observational study. Conducted in Department of General Medicine, Kempegowda Institute of Medical Sciences and Research Center, Bengaluru.

Total 60 subjects were included in the study

Inclusion Criteria

- Age group of ≥ 18 years,
- Dengue NS1Ag and / Ig M positive cases

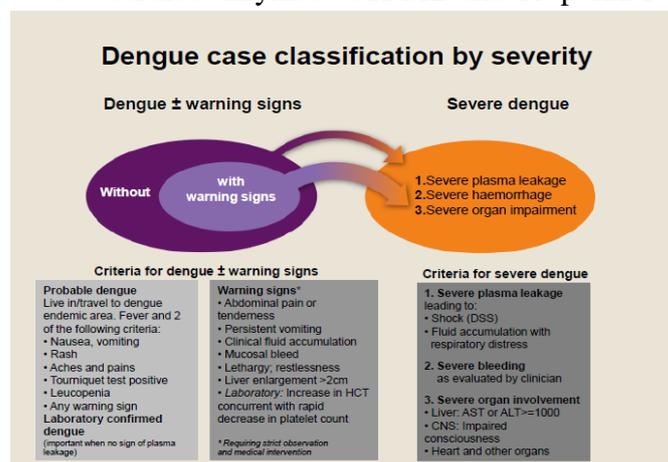
Exclusion Criteria

- Patients on medications affecting the heart rate / rhythm,
- Patients with history of pre-existing heart disease,
- Patients with electrolyte abnormalities affecting the heart rate/rhythm

The local ethical committee approved the research.

The patients underwent general physical examination, systemic examination and a group of tests that included:

- Complete blood count
- Platelet count
- Electrocardiography
- 2D Echocardiography
- Cardiac enzymes– CK-MB and Troponin I



ALT = alanine aminotransferase; AST = aspartate aminotransferase; CNS = central nervous system; DSS = dengue shock syndrome; HCT = haematocrit

The diagnosis of dengue fever was based on WHO criteria for dengue fever

Three serial ECGs were taken on; Day one, day three and day five or day of discharge (Whichever was earlier).

All the patients were evaluated using two-dimensional echocardiography on day one CKMB and Troponin I was done (whenever required) and values were interpreted as Troponin I – normal between 0.00 – 0.40 ng/ml CKMB – normal between 0.0 – 4.3 ng/ml

Results

A total of 60 patients were included in the study out of which 41(68%) male and 19(32%) female patients. The male to female ratio was 2.1:1. Minimum age was 18 years and maximum age was 78 years .The mean age of the patients was 36.8 years. The commonest clinical presentation was retro orbital pain (85%) followed by fever (76.6%). CK-MB was elevated in 2 cases(3.3%) and Troponin I was elevated in 2 cases

(3.3%).The most common cardiac abnormalities noted was sinus bradycardia, found in 53.33 percent. Cardiac manifestation in the form of myocarditis was observed in 2 patients (3.3%)

Gender Distribution

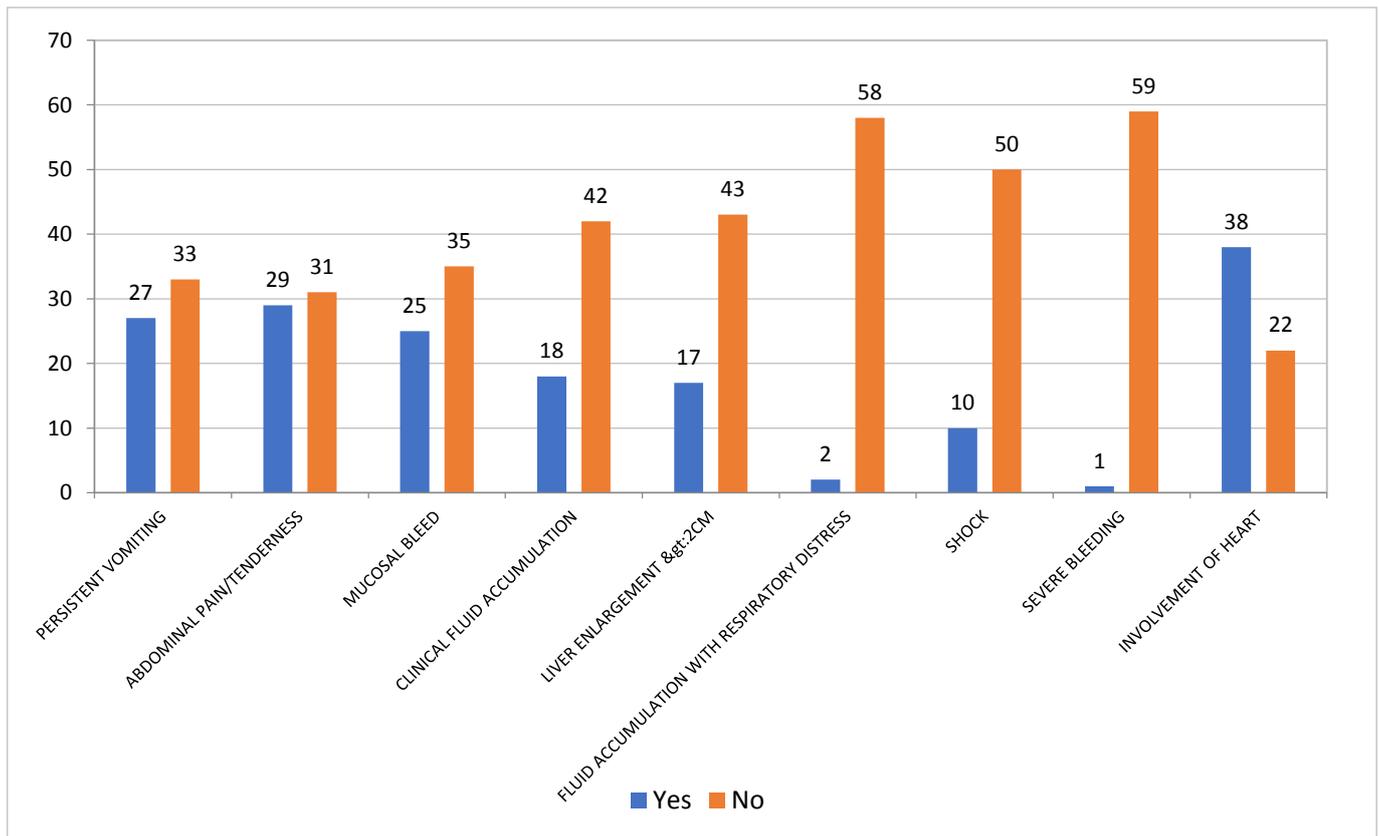
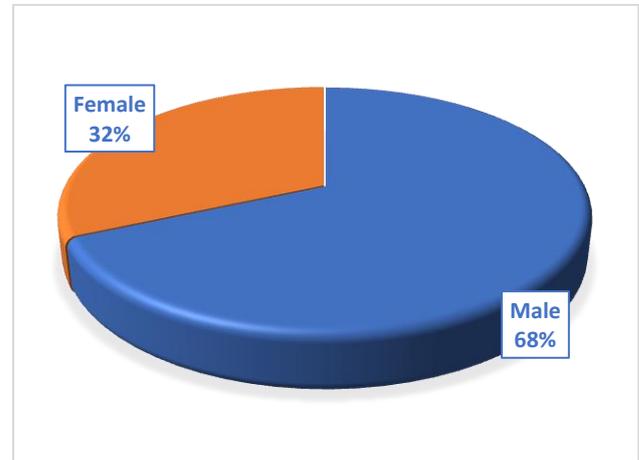


Table-1: Number of Patients Having Cardiac Manifestations

Cardiac manifestations	Number (60)
Present	38(63.33%)
Absent	22(36.66%)
Total	60

Table-2: ECG Changes in Dengue Patients

Cardiac manifestation	Number of Patients
Sinus Bradycardia	32
First Degree AV Block	1
LBBB	1
AF	1
Myocarditis	2
Complete Heart Block	1

Discussion

Many infectious diseases cause relative bradycardia, such as typhoid fever, chlamydia pneumonia, and legionnaire's disease. Various viral infections cause myocardial damage, either by invasion or an autoimmune reaction resulting in myocardial inflammation. The cardiac abnormalities in dengue are invariably benign, transient, and self-limited and are attributed to subclinical viral myocarditis. Cardiac manifestation in dengue fever ranges from asymptomatic bradycardia to severe myocarditis. Cardiac abnormalities including various ECG abnormality (sinus bradycardia, and prolongation of PR interval, transient AV block, transient ventricular arrhythmias), myocarditis, systolic and diastolic dysfunction and pericardial effusion have been observed during acute phase of viral dengue infection^{7,8} Rhythm disturbance such as sinus bradycardia and ventricular ectopics, have also been reported during convalescence period of dengue fever.⁹

Mean age group of present study is 36.8 years youngest was 18 years and oldest was 78 years and age group that is mostly affected in other studies like Gupta et al New Delhi was 5-20 years, Dash PK et al Gwalior was <15 years, and Neeraja M in Hyderabad was 20 -39 years.¹⁰⁻¹² In this study most of the patients are males (68%) in comparison to females (32%) and ratio is 2.1:1. In other studies like Dash PK et al, Gwalior male female ratio was 1.28:1, Neeraja M Hyderabad was 2:1, Gupta et al New Delhi, was 1.8 :1. Difference in this may be due small number of patients taken in this study group or it may be due to because of male dominated region where male seeks more medical help in comparison to females¹⁰⁻¹²This needs study with more numbers of patients.

Most common warning sign in this study was abdominal pain (29 cases) and Persistent vomiting (27 cases). In the study by Thien et al with dengue patients' fever and persistent vomiting was noted in 39% of cases and was most common warning sign¹³ Hepatomegaly was least common warning

sign in our study and seen in 17 of cases. In this study 10 patients had shock, 2 had respiratory distress and 1 had severe bleeding. 1 case had Severe hepatic derangement (SGPT >1000). In the study of theinleo et al 4% had severe hepatic impairment and 4 patients had renal impairment, maximum creatinine was 2.1 mg /dl, and 4 patients had ARDS¹⁴

In this study cases showed sinus bradycardia in 53.33%, first degree heart block in 1.66%, LBBB in 1.66%, Atrial fibrillation in 1.66%, Myocarditis in 3.33%. While in other studies Gupta V et al showed 18% Brady cardia, 64% relative bradycardia, and 14% sinus tachycardia¹⁵in the study by Gupta et al sinus bradycardia was found in 14.28% cases, and sinus tachycardia in 21.4% cases. AV dissociation was observed in one patient, which was resolved in 24 hours. Kaushik et al have described AV dissociation and SA exit block in child from dengue fever.¹⁶ In present study ECG abnormalities were fairly common but all the ECG changes were reversible and no patient died in our study

Limitations of the study

First, we included a population admitted to a single center. Second, the study population was possibly underpowered to detect a significant difference in in-hospital mortality. Third, our data are only hypothesis generating, because they do not provide evidence to support a causal relationship, and they require confirmation in suitably designed clinical trials.

Conclusion

The most common cardiac manifestations noted was sinus bradycardia and was transient. There were 2 cases with myocarditis, 1 first degree AV block, 1 LBBB, 1 Atrial fibrillation, 1 complete heart block. Patients with dengue fever are at high risk of cardiac manifestations including myocarditis and heart blocks. Therefore, require a close cardiac monitoring.

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