

ECG Manifestation in Dengue Fever

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Abstract

Background and objectives: Dengue mostly spreads in tropical climates. Dengue is known to affect various systems cardiovascular system is one of them. This study was conducted to observe the presence of electrocardiographic (ECG) changes in patients presenting with dengue fever. **Material and method:** This was a cross sectional analytical study conducted at Nalanda medical college and hospital, Patna. Cases were selected after taking into account the inclusion and exclusion criteria from serologically confirmed dengue cases. The details of patient's clinical presentation and examination was noted. ECG was carried out to all patients. **Results:** Out of 108 patients, 56 patients had normal ECG. Abnormal ECG findings like sinus bradycardia, tachycardia, ST-T changes, bundle branch block were noted among 52 patients. **Conclusion:** ECG changes can occur in dengue infection, most common finding were sinus bradycardia. There was no evidence of myocarditis in any of the patients.

Keywords: Dengue, Sinus bradycardia.

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Introduction

Dengue fever has recently emerged as one of the most important viral disease in the world. It is transmitted by the bite of female Aedes Aegypti mosquito infected with the dengue virus. It spreads mostly in tropical and sub tropical climate. Dengue is Flavi virus infection. There is few known strain of dengue virus (DENV1, DENV2, DENV3, DENV4). The disease can range from mild dengue fever to severe forms. It may be asymptomatic, self limiting fever, classical dengue fever, dengue hemorrhagic fever and in worst cases dengue shock syndrome [1,2]. Initially it presents with fever and Flu like symptoms. Later patient develops Leucopenia and thrombocytopenia which ultimately leads to bleeding from different sites. Various biochemical and radiological derangements are found

and should be approached with dengue infection, which are: deranged liver enzyme, decreased serum albumin, decrease cholesterols, Pleural effusion and ascites commonly observed findings[3]. Dengue is known to affect various system, cardiovascular system is one of them. Cardiac complications of dengue fever though uncommon, have been reported as burden of disease is increasing. A variety of cardiac complications have been recognized, the most common being the myocarditis, though conduction defect and arrhythmia have also been reported [4]. The pathophysiology of cardiac involvement in dengue is not clearly understood it is either from direct viral invasion of cardiac muscles or cytokine induced immune damage or both. It may be either focal or diffuse myocarditis[5]. Various studies have demonstrated cardiac abnormalities and ECG changes in dengue patients. Aim of the present study is to find out any changes in ECG in dengue patients.

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Materials and Methods

This prospective, unicentric, randomized, evaluation study was conducted in the Department of Medicine at Nalanda Medical College and Hospital, Patna. The study was approved by Institutional Research and Ethical Committee. A total No. of 108 subjects comprising of 80 male and 28 females were included in this study. Informed and written consent was taken from all the participating subjects prior to the commencement of the study. Randomly selected serologically confirmed cases of dengue fever were evaluated with 12 lead electrocardiogram taken during febrile phase of dengue fever at an interval of 24 hrs for a total of 05 days.

Study design: Prospective, Cross sectional study, Unicentric, Simple random selection.

Selection of patient

Inclusion criteria

- a) High grade fever –For 1 to 5 days
- b) Both primary dengue (NS-1 Antigen and dengue IgM positive) Secondary dengue (IgM and IgG positive)

Exclusion Criteria - Patients with

- (1) Pulmonary, cardiac (Rheumatic heart disease, Dilated cardiomyopathy, conduction disorder, patients on pacemaker) thyroid disease
- (2) Age < 15 yrs or > 60yrs
- (3) Patients on medication affecting heart rates such as B2 Agonist, B2 Antagonist, Digoxin, Theophylline and its derivative.
- (4) Electrolyte imbalance-Hypokalemia, Hyperkalemia, Hypocalcemia, Hypercalcemia etc.
- (5) Known cases of DM & HTN 12 lead electrocardiogram will be taken at the time of admission and discharge

Result

This prospective study to evaluate the ECG changes in patients admitted with dengue fever conducted at Department of Medicine at Nalanda Medical College and Hospital, Patna was conducted on 108 patients diagnosed to be suffering from dengue fever.

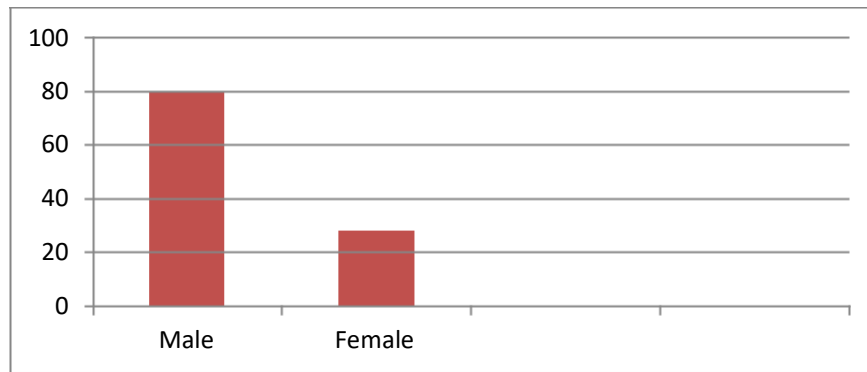


Fig 1: Gender wise distribution of subjects

Ninety four (94) patients were diagnosed as dengue fever and dengue hemorrhagic fever(DHF) was diagnosed in 14 patients. None of patients had dengue shock syndrome. (Table :-1)

Table 1: Distribution of Subjects according to type of fever.

Dengue Fever	94
Dengue Hemorrhagic Fever	14
Dengue Shock Syndrome.	0

Fever (94.44%) was commonest symptoms, next was myalgia (75.92%). Other symptoms were headache (53.70%), diarrhea (37.04%), rashes (33.4%), vomiting (29.62%) and abdominal pain(22.22%). Hemorrhagic manifestations were present in 12.96% patients. Arthritis was present in 14 cases. In one case retro orbital pain was found to be there. Regarding primary

outcome, all patients were discharged, no death occurred. None of the patient had symptoms of chest pain at the time of presentation and neither they developed it later or any other cardiac complications like angina, myocardial infarction or cardiac failure. ECG was done in all the patients. When we analyzed the ECG of patients with dengue fever and

dengue hemorrhagic fever, in most of the patients (56) ECG was normal sinus rhythm, 52 patients had abnormal ECG. Out of 94 patients of DHF, 48 had normal ECG, 30 patients had sinus bradycardia and 3 had sinus tachycardia which persisted even when patients were afebrile and hemodynamically stable.

Non specific ST-T changes were seen in 12 patients, two patients had new onset right bundle branch block. No other rhythm disturbance was noted. In 14 cases suffering from DHF, ECG was normal in 6 patients. Bradycardia was noted in 4 patients, 3 had non specific ST-T changes and 1 had sinus tachycardia.

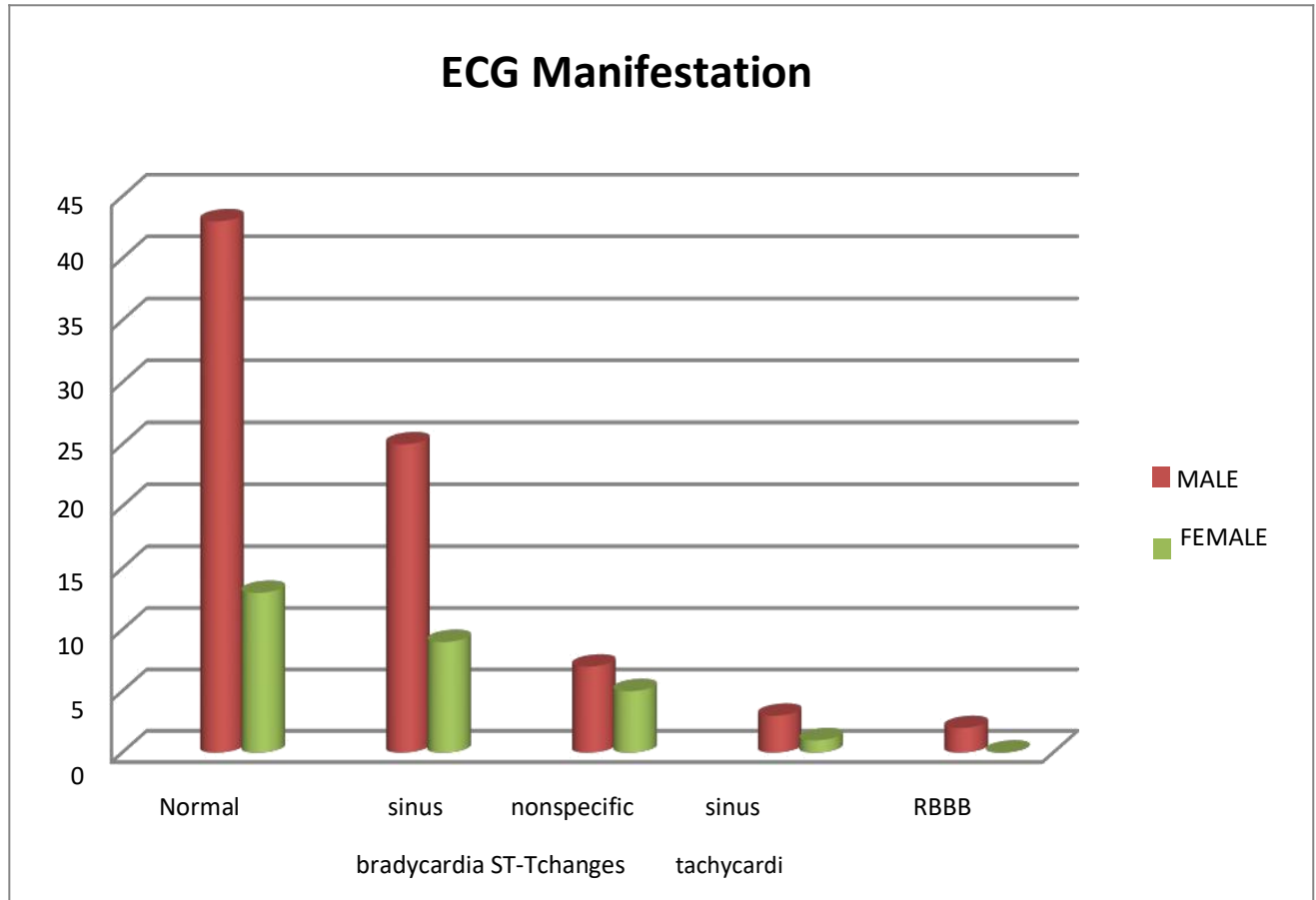


Fig 2:ECG Manifestations

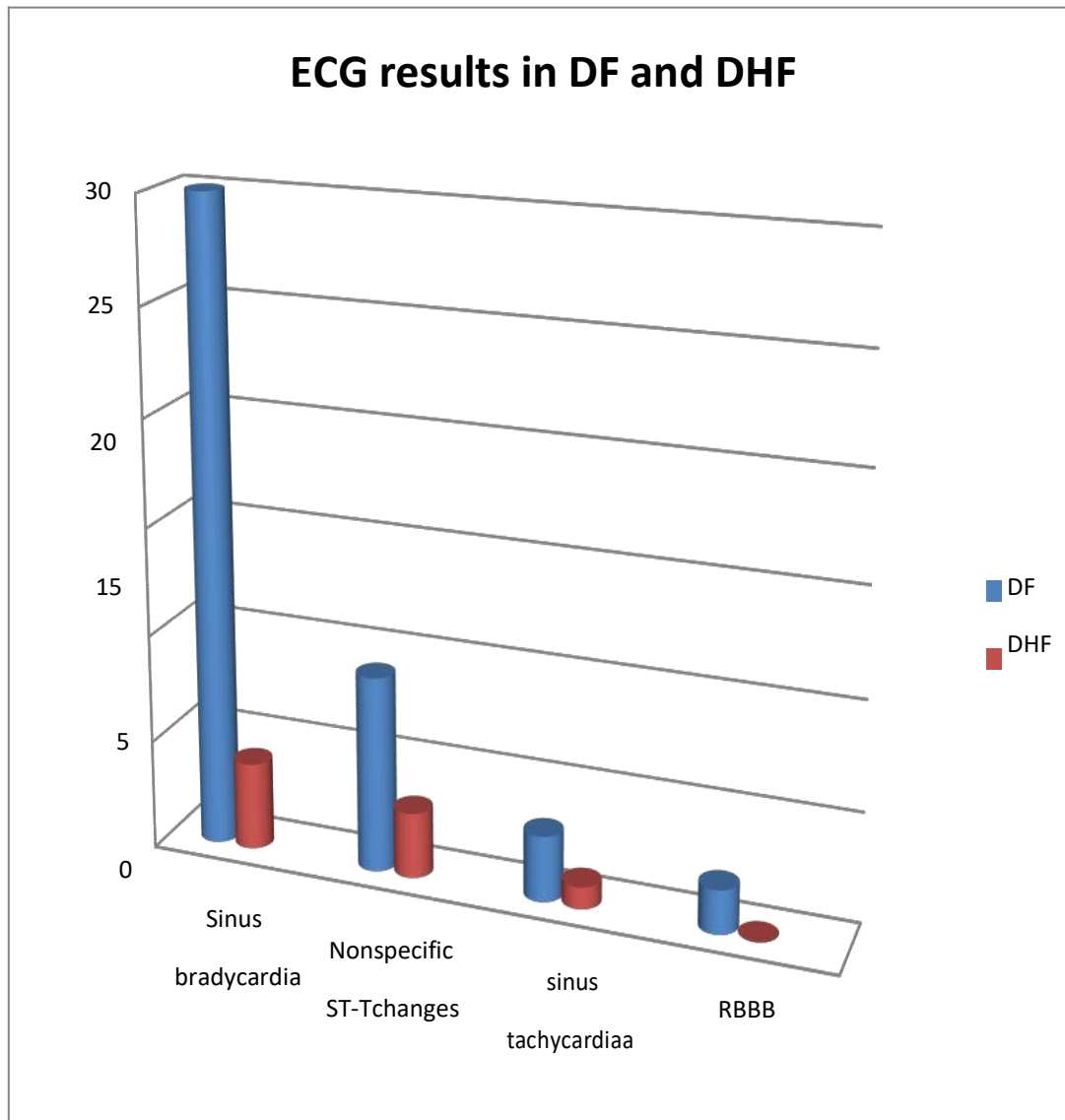


Fig 3:ECG Results in DF and DHF

Table 1: Clinical features, their number and percentage

Clinical feature	No.	%
Fever	102	94.4
myalgia	82	75.9
headache	58	53.7
diarrhoea	40	37
rashes	36	33.3

Vomiting	32	29.6
Abdominal pain	24	22.2
Hemorrhagic manifestations	14	12.9
Arthritis	14	12.9
Palpitation	6	5.5
Sob	3	2.8

Discussion

Dengue epidemics have been affecting tropical and subtropical climates. Over the time involvement of various organs has been observed[6]. Dengue viral infection cause myocardial damage either by infection or by an autoimmune reaction resulting in myocardial inflammation[7]. The cardiac abnormalities in dengue are invariably benign, transient and self limiting and attributed to subclinical viral myocarditis[8]. In our study a total of 108 patients of dengue fever were analyzed. Out of 108 patients, 56(51.85%) had normal and 52(48.14%) had abnormal electrocardiography. Abnormal ECG were also noticed in other studies like Tarique et al, but incidence was slight higher than our study (62.79%)[8]. ECG findings were sinus bradycardia in 31.48%, next is non specific ST-T changes in 11.11%. Other findings were sinus tachycardia in 3.70%, right bundle branch block in 1.85%, none had ventricle ectopics or any degree of atrioventricular block. In the study by Gupta V et al, sinus bradycardia was found in 14.28% and sinus tachycardia in 21.29%[9]. Lateef et al showed sinus bradycardia is commonest rhythm abnormality(32%), similar findings were noted in our study[10]. Study done by H Poornima and Juby John showed that out of 341 dengue patients 72 patients had abnormal ECG (21.11%) in which sinus bradycardia was the commonest abnormality and was observed in 30 patients. ST was present in 8 patients (2.3%)[12]. Literature review by Gulati et al reveal that rhythm disturbances such as atrial fibrillation, sinus node dysfunction, AV block and ectopic ventricular beats have been documented in DHF[13]. In a study done by Yadav RK et al, sinus bradycardia was the commonest ECG changes (60%). Other changes were sinus tachycardia, first degree heart block and ventricular ectopics[13]. Other studies also revealed that rhythm disturbance such as sinus node dysfunction, atrioventricular block, ventricular ectopic beats and atrial fibrillation have been documented in dengue hemorrhagic fever[15,16]. In our study, the incidence of ECG abnormalities was higher among DHF as compared to DF(57.14% vs 46.80%), but this difference was not found to be statistically significant.

Conclusion

We conclude that cardiac involvement may occur in dengue infection. ECG changes are noted in both symptomatic and asymptomatic patients. Commonly noted findings were sinus bradycardia and non specific ST-T changes. There was no evidence of myocarditis. In present study ECG abnormalities were common but all the ECG changes were reversible and no patient died in our study. Transient cardiac abnormality can be an important presentation and this should guide the treating physician to look for cardiac involvement.

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