

ELECTROCARDIOGRAPHIC CHANGES IN DENGUE FEVER- ITS CLINICAL CORRELATION WITH DISEASE SEVERITY AND OUTCOME

Dr. Daya Sindhu Krishna

Post Graduate, Department of General Medicine, Sree Balaji Medical College & Hospital, Bharath University, Chrompet, Chennai.

Prof. Dr. S. Palaniandavan*

Professor, Department of General Medicine, Sree Balaji Medical College & Hospital, Bharath University, Chrompet, Chennai.*Corresponding Author

ABSTRACT

The dengue virus is an Arbovirus, belonging to the family Flaviviridae and genus Flavivirus. It is a mosquito borne infection and mostly transmitted by *Aedes aegypti* and sometimes by *A. albopictus*. Dengue is caused by four serotypes; DEN-1, DEN-2, 3 and 4. Dengue virus causes a range of illness from a self-limiting classical dengue fever to life threatening dengue hemorrhagic fever and dengue shock syndrome. Dengue is characterized by increased vascular permeability, hypovolemia and abnormal clotting mechanisms [1]. Case fatality rates in endemic countries like India are 2.5%. During dengue epidemics, illness rates among susceptible people are 40-90%. Early recognition and prompt treatment are vital if disease related morbidity and mortality are to be limited [2]

KEYWORDS :

INTRODUCTION

Dengue fever is a disease which causes significant morbidity and mortality. More than 2.5 billion people are at risk worldwide and is endemic in more than 100 countries. Virus-specific IgM antibodies are detectable after 5–7 days. The induction of fever by an infection is mediated by release of endogenous pyrogenic cytokines, such as TNF- α , interleukin -1, and IL-6. When these mediators reach the CNS, they induce prostaglandin release and raise the core body temperature. The most common symptoms with fever are malaise, myalgia, anorexia, headache, fatigue, diaphoresis, arthralgia, and sweating. Physiologic changes such as increased heart and respiratory rates can occur with fever. In certain infectious conditions, there is dissociation between heart rate and temperature. In the following case series, we describe heart rate findings in patients admitted at our hospital with proven diagnosis of Dengue (IgM positive).

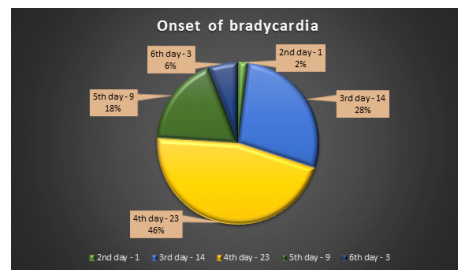
AIM OF THE STUDY

The aim of the study is to evaluate the cardiac rhythmic abnormalities in dengue patients. This was a retrospective observational study in Sree Balaji Medical College during the period of November 2017 to April 2018. Patients with a clinical diagnosis of dengue fever and Dengue IgM positive- serologic confirmation plus a temperature of $>38^{\circ}\text{C}$ were included as case-patients.

1. To evaluate the cardiac rhythm abnormalities in dengue patients.
2. To establish the clinical correlation between cardiac rhythm abnormalities and severity of the illness.
3. To establish the relationship between cardiac rhythm abnormalities and disease outcome.

RESULT

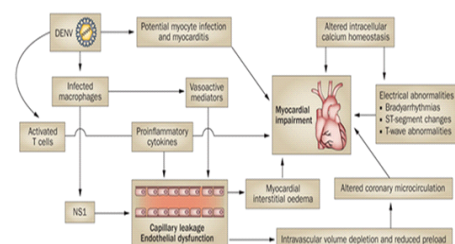
A total of 75 patients with proven serological diagnosis of dengue were considered for the study. Out of the 75 patients, 50 had sinus bradycardia. No other rhythm abnormality was detected. 27 were male and 23 were female out of the 50 patients who had bradycardia, which showed no significance in the occurrence of bradycardia amongst male and female. The mean age for dengue patients was $33.06 (\pm 9.40)$ years. Their mean peak temperatures was 38.7°C . Majority of bradycardia cases (38 out of 50 cases) are in patients with age less than 30yr. It was noted that 46% (23 patients) developed bradycardia on the 4th day, while 28% (14 patients) developed bradycardia on the 3rd day. The bradycardia was self-limiting and normalized in the 3rd week for most patients. The bradycardia was not associated with the severity of the illness or change the outcome.



DISCUSSION

Dengue fever is a common acute febrile illness. Majority of the cases follow a benign course. Some times, severe manifestations include bleeding and capillary leak. Cardiac manifestations in dengue fever are poorly characterized. Cardiac involvement in dengue is usually benign, transient and self-limited. Various ECG abnormalities (sinus bradycardia and prolongation of the PR interval) are found in 44-75% of patients with viral hemorrhagic fever. Cardiac rhythm abnormalities, including ventricular arrhythmia, atrial fibrillation and atrioventricular block are usually seen in the acute stage of dengue hemorrhagic fever. Bradycardia and ventricular ectopic have been reported during the convalescence period of dengue fever [4]. The bradycardia did not correlate with severity of illness or affect the management or outcome [8].

Proposed viral and immune mechanisms involved in the cardiac and vascular manifestations of dengue.



The pathogenesis of bradycardia (postulates)

1. Cardiac
 - a. Myocarditis
 - b. Localised – Minute bleeding in the area of the SA node
2. Immune
 - a. Antibody mediated – unlikely as the ECG changes recovered while the antibodies were still in circulation
 - b. Cytokines – TNF, IFN- γ , IL-8, IL-10 and IL-13; exact role not known

(brisk immunological response in younger age group)

c. Cellular component of immunity – CD8+ cells

3. Neural

a. Abnormalities in autonomic tone

There is no change in management of dengue with bradycardia and hence no specific intervention is required. It is self-limiting. Bradycardia may persist during convalescence period.

CONCLUSION

In conclusion we can say that the most common rhythm abnormalities in dengue fever is bradycardia. It is benign and self-limiting resolving in majority of patients at discharge or on follow up. Bradycardia in dengue fever not only relative, it does not correlate with the severity of illness or affect the management outcome.

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