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Clinical And Hematological Profile Of Patients With Dengue Fever At A Tertiary Care Hospital – An Observational Study

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ABSTRACT

Background: Dengue fever is a mosquito-borne tropical disease caused by the dengue virus. Symptoms typically begin 3-14 days after infection. This may include a high fever, headache, vomiting, muscle and joint pains, and a characteristic skin rash.

Aim: Objective of this is to evaluate the clinical and hematological characteristics of dengue patients in a tertiary care hospital.

Materials and methods: A cross-sectional study was carried out among patients with positive dengue serology results for NS1, IgM, and IgG. A total of 200 dengue cases that fulfilled the inclusion criteria were enrolled in the study. Clinical examination findings were recorded, hematological and biochemical parameters tests were done

Results: In our study, the incidence of dengue fever common in males (56%) compared to females (44%). Majority of patients (38%) were in the age group 21-40 years. Out of total 70% patients were diagnosed to have DF, 24% DHF and 6% patients were diagnosed to have DSS based on WHO criteria. NS1 were positive in 64% of patients. Common clinical manifestations were fever (100%) followed by headache (80%), joint pain (65%), myalgia (53%), vomiting (43%), and retro-orbital pain (33%). Hemetemesis/Malena (20%), petechiae (15%), epitasis (7%) and bleeding gums (6%) was the common bleeding manifestations. Leucopenia, thrombocytopenia and high hematocrit were the common hematological parameters in dengue.

Conclusion: Most common clinical presentation of Dengue fever is of fever. The most common laboratory abnormalities are of an increase in hematocrit, low total leucocyte count and low platelet count. Early diagnosis and prompt management of dengue can prevent complications

Keywords: *Dengue fever, Dengue hemorrhagic fever, Dengue shock syndrome, Thrombocytopenia, clinical and haematological profile*

1. INTRODUCTION

Dengue, an arboviral illness spread by mosquitoes, is a serious global public health concern that is primarily found in urban and semi-urban areas in tropical and sub-tropical regions of the world. Over time, the prevalence of dengue infection has increased significantly worldwide, resulting in considerable morbidity and mortality in tropical nations. [1,2] The dengue virus, which is a member of the flaviviridae family, causes dengue, an acute, self-limiting systemic viral infection. [3] Aedes female mosquitoes, Aedes aegypti, and Aedes albopictus mosquitoes are the vectors in question. [4] The distribution of dengue cases in urban areas serves as a key reservoir for dengue because the former are the breeding places, which mostly comprise any stagnant water collections such buckets, mud pots, discarded containers, used tires, etc. It is also observed that the number of dengue, breakbone, or 7-day fever cases is rising in this region of North East India with a relatively small urban population [5] due to individuals who have traveled to other Indian cities. The WHO estimates that about half of the world's population resides in nations where dengue infection is endemic, and that nearly 50 million individuals contract the disease each year. The dengue virus can spread through four different serotypes: DEN-1, DEN-2, DEN-3, and DEN-4. [6] After infection, symptoms usually appear three to fourteen days later. A high fever, headache, nausea, joint and muscular discomfort, and a distinctive skin rash are some of the symptoms that may be present. It usually takes two to seven days to

recover. A tiny percentage of cases progress to severe dengue, also called dengue hemorrhagic fever, which causes bleeding, low platelet counts, and blood plasma leakage, or dengue shock syndrome, which results in dangerously low blood pressure [7,8]. Dengue infection occurs in three stages: the critical period, which lasts from the fourth to the sixth day, the healing phase, and the febrile phase, which lasts for one to three days. Dehydration in the febrile phase, shock, bleeding (from thrombocytopenia), and organ damage in the critical phase, as well as reabsorption and fluid overload in the recovery phase, are possible clinical problems during the corresponding phases. [9] The identification of the dengue NS1 antigen (sensitivity 76% and specificity 98%) or the dengue IgM antibody using the ELISA method (sensitivity 90% and specificity 93%) are two examples of the serological test now used to confirm the diagnosis of dengue infection.[10]. Despite being a self-limiting illness, dengue can be fatal if not identified and treated quickly. Viral isolation, reverse transcription polymerase chain reaction (RTPCR) analysis of the viral genomic sequence, and NS1 antigen identification are the methods used to diagnose dengue. For outpatient care, the treatment primarily consists of oral fluids and paracetamol; for inpatient care, intravenous infusion of isotonic fluids such as ringer lactate and normal saline is used. Over the past ten years, significant progress has been made in the development of vaccinations, targeted antiviral medications, and vector control initiatives. If these new tools are used effectively, they will open up new avenues for disease control. [9]

Aim of the Study: The purpose of this study is to identify the clinical and hematological characteristics of dengue patients.

2. MATERIAL AND METHODS

This cross sectional observational hospital based study was carried out in the department of medicine, in a tertiary care center, India. A total of 200 patients fulfilling the inclusion criteria were enrolled in this study.

Inclusion Criteria

- Patient's of ≥16 years of age with both genders
- Individuals with positive dengue serology results for NS1, IgM, and IgG
- Patients who provided written informed consent for the study

Exclusion Criteria

- Patients <16 years of age
- A history of underlying medical illness, for example, diabetes mellitus, hematologic diseases, chronic kidney disease, or malignancy
- Patients who not provided written informed consent for the study

Patients presenting to the emergency, outpatient and inpatient departments with complaints of fever and clinical features of dengue with positive NS1 antigen test or dengue antibody serology IgM were included in the study.

Age, gender, clinical presentation, duration of fever, dehydration, hemodynamic status, urine output, hepatomegaly, Splenomegaly, ascites, pleural effusion, presence of petechiae, positive tourniquet test, other bleeding manifestations, haematocrit and platelet counts were recorded at presentation.

Statistical analysis: Statistical analysis was done by using excel sheet and Statistical package for social sciences (SPSS version 22) (SPSS Inc, Chicago) software packages were used for data entry and analysis. The results were presented in numbers and percentage for categorical data in table. A p value <0.05 was considered statistically significant

3. RESULT

A total of 200 patients diagnosed as dengue were enrolled in this study. Majority of the cases (38%) were 21–30 years of age followed by (21%) 31–40 years of age group, with male predominance (56%). Most of them (60%) resided in urban area. Duration of fever were 5-15 days among 43% of patients

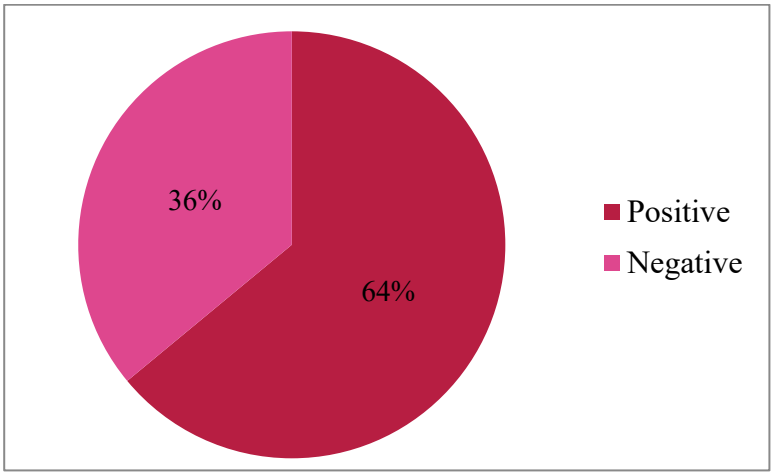
Table 1: Socio-demographic variables among the study patients

Variables		No. of Patients	Percentage
Age in Years	16–20	40	20%
	21–30	76	38%
	31-40	42	21%
	41–50	16	8%

	51–60	14	7%
	>60	12	6%
Gender	Male	112	56%
	Female	88	44%
Residential Area	Urban	120	60%
	Rural	80	40%
Duration Of Fever	< 5 days	70	35%
	5-15 days	86	43%
	>15 days	44	22%

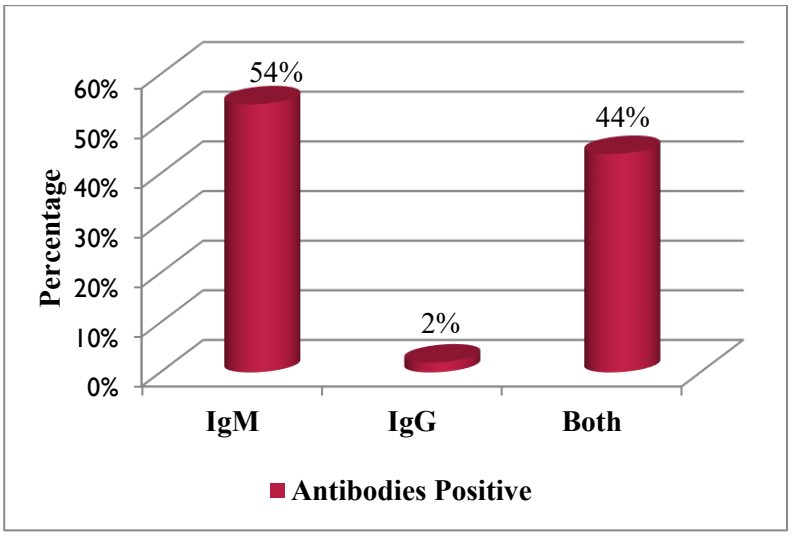
Dengue NS1 were positive in 64% of patients

Graph 1: NS1 Serology among study patients



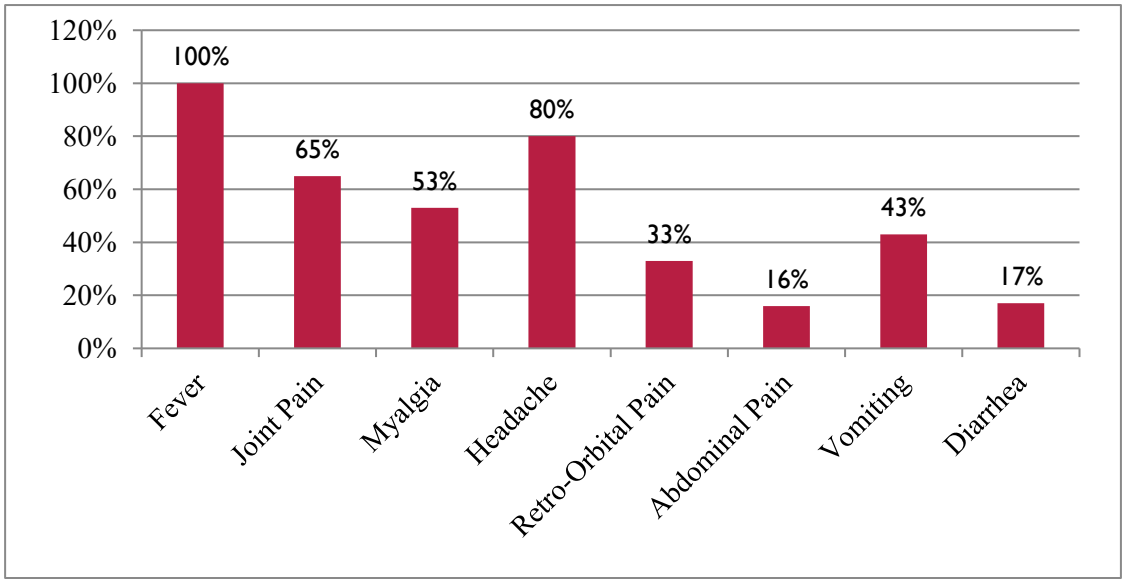
Most of the patients (54%) had positive IgM serology followed by (44%) both (IgM+IgG) and 2% had IgG against dengue

Graph 2: Dengue Serology among study patients



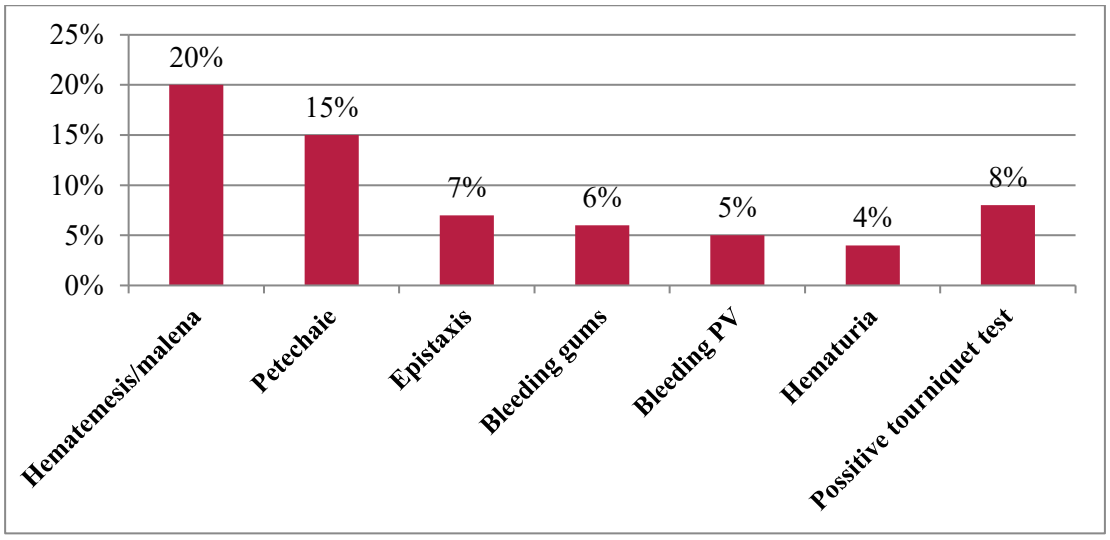
The common clinical manifestation among study patients were fever in 100% cases followed by headache (80%), joint pain (65%), myalgia (53%), vomiting (43%), retro-orbital pain (33%), diarrhea (17%) and abdominal pain (16%).

Graph 3: Common clinical manifestations among study patients



The most common bleeding manifestations were hemetemesis/Malena (20%), petechiae (15%), epitasis (7%), bleeding gums (6%), bleeding per vagina (5%), hematuria (4%) and positive tourniquet test in 8% cases

Graph 4: Hemorrhagic manifestation among study patients



All patients had thrombocytopenia. Most of the patients (58%) platelets were more than 50000, followed by 28% were platelet count between 20000-50000.

Table 2: Thrombocytopenia among Study patients

Thrombocytopenia	No of Patients	Percentage
<10000	12	6%
10000-20000	16	8%
20000-50000	56	28%
>50000	116	58%

Patients with decreasing platelet count (<10000) associated with the increasing risk of bleeding manifestations.

Table 3: Co-Relations between Bleeding Manifestations and Platelet Count

Platelet Count	Bleeding Manifestation		Total
	Present	Absent	
<10000	6 (100%)	0 (0%)	6 (100%)
10000-20000	6 (75%)	2 (25%)	8 (100%)
20000-50000	9 (32%)	19 (68%)	28 (100%)
>50000	1 (2%)	57 (98%)	58 (100%)

Mean hemoglobin and mean platelet counts were significantly lower among DSS cases as compared to dengue fever or DHF. It was observed that leucopenia was present in a significant number of patients with DF and DHF. Haemo-concentration was found in 25% patients with DHF and 50% in DSS patients.

Table 4: Haemotological parameters among study patients

Haemotological parameters	DF (n=140)	DHF (48)	DSS (12)
Mean hemoglobin	11.5 gm%	11 gm%	10.2 gm%
Mean platelets count	53000/cc^3	42000/cc^3	33000/cc^3
Leukopenia	98 (70%)	23 (47.9%)	3 (25%)
Haemoconcentration	Nil	12 (25%)	6 (50%)

4. DISCUSSION

Dengue is a hemorrhagic arthropod borne viral fever which may have serious consequences. The objective of the study is to analyze the clinical and laboratory parameters of dengue to facilitate early diagnosis and better management of dengue cases. The virologic diagnosis of dengue can be made by usual means (nucleic acid amplification or antigen detection) in the first 5 days of infection after which serology for antibody detection has to be performed.

This study showed that the age group of 21-30 years was affected the most followed by 31-40 years, which was similar to the findings of the previous studies by Naveen K et al,[11] and Gopal K et al [12], shows maximum affected age group to be 21-40 years

In our study we have found that more males are affected as compared to females. This is in coherent with the previous studies, notably study by Sankhe P, et al,[13] and Aiswaria M, et al [14]. Classical dengue fever is an acute febrile illness but in a small percentage of dengue infection, a more severe form of disease known as DHF occurs

In the current study NS1 Antigen assay was positive in 64% of patients, 54% and 44% patients with primary and secondary dengue infections, respectively, underwent dengue IgM and IgG serology, in agreement with the Salvi D, et al [15].

Dengue has diverse of clinical manifestations starting from simple fever to life threatening complications and severe encephalopathy too. In our series all patients presented with fever, followed by Headache, joint pain, myalgia, retro-orbital pain and vomiting, our results comparable with the many other studies like Kapoor et al [16], Deshwal et al [17] and Khan, M. Y et al [18].

The most frequent Hemorrhagic manifestations of dengue fever with warning signs and severe dengue are hemetemesis/ malena, petechiae, epistaxis, gum bleeding, and hematuria, concordance with the Sreenivasa B,et al [19] and S Khatroth, et al [20].

Risk of bleeding increases was increases with the fall of platelets counts observed in this study, accordance with the many other studies by Kanchana et al [21] and Tewari K, et al [22] The severity of the dengue infection and bleeding symptoms are associated with thrombocytopenia.

In laboratory parameters it was observed that a low white cell count and low platelets counts was present in a significant number of patients with DF and DHF, our results correlates with the D P Bhurke, et al [23] and Srinivas H.D, et al [24].

The mainstay of treatment for dengue infections is supportive care. In order to prevent secondary bacterial infections, antibiotics were administered to patients with severe dengue and those exhibiting warning signals.

5. CONCLUSION

Thrombocytopenia, leucopenia, elevated AST and ALT gives clues to test dengue fever so that the dengue fever cases can be identified in early stages and prompt management can be started to prevent complications and mortality outcome of the disease. The outcome of the condition is significantly influenced by early detection and appropriate fluid management. Therefore, public awareness is very important and early diagnosis and medical intervention is necessary to prevent complications of dengue fever.

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