Research Article

A study of hematological profile in dengue fever at tertiary care center, Kota Rajasthan, India

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ABSTRACT

Background: Dengue fever continues to be one of the important public health problems in India. Dengue fever is an acute febrile disease characterized by sudden onset of fever of 3-5 days, intense headache, myalgia, retro-orbital pain, anorexia, gastrointestinal disturbances and rash. In present study we planned to study hematological profile of seropositive (Igm) dengue fever patients

Methods: A total of 100 cases were included in the study that admitted at NMCH, Kota and identified positive for IgM dengue fever.

Results: Majority of case having dengue infection belong to the age group of 21-30 year (29%). Thrombocytopenia was found in 90% patients, Leucopenia in 51% patients and hematocrit value >45% in 13% patients. Seven patients out of 61 (11.47%) had bleeding manifestation with platelet count between 20,000-60,000. Seven patients out of 15 (46.67%) had bleeding manifestation with platelet count <20,000.bleeding was noted in 14% of cases in which Cutaneous hemorrhagic manifestations were the most common manifestation.

Conclusions: With increasing severity of thrombocytopenia there is increasing incidence of bleeding manifestation.

Keywords: Dengue fever, Thrombocytopenia, Bleeding, Hematological

INTRODUCTION

The word dengue is believed to have originated from Swahili language "ki denga pepo", which describes sudden cramp like seizure. The clinical symptoms suggestive of dengue virus infection can be traced back to Chinese Chin Dynasty (265-420 AD) where disease was considered as water poison and was known to be associated with water and insects. [1]

The first epidemic occurred in Manila, Philippines in 1953–54, followed by Bangkok in 1958, and Singapore, Malaysia, and Vietnam in the early 1960s.[2] In India, the first major epidemic illness clinically compatible with dengue was reported from Madras in 1780, which later spread all over the country. Later, an outbreak of dengue like illness was reported in 1956 from Vellore, Tamil Nadu and since then, it has persisted in various parts of the country.[3]

Dengue fever is an acute febrile disease characterized by sudden onset of fever of 3-5 days, intense headache, myalgia, retro-orbital pain, anorexia, gastrointestinal disturbances and rash.[4] The hematological effects observed are changes in blood counts, hemo-concentration due to plasma leakage, leucopenia because of decreased neutrophils near the end of the febrile phase, presence of atypical lymphocytes and relative lymphocytosis before shock, thrombocytopenia and changes in blood hemostasis with frequent presence of hemorrhagic manifestations.[5] In this study we planned to study hematological profile of seropositive (Igm) dengue

fever patients which were admitted in New Medical College Hospital, Government Medical College Kota, Rajasthan, India.

METHODS

A randomized, prospective study was conducted in the Department of medicine, new medical college hospital, govt. Medical College, Kota, Rajasthan from January 2014 to December 2014. This study conducted in 100 patients admitted to the hospital IgM dengue positive were be selected by randomization.

A written informed consent was taken from each patients included in the study after thorough counseling. All cases were selected, taking into consideration the inclusion and exclusion criteria. Inclusion criteria were serologically confirmed (IgM positive) dengue fever patients admitted to medicine ward and Patients willing to participate in study. Exclusion criteria were Age less than 15 years or more than 60 years. Preexisting substantial chrosnic liver, kidney or heart disease. Patients had history of hematological disorders.

A detailed history and complete general and systemic examination was done for cases recruited in the study as per Performa. Following investigation was done dengue IgM by ELISA, Complete blood count (hematology autoanalyser sysmax xs-800i), Peripheral blood film for cell morphology, thick and thin blood smear for malaria parasite and parasite count, specific malarial antigen test, random blood sugar, urine examination, liver function test, renal function test, blood and urine culture and sensitivity, chest X-ray PA view, ultrasonography of abdomen.

Statistical analysis was performed with the statistical package for the social science system version SPSS 17. Data collected will be analyzed by frequency, percentage, mean, standard deviation (S.D).

RESULTS

Total of 100 patients were eligible and randomized in the study and following characteristic were seen. Demographic characteristics of the study population showed in table 1. Out of these 100 cases of dengue, 63 cases (63%) were males and 37 (37%) were females. According to age, maximum cases (29%) were in 21-30 years and rest (27%) were in 15-20 years, (21%) were in 31-40 years, (16%) were in 41-50 years and (7%) in 51-60 years.

In the present study total leukocyte count ranged from 1310 to 16700 cell/mm^3, with mean total leukocyte count was 4701.2cell/mm^3. A total leukocyte count of less than 4,000 cell/mm^3 was present in 51 (51%) patients whereas a total leukocyte count of more than 11,0002 cell/mm^3 was present in 4 (4%) patients. 45 (45%) patients had total leukocyte counts between normal range (Table 2).

Table 1: Distribution of study population by demographic profile.

Age (years)	Number	Percentage
15-20	27	27%
21-30	29	29%
31-40	21	21%
41-50	16	16%
51-60	7	7%
Sex		
Male	63	63%
Female	37	37%

Table 2: Distribution of study population by total leukocyte count.

TLC (cell/mm^3)	Number	Percentage
<4000	51	51%
>11000	4	4%
4000-11000	45	45%
Total	100	100%

In the present study, hematocrit value ranged from 20.30% -51.50% with a mean value of 39.08%. 54% (54) of patients had hematocrit <40%. 13% (13) of patients were having hematocrit >45% (Table 3). In present study, the range of platelet count was 0.07-3.14 lakhs with a mean platelet count of 52,840 cells/ cu.mm. 14 (14%) patients had a mild thrombocytopenia; 61 (61%) had moderate thrombocytopenia, and 15 (15%) had severe thrombocytopenia. In this study seven patients had a platelet level at the lower normal level ranging from 1.0 lakhs to 1.5 lakhs and three patients had normal level more than 1.5 lakh (Table 4).

Table 3: Distribution of study population by haematocrit.

Hematocrit	Number	Percentage
<40%	54	54%
40-45%	33	33%
>45%	13	13%

Table 4: distribution of study population by grade of thrombocytopenia.

Grade	Platelets count	Number	Percentage
Low normal	>1,00,000	10	10%
Mild	60,000-100,000	14	14%
Moderate	20,000-60,000	61	61%
Severe	<20,000	15	15%

In present study the hemoglobin levels among these patients ranged from 7.5-17.5g/dl with a mean of 12.62 g/dl. 6% had a hemoglobin level of more than 15 g/dl (Table 5). In the present study, bleeding was noted in 14% cases. Petechial manifestation was the most common manifestation (Table 6).

In present study out of 100 cases of dengue fever, 90 (90%) cases had thrombocytopenia, in which 61 patients had platelet count between 20,000-60,000, out of these 61 patients, seven patients (11.47%) had bleeding manifestation, remaining 15 patients had platelet count less than 20,000.]

Out of these 15 cases 7 cases (46.67%) had bleeding manifestation and rest of 14 patients had no bleeding manifestation (Table 7). In present study, out of 100 patients, 84 (84%) patients were diagnosed to have DF, 14 (14%) patients were diagnosed to have DHF and 2 (2%) patients were diagnosed to have DSS based on WHO criteria (Table 8).[3]

Table 5: Distribution of study population by Hemoglobin level.

HB (gm %)	Number	Percentage
<10	4	4%
10-12	33	33%
12-15	57	57%
>15	6	6%

Table 6: Distribution of study population by bleeding manifestation.

Bleeding	Number			Percentage		
	Male	Female	Total	Male	Female	Total
Present	9	5	14	14.24%	13.51%	14%
Not Present	54	32	86	85.76%	86.49%	86%
Total		100			100%	

Table 7: Correlation of thrombocytopenia with bleeding in population.

Thrombocytopenia (<100,000 lakhs)	Total (90 Cases)	No. of Cases with Bleeding
60,000-100,000	14	0 (0%)
20,000-60,000	61	7 (11.47%)
<20,000	15	7 (46.67%)

Table 8: Clinical spectrum of dengue positive cases in study population.

Diagnosis	Number	Distribution
DF	84	84%
DHF	14	14%
DSS	2	2%
Total	100	100%

DISCUSSION

Dengue fever is the one of the most important arboviral infection. It has become a major global public health problem in India. Epidemics are becoming more frequent now days. 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. Early recognition and meticulous management are very important to save precious lives from this killer disease.

In the present study majority of patients i.e., 29% were in the age group of 21-30 years. It was more common in younger population. Observations made by Farhan F et al showed that majority of patients i.e., 30% were in age group of 21-30 years which is almost similar to the present study.[6] Singh NP et al also showed mean age of 26±10 years in their study.[7] This may be due to young adults are being more active outside from the home. In present study 37 (37%) were female and 63 (63%) were male patients.

Male to female ratio was 1.7:1. Other studies by Singh NP et al, Neerja M et al and Farhan F et al observed sex ratio of 3.02:1, 2:1, 0.98:1 respectively.[4,6] In present and other study showed that the incidence of malaria is more common in males than females this is because males are more frequently exposed to the risk of acquiring malaria than females because of their outdoor life which they lead. Further, female in India are usually better clothed than males, hence they are less exposed.

In present study 90 (90%) patients had thrombocytopenia (<100,000). Studies by, Singh NP et al Khan E et al and Farhan F et al showed the incidence of thrombocytopenia in 61.39%, 67.2%, 73% respectively which is lower than present study.[6,7,9]

In present study hematocrit ranged from 20% to 51%. The mean hematocrit value of dengue positive cases in our study was 39.08%. In DHF and DSS, an increase in hematocrit levels was noted. Hematocrit value >45% was found in 13% patients. Hematocrit <40% found in 54% patients in present study which is similar with study done by Farhan F et al and They found hematocrit value >45% in 19% patients.[6] In present study, hospital was a tertiary

care level; mostly patients came here from other hospital with primary management with I.V fluid. So mostly patients were had normal range hematocrit.

In present study hemoglobin ranged from 7.5-17.5 g/dl, mean hemoglobin value was 12.62g/dl. 6% had a hemoglobin level more than 15g/dl. Observation made by Trupti D et al showed a mean hemoglobin value 11.95g/dl which is almost similar to present study.[10] Nazish et al observed a range of hemoglobin 3.6-16.6g/dl with mean hemoglobin 10.5g/dl while in present study range of hemoglobin is 7.5-17.5 g/dl, with mean hemoglobin value is 12.62g/dl.[11]

In present study mean total leucocyte count was 4701.2cells/cumm and 51% had leucopenia (<4000cell/cumm). Observation made by Ole wichmann et al 53.2% patients had leucopenia.[12] Nazish et al in their series found that out of 104 patients 55 (52.8%) had leucopenia which is almost similar to present study.[11]

In present study the Bleeding was noted in 14% of total number of cases. Cutaneous petechial hemorrhagic manifestations were the most common manifestation. Out of 100 cases, bleeding was seen in 14 cases (14%). Observation made by Farhan F et al bleeding was seen in 21% cases which are higher than present study.[6] In present study severity of thrombocytopenia was associated with increased incidence of bleeding. Khan et al also found that bleeding was related to the severity of thrombocytopenia as 80% of patients having platelet count lower than 25,000/µl Showed bleeding manifestation.[9] Out of 250 patients 2% had severe thrombocytopenia.

CONCLUSION

Thrombocytopenia was universal finding in our study validating the results of previous studies. With increasing severity of thrombocytopenia there is increasing incidence of bleeding manifestation. 11.47% in patients had platelet count 20,000-60,000 with 46.67% in patients who had platelet count <20,000.So should not platelets transfusion above >20000 platelet counts unless otherwise bleeding manifestation occurred.

ACKNOWLEDGEMENTS

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