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Original Research Article

A study of clinical and laboratory profile of dengue positive cases in hadoti region Rajasthan, India

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ABSTRACT

Background: Dengue fever is one of the most common arboviral mediated outbreaks reported with increased prevalence year after year with considerable morbidity and mortality in hadoti region. the aim to study various clinical and laboratory manifestations of Dengue fever admitted in MBS Hospital KOTA, with a diagnosis of Dengue fever according to WHO protocol from December 2018 to January 2020.
Methods: Prospective observational study was undertaken among adult patients. 132 patients were studied and analysed. And diagnosis was confirmed with Dengue IgM ELISA test. Other routine investigations done were routine hematological and biochemical investigations.
Results: A total of 132 cases, out of which 95 cases of Dengue Fever (DF), 34 cases of dengue hemorrhagic fever and 3 cases of Dengue Shock syndrome, out of which Male: Female ratio was 2.1. and mean age of presentation was 37. Fever and myalgia were the most common finding (100%) followed by arthralgia and headache. Pruritus was found in 21 cases (15.9%) which carried a significant difference between DF and DHF (p value <0.05). Among the laboratory features, thrombocytopenia and hematocrit were found to be statistically significant in DHF patients (p value <0.05). Mean platelet count was 0.71 lakhs/mm3. Leukopenia in 40(30.3%) cases. Raised Serum Aminotransferase level, AST (>40 IU/L) was seen in 39 cases (29.54%.). Pleural effusion was seen in 4 cases (3%), of which 3 cases of DHF and 1 case of DSS. Ascites in 6 cases (4.8%), all cases belong to DHF. Gall bladder wall thickening was seen in 28 cases (21.21%) of which 20 cases (54.04%) were of DHF. Melena was the most common bleeding manifestation. Skin rash was found to be positive in 40.5% cases. Hess test was positive in 4 cases (10.8% of DHF).
Conclusions: Incidence of dengue fever is on the rise in hadoti region and one of the most important differential diagnosis of patients presenting with fever during monsoon and post monsoon seasons.

Keywords: Ascites, Arboviral, Dengue fever, Shock syndrome, Urea

INTRODUCTION

Dengue Fever (DF) is an arthropod borne viral fever.[1] While dengue is endemic in more than 100 countries, most cases are reported from Southeast Asia and the western Pacific regions. Southeast Asian region together with Western Pacific region bears nearly 75% of current global disease burden.[2] Estimates suggest that 50 million cases of dengue infection and 500,000 cases of dengue hemorrhagic fever occur in Asian countries. India is one of the seven identified countries in the South-East Asia region regularly reporting incidence of DF/DHF outbreaks and may soon transform into a major niche for dengue infection. The first confirmed report of dengue infection in India dates back to 1946 and since then more and more new cases have been reporting the disease with increased morbidity and mortality in both urban and rural environments more than 80 outbreaks have been reported

from 16 States and Union Territories, the largest one being in 1996 when a severe outbreak of DF/ DHF occurred in Delhi wherein about 10,252 cases and 453 deaths were reported.[1,3] Dengue infections vary in severity, ranging from influenza-like self-limiting illness to life-threatening Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) which if left untreated, are associated with case fatality rate of 5%.[2] Although the mortality rate for dengue cases is low, even uncomplicated dengue fever causes considerable suffering and loss of productivity despite its short duration.[4] The various manifestations of dengue may not have a distinct line of demarcation.

According to NVBDCP, cases are increasing from 99913 in 2015, 129166 in 2016 to 157220 in 2017. Its distribution varies from state to state. At present incidence of dengue fever is increasing rapidly in Rajasthan, dengue cases doubled within 2 year from 4043 in 2015 to 8387 in 2017.[3]

In hadoti region is endemic area for dengue fever, in last 5 years 17 cases died out of 5791 dengue positive cases according to CMHO office kota.

This study is intended to study the clinical profile of Dengue fever patients admitted in hospital and correlate these features with laboratory findings which may help us in early diagnosis and better case management.

METHODS

It is a prospective observational study over a period of 13 months. A total of 132 patients admitted in medicine ward with symptoms suggestive of dengue fever and diagnosis confirmed with Dengue IgM antibody by ELISA test were included in this study. They were followed from time of admission to the time of discharge according to WHO discharge criteria.

Inclusion criteria

- Patients admitted with symptoms suggestive of Dengue Fever and found positive with Dengue IgM antibody by ELISA test.

Exclusion criteria

- Patients with chronic kidney disease
- Patients with chronic liver disease.
- Patients with co-infections - malaria, leptospirosis, Scrub typhus

Study duration was from December 2018 - January 2020. Study population was a total of 132 patients admitted in medicine ward.

It is a prospective observational study over a period of 13 months. A total of 132 patients admitted in medicine ward with symptoms suggestive of dengue fever and diagnosis confirmed with Dengue IgM antibody by ELISA test were included in this study. Purpose of the study will be explained to the study subjects and their attendants and written informed consent will be taken prior to their participation in the study. Pre structured proforma will be used to record the relevant information and history from individual cases selected for the study. The study was approved by hospital ethics committee and informed consent was obtained from each patient.

Statistical analysis

Descriptive statistics was analysed with SPSS (Software Package used for Statistical Analysis) software. Continuous variables were presented as Mean, Standard Deviation (SD). Categorical variables were expressed as frequencies and percentages.

Nominal categorical data between the groups were compared using Chi-squared test after construction of 2x2 table. For numeric variables, student's t test was used to find the difference between Dengue fever and severe dengue for all statistical tests, a "p value" less than 0.05 was taken to indicate a significant difference.

RESULTS

132 patients were admitted in department of medicine, MBS Hospital Kota over a period of 13 months from December 2018 to January 2020, out of which total number of patients of Dengue Fever (DF) were 95, Dengue Hemorrhagic Fever were 34 and Dengue Shock syndrome were 3 (Figure 1).

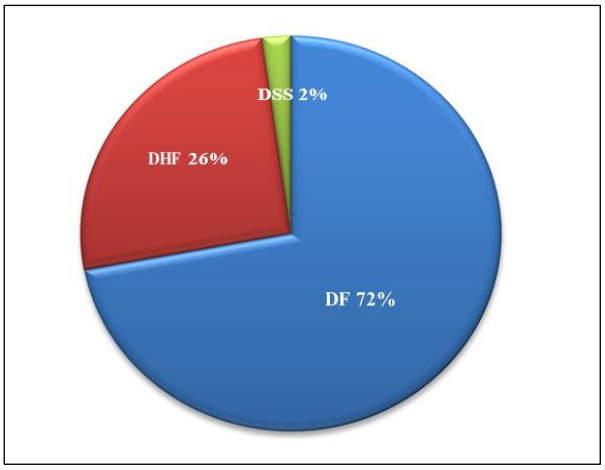

Figure 1: Clinical spectrum of dengue infection.

Out of the total cases, 89 cases (67.4%) were Males and 43 cases (32.5%) were Females and male to female ratio was 2.1. Mean age of presentation was 37 years.

Among male patients admitted, 64 cases (72.7%) had DF, 21 cases (23.8%) DHF, 3 cases (3.4%) DSS and among females 31 cases (70.4%) and 13 cases (29.5%) had DF and DHF respectively (Figure 2).

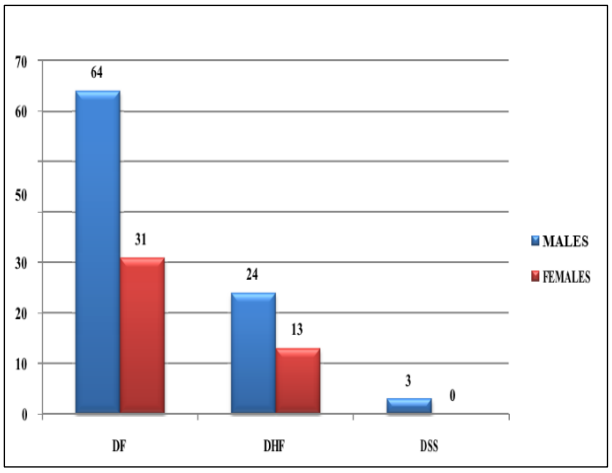

Figure 2: Distribution of sex in dengue infection.

Among patients of 18-45 years age group, 54 cases were males and 32 females, among 45-60 years age group 26 cases were males and 10 females, among >60 years age group 9 cases were males and 1 case were female.

Table 1 shows 95 cases (71.9%) had DF, 34 cases (25.7%) DHF and 3 cases (2.2%) DSS.

Table 1: Age and sex distribution.

Age group	Male	Female	Total
18-45 yrs	54 (61.3%)	32 (72.72%)	86
45-60 yrs	26 (29.5%)	10 (22.7%)	36
>60 yrs	9 (10.2%)	1 (2.2%)	10
Total	89	43	132

Fever was the most common finding (100%) along with myalgia (100%). Other common symptoms in chronological order included joint pains (86.3%), headache (70.4%), abdominal pain (60%) vomiting (58.3%), bleeding manifestations (28%), retro-orbital pain (13.6%), skin rash (11.3%), and shock (2.2 %).

Table 2: Clinical manifestations in dengue infection.

Clinical feature	Total no. (N=132) %(N)	DF (N=95) %(N)	DHF and DSS (N=37) %(N)	p value
Fever	100 (132)	100 (95)	100 (37)	-
Myalgia	100 (132)	100 (95)	100 (37)	-
Headache	70.4 (93)	67.3 (64)	78.3 (29)	0.21
Arthralgia	86.3 (114)	85.2 (81)	89.1 (33)	0.46
Retro-orbital pain	20.4 (27)	18.9 (18)	24.3 (9)	0.49
Vomiting	58.3 (77)	58.9 (56)	56.7 (21)	0.81
Abdominal pain	60 (80)	32 (31)	56.7 (21)	
Pruritus	16 (21)	5.2 (5)	43.2 (16)	0.001
Hepatomegaly	14.3 (19)	14.7 (14)	13.5 (5)	0.85
Pleural effusion	3.0 (4)	-	10.8 (4)	-
Ascites	4.8 (6)		16.2 (6)	

Pruritus was found in 21 cases (15.9%) which had significant difference between DF and severe dengue (p value <0.05). Hepatomegaly was seen in 19 cases (14.3%) of which 14 cases (13.5%) were of DF and 5 cases (13.5%) were of severe dengue (Table 2).

Chest X ray was done and Pleural effusion was seen in 4 cases (3%), of which 3 cases belong to severe dengue and 1 case belong DSS. And 6 cases (4.8%) with ascites, of which 4 cases belong to severe dengue and 2 cases belong to DSS. Among the laboratory features, hematocrit was found to be statistically significant in DHF patients. 61 patients were found to have hematocrit of >40% and 71 patients were found to have ≤40%.

Raised Serum Aminotransferase level (>40 U/L) was seen in 39 cases (29.54%) of which 32 cases (33.6%) were of DF and 7 cases (18.9%) were of DHF. Mean levels of AST and ALT calculated was 80 and 75 respectively.

Serum CPK level was elevated in 13 patients (9.8%) of which nine (9.4%) and four patients (10.8%) were of DF and DHF respectively. Serum LDH levels were also elevated in 10 patients (7.5%) of which seven patients (7.3%) were of DF and three (8.1%) were of DHF (Table 3).

Leukopenia was found in 40 (30.3%) cases in which 28 cases are of DF and 12 cases are of DHF. In USG abdomen ascites and gall bladder wall thickening was found statically significant in DHF patients (p value <0.05).

In x ray chest pleural effusion was found statically significant in DHF patients (p value <0.05).

Table 3: Laboratory parameters.

Lab parameters	Total (n=132) % (n)	DF (n=95) % (n)	DHF (n=37) % (n)	p value	Mean±sd
TLC <4000 /MM^3	30.3 (40)	29.4 (28)	32.4 (12)	0.52	-
PCV >40%	46 (61)	43 (41)	54 (20)	0.02*	39.93±5.77
Thrombocytopenia <1 lakh/mm^3	77.23 (102)	84.21 (80)	59.45 (22)		
Raised CPK (U/L)	9.8 (13)	9.4 (9)	10.8 (4)	0.77	178±189
Raised LDH (IU/L)	7.5 (10)	7.3 (7)	8.1 (3)	0.87	286±114.7
AST (>40 U/L)	29.54 (39)	33.6 (32)	18.9 (7)		
ALT (>40 U/L)	24.24 (32)	26.31 (25)	18.9 (7)		
Chest x ray (pleural effusion)	3.0 (4)		10.8 (4)	<0.05	
USG (gall bladder wall thickening)	21.21 (28)	8.42 (8)	54.04 (20)	0.01	
USG (ascites)	4.8 (6)		16.2 (6)	0.01	

Table 4: Thrombocytopenia in dengue patients.

	Total N=132 %(N)	DF N=95 %(N)	DHF and DSS N=37 %(N)	p value
Platelet count ≤1lakh/mm^3	77.23 (102)	84.21 (80)	59.45 (22)	<0.05
Platelet count >1 lakh /mm^3	22.72 (30)	15.78 (15)	40.54 (15)	

Among 102 patients (77.23%) had platelet count <1,00,000. Among these, 80 cases (84.21%) were of DF and 22 cases (59.45%) were of DHF as in Table 4.

Mean platelet count calculated was 0.71 lakhs/mm^3.

Thrombocytopenia was significant finding in patients of severe dengue as compared to DF (p-value<0.05) (Table 4). Thrombocytopenia was seen in 80 cases (84.21%) of DF, 22 cases (59.45%) of DHF and DSS (Figure 3).

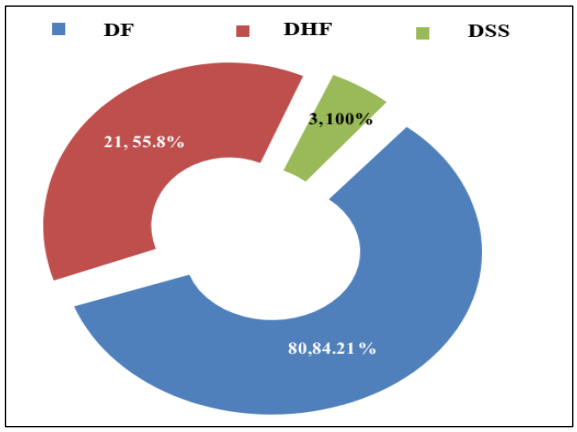

Figure 3: Distribution of thrombocytopenia in dengue patients.

Patients having platelet count of <20000 were 22 (16.66%), 20000-50000 were 42 (31.81 %), 50000-100000 were 38 (28.78%) and >1 lakh were 30 (22.7%) (Table 5). The level of thrombocytopenia was in concordance with the severity of dengue infection but there was poor relation between the level of thrombocytopenia and bleeding tendency as patients of DF who did not bleed had thrombocytopenia and in patients of DHF, bleeding manifestations did not occur even if the platelet count was less than 20000/mm^3.

Among the bleeding manifestations, melena was the most common seen in 35.1% of DHF patients, followed by hematuria (16.2%), subconjunctival hemorrhage (8.1%), epistaxis (3.7%), gum bleeding (5.4%).

Skin rash was found to be positive in 40.5% cases. Hess test was positive in 4 cases (10.8% of DHF) (Table 6).

Table 5: Variation in platelet count of dengue patients.

Platelet count	No. of patients	Percentage (%)
< 20000	22	16.66
20000-50000	42	31.81
50000-100000	38	28.78
>100000	30	22.7

Table 6: Bleeding manifestations.

Bleeding manifestation	Occurrence n=132	Total %	% of DHF and DSS %
Melena	13	9.8	35.1
Skin rash	15	11.3	40.5
Hematuria	6	4.5	16.2
Bleeding gums	2	1.5	5.4
Epistaxis	2	1.5	5.4
Sub conjunctival hemorrhage	3	2.2	8.1
Hess test	4	3	10.8

DISCUSSION

In this study, 89 cases (67.4%) were males and 43 cases (32.5%) were females and male to female ratio was 2:1. Mean age of presentation was 37 years. In a study done by Deshwal et al, mean age was 35 years, which was more than Sharma S et al, (26.3 years) and Singh NP et al, (26 years).[4,5] Male to female ratio in this study was very similar to study of Kumar A et al, in which the male-female ratio was 1.82:1, and study by Aheamad et al, was 1.6:1 but in study by Singh NP et al, it was 3:1.[5-7]

Out of the total cases, 95 cases (72%) were of DF and 37 cases (28%) were of DHF and DSS. These findings were in concordance with study by Ritu Karoli et al, and study by Meena KC et al, in hadoti region 84 cases (84%) were of DF and 16 cases (16%) were of DHF and DSS.[8,9] Among male patients admitted, 64 cases (72.7%) had DF, 21 cases (23.8%) had DHF, 3 cases (3.4%) had DSS. Among females 31 cases (70.4%) and 13 cases (29.5%) had DF and DHF respectively.

Commonest clinical manifestations in this study were fever and myalgia (100%) followed by joint pains (86.3%) and headache (70.4%), vomiting (58.3%). Analogous findings were observed by Deshwal et al, and Mandal SK et al, in their study.[4,10] In this study, headache was found in 70.4% cases as compared to findings by Singh NP et al, (61.6%) and Singh VK et al, (54%).[5] Abdominal pain was found in 80 cases (60%) as compare to finding by deshwal et al, (24.5%).[4] Retro-orbital pain was found in only 20% cases as contrast to some of the other studies, where it was one of the common presentations.

Pruritus was found in 21 cases (15.9%), in variance with study done by Tewari KN et al11, in which 9.6% cases were involved and study done by Deshwal et al, in which 13.4% cases were involved which show similar result with this study.[4] In this study, Pruritus was a significant finding in patients of severe dengue as compared to DF ($p<0.05$).

Bleeding manifestations were found in 37(28%) cases, occurrence being comparable to other studies.

Hepatomegaly was found in 13.3% cases, similar to that of study of Singh NP et al, (10.8%) and Sharma SK et al, (20.4%) and Deshwal et al, (14.8%).[4,5]

Pleural effusion was found in 4(3%) cases in contrast with studies by Tewari KN et al, Mandal SK et al, and Deshwal et al, in which, pleural effusion was found in 16.5 %, 19.0 % and 20% respectively.[4]

Ascites was found in 4.8% cases in contrast with study by Deshwal et al, in which ascites was found in 16.3% cases.

In present study, thrombocytopenia (platelet count <1 lakh/mm^3 as per WHO criteria) was present in 102 (77.23%) cases. In studies done by Deshwal et al, Khan et al, Singh NP et al, Anuradha M et al, and Nandini Chatterjee et al, thrombocytopenia was observed in 69.15%, 84.66%, 62%, 60% and 55.5% respectively.[9,12,13]

The levels of AST and ALT (>40 IU/L) were elevated in 39 (29.54.%) case and 32 (24.44%), analogous findings of AST and ALT were observed by Khan et al, 40.66% and 28% respectively.[9] However, in a study done by Deshwal et al, AST was raised in 88.5% and ALT was raised in 88% cases.[4] Leukopenia(WBC <4000/mm^3) was found in 40 (30.3%) cases, similar to that observed by Nandini Chatterjee et al, and Khan et al, (38.66%) but lower than that observed by Singh NP et al, (68%).[5,9,13] And higher than that observed by Deshwal et al, (20%).[4]

Melena was the most common bleeding manifestations in this study, similar with that of Singh VK et al, Rachel Daniel et al, Nandini Chatterjee et al.[13,14] Epistaxis was the most common bleeding manifestations as observed by Tewari KN et al, and Singh NP et al.[5]

Skin rash was present in 11.3% cases as noted by Rachel Daniel et al, (13.2%) and Singh NP et al5 (20%).

Subconjunctival hemorrhage was observed in only 2.2% cases as compared to study by Singh NP et al, and Mandal SK et al, in which 8.6% and 5.4% had this manifestation respectively.[5,10]

Tourniquet test was found to be positive in 4 (11.7%) cases of DHF. This is not in accordance with study done by Singh NP et al, and Rachel Daniel et al, in which this test was positive in 21% and 26% cases respectively.[5]

Thrombocytopenia as per WHO criteria, was present in 102 cases (77.23%), lower than that found by Khan et al.[9] Most of the patients in this study had platelet count of <50000/mm^3 compared to study by Khan et al, and Deshwal et al, where most patients had platelet count <50000/mm^3.[4,9] Many of the cases admitted with bleeding manifestations did not bleed subsequently though there was dip in platelet count (some even <20000/mm^3) during hospital study, indicating poor correlation between thrombocytopenia and bleeding tendencies, an observation similar to the one made by Sharma et al, indicating thereby that the abnormal platelet aggregation rather than reduction in absolute numbers was the cause of bleeding diathesis along with the cytokine mediated endothelial injury.[15] So, in management of DF/DHF immediate replacement of plasma loss by rapid volume expanders is the most important therapy. Thrombocytopenia severity had correlation with severe types of dengue (p-value significant).

CONCLUSION

Incidence of dengue fever is on the rise in hadoti region and one of the most important differential diagnosis of patients presenting with fever during monsoon and post monsoon seasons.

Multisystem involvement and atypical manifestations occur in association with severe dengue. Early recognition of these manifestations can help in early identification of severe dengue and better case management.

There is positive correlation between the level of thrombocytopenia and severity of Dengue fever, but it has poor correlation with bleeding manifestations. Thrombocytopenia can be used to assess the severity of Dengue infection so that timely management can reduce both mortality and morbidity. Ascites and gall bladder thickening in USG abdomen are indicative of DHF.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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