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ECG Manifestations in patients presenting with Dengue infection

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Abstract

Background & Objectives: *Dengue mostly spreads in tropical and subtropical climates. Dengue is known to affect various systems. Cardiovascular system is one of them. This study was conducted to study the frequency of Electrocardiographic (ECG) changes in patients with dengue fever and dengue hemorrhagic fever.*

Materials and Methods: *This study was conducted in kanyakumari government medical college in the department of general medicine. 100 patients were included in the study over a period from September 2017– February 2018 for a period of 6 months. The details of the patient, clinical presentation and examination was noted. ECG was carried out in all patients.*

Results: *Out of 100 patients, 42 patients had normal ECG. Abnormal ECG findings like tachycardia, bradycardia, bundle branch block, ST depression, 1st degree AV block, ventricular ectopics were noted among the 58 patients. There was no significant relationship of ECG findings with the disease.*

Conclusion: *ECG changes can occur in dengue infection with or without cardiac symptoms. Commonly noted findings were bradycardia and tachycardia.*

Introduction

Dengue is a viral infection. It spreads mostly in tropical and subtropical climates. Dengue has now emerged as a most important arboviral disease in India. It is caused by a flavivirus with four distinct serotypes (DENV1, DENV2, DENV3, and DENV4). Dengue viral infection was first reported in India from Chennai in 1780.India have recorded increasing incidence of dengue viral infections in recent years. In 2017, India has seen 11832 more cases of dengue when compared with 2016 and the number of deaths was 46, eleven deaths more than last year.

The disease manifests as dengue fever (DF), and in more severe form as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). Initial manifestation is with fever and flu like symptoms. Patient develops leucopenia and thrombocytopenia. The latter may lead to bleeding from different sites. DHF is characterized by critical period. Patient can recover fully with strict monitoring and fluid management. In severe cases patient can develop shock and multi organ failure. A number of biochemical and radiological findings are found to be associated with dengue infection; deranged liver enzymes, decreased serum albumin, decreased serum cholesterol, pleural effusion and ascites are commonly observed findings.

As dengue fever is now occurring frequently as anendemic in southern parts of India especially tamil nadu, and recent outbreak has occurred in tirunelveli in 2013& in salem in 2017, so it is need of the hour to explore the different aspects of the disease. Dengue is known to affect various systems. Cardiovascular system is one of them. There are studies which have reported myocarditis, mostly asymptomatic or with arrhythmias

Materials & Methods

Aims and objectives: To study the frequency of Electrocardiographic (ECG) changes in patients presenting with dengue infection.

Design of the study: Hospital based observational cross sectional study**.**

This study was conducted in the kanyakumari government medical college in the department of general medicine.100 patients were included in this study over a period from September 2017 to February 2018 for a period of 6 months.

Inclusion Criteria

a) All patients of age more than 20 years, coming with history of fever with one or more of the following symptoms (1) vomiting, (2) joint pain, (3) diarrhea, (4) abdominal pain, (5) headache, amongst others.
b) Dengue NS 1positive cases
c) Dengue IgM positive cases

Exclusion Criteria

a) All patients with fever who are Dengue IgM/NS1 Ag negative.
b) Age below 20 years
c) Patients who had any known cardiac disease, chronic kidney disease, diabetes mellitus, hypertension were excluded.

The following parameters were considered and/or measured in all patients:

Age, gender, complete physical examination. All patients underwent the following investigations: ECG, Chest X-ray USG Abdomen, Serial Platelet counts, Total counts, Blood urea, Serum Creatinine, Dengue IgM/NS1 testing. ECG was checked in all patients within 24 hours of admission. Patients having abnormality in ECG was monitored regularly Primary outcome measure of our study was death or discharge in stable condition. Secondary outcome variables were symptoms like dyspnea, chest pain, evidence of cardiac failure and arrhythmias noted clinically or on ECG.
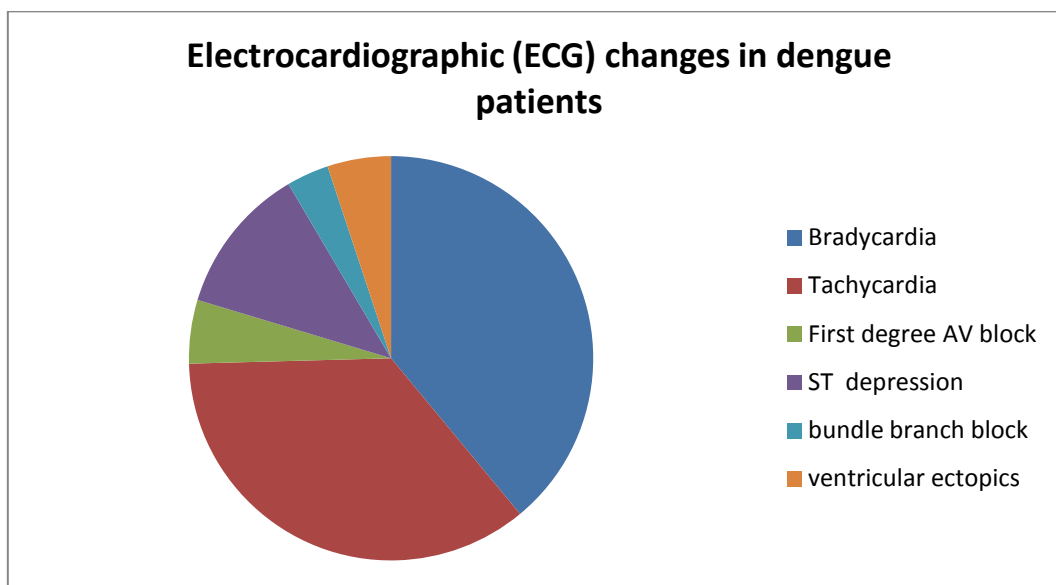
Results

100 patients diagnosed as a case of dengue fever were enrolled. of the total 100 patients, 58 were male and 42 were female. Most of the patients are in the age group of 31-40 years.
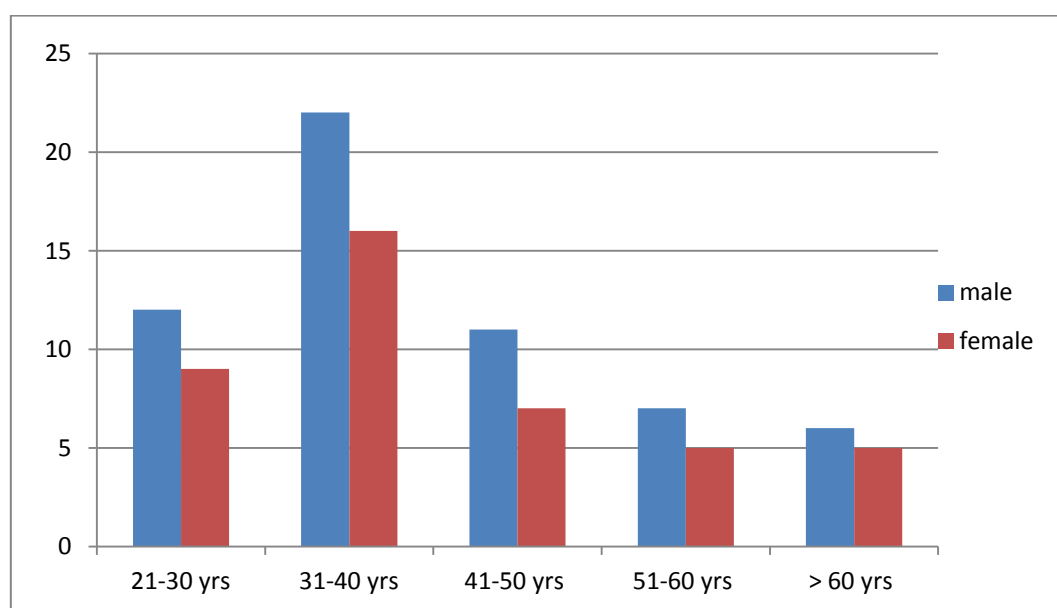
In this study, patients presenting with dengue fever had the following clinical features

Clinical features	Number of patients
Fever	100
Abdominal pain	54
Upper GI bleed	36
Gum bleeds	8
Menorrhagia	14
Palpitations	13
Shortness of breadth	7
Hepatic failure	2

Of the total 100 patients, 42 patients ECG was normal. Among the 58 patients, abnormal ECG, 23 patients had sinus bradycardia, 21 patients had sinus tachycardia. ST depression was noted in 7 patients. ventricular ectopics in 3 patients, bundle branch block in 2 patients and first degree AV block in 3 patients.

Electrocardiographic (ECG) changes in dengue patients

- Bradycardia
- Tachycardia
- First degree AV block
- ST depression
- bundle branch block
- ventricular ectopics

We also noted the relationship of cardiac symptoms like palpitations and shortness of breath with different ECG findings in DHF. Regarding the primary outcome, all patients were stable and discharged and no death was occurred

Discussion

Dengue epidemics mostly occurs in the tropics, sub tropical regions and our country has also seen a major outbreak over last few years. 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.

In the present study, a total of 100 patients of Dengue fever were analyzed. The most common age group affected in our study was 31 – 40 years. This is comparable to the study done by Neeraja et al in 2004, in Hyderabad, in that study most common age group affected was 20-39 years.

In our present study, 58 males and 42 females were affected, the incidence among males is more than females, ratio is 1.38 : 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. This needs study with more numbers of patients.

Cardiac involvement in the form myocarditis has been documented. In a study by Satarasinghe et al, and the major finding was T wave inversion in this study. Our study showed that T wave inversion was not the sole manifestation. Masilza et al reported atrial fibrillation in a patient with structurally normal heart. Atrial fibrillation along

with low voltage QRS and diffuse ST segment elevation was recorded in a fatal case of myocarditis. Our patients had other arrhythmias like bundle branch block but no atrial fibrillation was noted. During Dengue outbreak in Srilanka in 2005, ECG manifestations such as T wave inversion, bundle branch block, tachycardia and bradycardia were noted, similar findings were noted in our patients.

Our patients had Cardiac symptoms such as dyspnea and palpitations which is in contrary to another study by Gupta and Gadpayle, in which no patient had any cardiac symptoms though they had ECG changes like tachycardia and bradycardia.

Conclusion

We conclude that cardiac involvement may occur in dengue infection. ECG changes were noted in both symptomatic and asymptomatic patients. Commonly noted findings were sinus bradycardia and sinus tachycardia which resolved spontaneously over a period of 24 to 48 hours. First degree heart block and ventricular ectopics were other ECG manifestations. There was no evidence of myocarditis in any of the patients. In present study ECG abnormalities were common but all the ECG changes were reversible.

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