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Study on the Clinical Profile and ECG Changes in Dengue Infection in A Tertiary Care Hospital

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ABSTRACT: Background: Dengue is one of the important causes of acute febrile illness worldwide, more so in developing countries[1]. Case fatality rates in tropical endemic countries like India are 2.5%. The present study was conducted to evaluate the clinical profile and ECG changes in dengue infection.**Materials andMethods**: It was a hospital-based observational study. One hundred ninety-nine dengue fever cases were selected for the study. Appropriate investigations were done**. Results:** A total of 199 patients with Dengue fever were studied and analyzed. The commonest age group affected in our study was 21-39 years (31%). The clinical spectrum of cases analyzed included 22% cases of Dengue fever (DF), 72% cases of Dengue Hemorrhagic fever (DHF), and 5% cases of Dengue Shock Syndrome (DSS). Clinical pulse rate distribution amongst cases showed 1.50% with bradycardia, 26.13% with relative bradycardia, and 8% with tachycardia. Electrocardiographic changes in our study showed 36% with sinus bradycardia, 48% with normal heart rate, 1% with first-degree heart block, and 14% with sinus tachycardia. **Conclusion**:In our study, fever, vomiting, and body pain were predominant presenting symptoms.85% had thrombocytopenia. In our study of 199 patients, 28% had bradycardia clinically, and around 36% had electrocardiograph evidence of bradycardia.
Keywords: Bradycardia, dengue fever

I. BACKGROUND

Dengue remains one of the most important mosquito-borne illnesses worldwide [1]. It is caused by a flavivirus with four different serotypes (DENV1, DENV2, DENV3, and DENV4). Current estimates show that 390 million infections occur annually in over 100 countries, of which 96 million result in clinical disease with a case fatality rate of around 1% [2]. Infection with any one of the serotypes is thought to result in lifelong serotype-specific immunity. Serious disease is known to occur as a result of a second infection by a different serotype [3]. Acute vascular leakage is the primary pathological phenomenon that lasts for 24–48 hours after its onset.

The majority of infections are asymptomatic and subclinical. Symptomatic disease follows an incubation period of four to seven days, after which it begins as an acute febrile illness with high temperature, malaise, retro-orbital headache, myalgia, backache, loss of appetite, and vomiting [5]. For treatment purposes, clinical illness is divided into three phases: the febrile phase, the critical phase, and the recovery phase. Around the third to the seventh day of illness, the critical phase, which is associated with adropping platelet count, recovery of leukopenia, and defervescence, begins. The critical phase is defined by the presence of features of plasma leakage such as rising hematocrit, clinical or radiological evidence of third-space fluid leakage, and in some cases, hypotension. A proportion of affected patients develop severe clinical shock, of which a minority proceed to develop severe, intractable shock, coagulopathy with bleeding, and multi-organ failure, which can culminate in death [6].

Early recognition and prompt treatment are vital if disease-related morbidity and mortality are to be limited[7]**.**An increased burden of this disease has been linked to the resurgence of mosquito vector Aedes aegypti, overcrowding, urbanization, and increasing travel. Dengue fever and dengue hemorrhagic fever are endemic in certain areas of South East Asia like Bangladesh, India, Indonesia, Myanmar, Sri Lanka, and Thailand. Dengue infection is a major cause of hospitalization and death, especially among children. Dengue infection is one of the important epidemics to be addressed in our country, and hence this study was taken up to assess clinical features and electrocardiograph(ecg) changes in dengue patients.

Aims & Objectives

To study the clinical features and ECG changes in dengue infection.

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II. MATERIALS& METHODS

This study was conducted in the Sri Venkateshwara Medical College, Tirupati, Andhra Pradesh. It was a hospital-based observational study and was carried out from April 2020 to September 2020. A total of 199 successive dengue fever cases fulfilling the inclusion criteria were included after the beginning of the study.

Inclusion Criteria:

a) All patients coming with a history of fever with one or more of the following symptoms (1) vomiting, (2) joint pain, (3) severe myalgia, (4) abdominal pain, (5) headache, amongstothers.
b) Patients of dengue (NS-1 antigen or IgM or both positive) .

Exclusion Criteria

a) All patients with fever who are Dengue IgM/NS1Ag negative.
b) Patients who had any known cardiac disease,chronic kidney disease, diabetes mellitus, hypertension were excluded.

The following parameters were recorded in all patients included in the study: Age, gender, Pulse/Heart rate, Blood Pressure, Respiratory rate, Temperature, JVP, Heart sounds, Breath sounds, Petechialrash.

All patients underwent the following investigations: Complete blood count, Renal function tests, Liver function tests, Dengue IgM/IgG, NS1 antigen, X-ray chest ECG USG Dengue.

III. RESULTS

TABLE 1:AgeWise Distribution of Cases
Table 1

Age (Yrs)	No. of Cases	Percentage %
<20	47	23.61
21-29	63	31.65
30-39	47	23.61
40-49	18	09.04
50-59	15	07.53
>59	09	04.52

The most common age group affected in our study is 21-29 years [31%]

TABLE 2:Gender Wise Distribution of Cases
Table 2

Gender	No. of Cases	Percentage %
Male	100	50.25
Female	99	49.74

In our study, the incidence of males and females is almost equal.

TABLE 3:Analysis of Various Symptoms
Table 3

Symptoms	Cases	Percentage%
Fever	148	99.3
Vomiting	63	42.28
Headache	27	18.12

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Abdominal pain	**27**	**18.12**
Bodyache	**19**	**12.75**
Joint pain	**17**	**11.40**
Malaise	**15**	**10.06**
Diarrhea	**12**	**8.05**
Rashes	**03**	**2.01**
Chest pain	**02**	**1.34**
Petechiae	**04**	**2.01**
Gum bleed	**02**	**1.00**
Melena	**06**	**3.01**

In our study the commonest symptom was fever[99.3%] followed by vomiting[42%],headache[18%] and body ache[12%].

TABLE 4:Clinical Spectrum of Cases

TABLE 4

Clinical Spectrum	Cases	Percentage%
Dengue Fever	**66**	**33.16**
DHF	**118**	**59.29**
DSS	**15**	**7.53**

The clinical spectrum of cases in our study included 33% cases of Dengue fever (DF), 59% cases of Dengue Hemorrhagic fever (DHF), 7% cases of Dengue Shock Syndrome (DSS).

TABLE 5:Distribution of Platelet Counts among Cases

Table 5

Platelet count	Cases	Percentage %
<50000/µL	**52**	**26.13**
50000-100000/µL	**73**	**36.68**
100000-150000/µL	**47**	**23.61**
>150000/µL	**31**	**15.57**

In our study, 85% of cases had thrombocytopenia, 15% had normal platelet counts.

TABLE 6:Pulse Rate Distribution among Cases

Table 6

Pulse rate	Cases	Percentage %
<40	**3**	**1.50**
41-60	**52**	**26.13**
61-100	**128**	**64.32**
>100	**16**	**8.04**

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In the present study, Clinical pulse rate distribution amongst cases showed 28% with bradycardia and 8% with tachycardia.

TABLE 7: Electrocardiographic Changes among Cases
Table 7

ECG	Cases	Percentage %
Normal Heart rate	**96**	**48.24**
Sinus Bradycardia	**73**	**36.68**
Sinus Tachycardia	**28**	**14.07**
First Degree Heart Block	**02**	**1.00**

Electrocardiographic(ECG) changes in our study showed that 37% had sinus bradycardia, 48% had normal sinus rhythm, 1% had first-degree heart block, and 14% had sinus tachycardia.

IV. DISCUSSION

in recent times dengue virus and all its clinical forms have been documented in most parts of India.Dengue virus epidemics have been affecting the tropics, and our country has also seen a major outbreak over the last couple of years. In the present study, a total of 199 patients with Dengue fever were analyzed. The commonest age group affected in our study was 21-39 years (31%).

S.No.	Author	Year	Place	Age (yrs)
1.	Baruah J	2002	Manipal	5-20
2.	Dash PK et al	2003	Gwalior	<15
3.	Neeraja M	2004	Hyderabad	20-39
4.	Present study	2020	Tirupati	21-39

This was comparable to the study done by Neeraja et al. in 2004, in Hyderabad.[8]
In our study, the incidence among males and females is almost equal. This was comparable to the study done by Dash P K et al. in 2003, in Gwalior.[10]

S.No.	Author	Year	Place	M: F Ratio
1.	Dash PK et al	2003	Gwalior	1.28:1
2.	Neeraja M	2004	Hyderabad	2:1
3.	Gupta et al	2008	New Delhi	1.8:1
4.	Present study	2020	Tirupati	1.01:1

The various clinical features in the current study included fever (99%), vomiting(45%), headache (31%), abdominal pain (13%), body ache(24%), joint pain (17%), malaise (17%), diarrhea(11%), rashes(6%), chest pain (1%). These were comparable to the study done by Dah Pk et al. 2003

Table No.	Study	Fever %	Vomiting %	Headache %	Bodyache %	Malaise %	Rashes %
1.	Dash Pk et .al2003	100	-	86	50	70	56
2.	Neeraja et al. 2003	100	-	74	-	53	41
3.	Gupta et al. 2008	92	-	-	-	-	82
4.	Present study	99	45	31	49	35	6

The clinical spectrum of cases in this study included 33% cases of Dengue fever (DF), 59% cases of Dengue Hemorrhagic fever (DHF), 7% cases of Dengue Shock Syndrome (DSS), whereas studies done by Gupta et al. has a higher percentage of DHF 72%.

SI No.	Study	Year	Clinical Spectrum
1.	Neeraja M et.al	2004	DF 85%,DHF 5%, DSS10%
2.	Gupta et.al	2008	DHF 72%, DSS28%
3.	Present study	2020	DF 33%,DHF 59%,DSS 7%

In the present study, Clinical pulse rate distribution amongst cases showed 28% had bradycardia, and 8% had tachycardia. This was comparable to a study done by Gupta et al. in 2008-9; 18% with bradycardia and 18% with tachycardia.

Electrocardiographic changes in our study showed 37% of patients with sinus bradycardia, 48% with normal sinus rhythm, 1% with first-degree atrioventricular block, and 14% with sinus tachycardia. In the study done by Gupta et al. in 2008, 11% had sinus bradycardia, 77% had normal sinus rhythm, and 12% had sinus tachycardia.[9]

The association of bradycardia with dengue infection has been demonstrated in this study and also previous other studies conducted worldwide, but the cause for such bradycardia remains to be explained in detail. This warrants further research in the field of infectious diseases in collaboration with a team of infectious disease specialists and cardiologists.

V. CONCLUSION

1) In our study, fever,vomiting, and body pain were predominant presenting symptoms.
2) 85% had thrombocytopenia
3) In a study of 199 patients, 28% had bradycardia clinically, and around 36% had electrocardiograph evidence of bradycardia.

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