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ESTIMATION OF CLINICAL AND HEMATOLOGICAL PROFILE IN DENGUE FEVER

Medical Science

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ABSTRACT

Background and Aim: Clinical diagnosis of early dengue patients is challenging as it presents with nonspecific symptoms, including fever, headache and myalgia. Present study is an attempt to elucidate the positive laboratory profile of serologically diagnosed dengue patients so as to facilitate early diagnosis, treatment, management and vector control measures, to reduce the morbidity and mortality because of this disease.
Material and Methods: This was a descriptive study with analysis of patients who were admitted for dengue fever in the at Tertiary Care center of Gujarat for duration of 5 months. This study was conducted on 100 indoor patients. Hematocrit raised >20% of normal was considered as hemoconcentration. Leukopenia was taken as total leucocyte count <4,000/mm3. Thrombocytopenia was taken as platelets count <1, 00,000/mm3.
Results: Most of the cases were seen in the 20-30 years age group. Majority of the patients were males compared to females and the male to female ratio was 2:1. Fever was the most common presentation and was seen in 43 cases (43%) cases. Present study showed hemoglobin range of 6 gm% to 17 gm%.). Raised hematocrit (>47%) was noted in 18 (18%) of patients at presentation and the hematocrit ranged from 20-51%.
Conclusion: Hemoconcentration, leucopenia, thrombocytopenia, and raised liver enzymes SGOT and SGPT along with reactive/ plasmacytoid lymphocytes on peripheral smear gives enough clues to test for dengue serology so that dengue cases can be diagnosed in their initial stages. This facilitates early treatment and aggressive fluid replacement therapy with good nursing care so that fatality rates can be reduced.

KEYWORDS

Dengue, Hemoglobin, Leukopenia, Thrombocytopenia

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 were described as early as 265-420 AD in China. At that time the disease was associated with water and insects.[1] Dengue is one of the most important viral diseases especially in the tropical regions. According to the WHO almost 50 million people get dengue infection annually and WHO estimates almost half of the world's population lives in countries having endemicity for dengue infection.[2]

There are four anti-genetically related but distinct serotypes of the dengue virus: DENV-1, DENV-2, DENV-3, and DENV- 4. It is a positive-stranded encapsulated ribonucleic acid (RNA) virus. In humans, one serotype produces lifelong immunity against reinfection but only temporary and partial immunity against the other serotypes.[3]

Dengue is an acute self-limited systemic viral infection caused by the dengue virus belonging to the family flaviviridae. Incidence of dengue fever (DF) has been increasing from past few years and dengue has become a global problem in recent times.[4] Dengue fever with warning signs (DFWS) and severe dengue (SD) with severe plasma leakage, severe bleeding or severe organ involvement have emerged as important public health threat in urban areas.

Clinical diagnosis of early dengue patients is challenging as it presents with nonspecific symptoms, including fever, headache and myalgia. Since there are many infectious diseases which have similar clinical features, a combination of clinical and laboratory parameters in any acute febrile illness could be used as markers to diagnose early dengue infection.

So, present study is an attempt to elucidate the positive laboratory profile of serologically diagnosed dengue patients so as to facilitate early diagnosis, treatment, management and vector control measures, to reduce the morbidity and mortality because of this disease.

MATERIAL AND METHODS

This was a descriptive study with analysis of patients who were admitted for dengue fever in the at Tertiary Care center of Gujarat for duration of 5 months. This study was conducted on 100 indoor patients. Patients presenting to the emergency department, outpatient department (OPD) with complaints of fever and clinical features of dengue with positive NS1 antigen test or dengue antibody serology IgM or IgG or both were included in the study.

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

Exclusion criteria were patients with only IgG positive on rapid card tests were excluded from the study. Patients with other identified illnesses like typhoid, malaria which were coexisted with dengue positive serology were excluded from the study.

Hemogram was done on automated cell counter analyzer (Sysmex XP 100) which included hemoglobin, hematocrit, total leucocyte count (TLC), differential leucocyte count (DLC) and platelets count. Platelets counts were cross checked on stained smears. Hematocrit raised >20% of normal was considered as hemoconcentration. Leukopenia was taken as total leucocyte count <4,000/mm3. Thrombocytopenia was taken as platelets count <1, 00,000/mm3.

STATISTICAL ANALYSIS

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

RESULTS

Most of the cases were seen in the 20-30 years age group (Table 1). Majority of the patients were males compared to females and the male to female ratio was 2:1. Fever was the most common presentation and was seen in 43 cases (43%) cases (Table 2).

Present study showed hemoglobin range of 6 gm% to 17 gm% (Table 3). Raised hematocrit (>47%) was noted in 18 (18%) of patients at presentation and the hematocrit ranged from 20-51%. The total leukocyte count ranged from 1500 cells/cumm to >11000 cells/cumm. Leucopenia with less than 4000 cells/cumm was present in 26% cases. In the present study out of 100 cases of dengue fever, 84% cases had thrombocytopenia and 16% cases had severe thrombocytopenia (<20,000/cumm) with bleeding manifestations.

Table 1: Age wise distribution of study participants

Age in years	Number	Percentage
20-30	45	45
31-40	18	18
41-50	19	19
51-60	10	10
More than 60	8	8
Total	100	100

Table 2: Distribution of clinical features

Clinical features	Number	Percentage
Fever	43	43
Myalgia	12	12
Fever and myalgia	14	14
Headache	6	6
Nausea and vomiting	8	8
Fever and skin rashes	7	7
Petechiae	6	6
Fever and itching	4	4
Total	100	100

Table 3: Distribution of study population by hemoglobin and hematocrit level

Hb (gm/dl)	Number	Percentage	HCT (%)	Number	Percentage
6-8.9	11	11	**20-26**	-	-
9-11.9	39	39	**27-36**	46	46
12-14.9	34	34	**37-46**	36	36
15-17.9	16	16	**47-56**	18	18
Total	100	100%	**Total**	100	100%

DISCUSSION

Dengue fever is a most common vector borne disease in tropical and sub-tropical countries. Dengue and dengue hemorrhagic fever is caused by four antigenically closely related viral serotypes (DEN-1, DEN-2, DEN-3, DEN-4) belonging to the genus flavi virus. The incubation period of dengue after transmission from vector mosquito to human host is 4 -10 days.[5]

In the present study most of the cases were seen in the 20-30 years age group. Deshwal et al studied a total of 515 patients of dengue.[6] In their study too maximum patients were in 21-40 years age group (62.91%). Vibha et al studied 100 patients, and observed 49 (49%) to be in the 15 to 25 years age group followed by 33 (33%) cases in the 26 to 35 years age group.[7]Meena et al 12 did a randomized study of 100 patients with dengue fever.[8] Ahmed et al (n=205) observed the age range for dengue as 10-65 years and the mean age was 31.29 years (SD+13.65).[9]

Dengue infection can cause a spectrum of illness ranging from mild, undifferentiated fever to illness up to 7 days' duration with high fever, severe headache, retro-orbital pain, arthralgia and rash, but rarely causing death. Dengue Haemorrhagic Fever (DHF), a deadly complication, includes haemorrhagic tendencies, thrombocytopenia and plasma leakage. Dengue Shock Syndrome (DSS) includes all the above criteria plus circulatory failure, hypotension for age and low pulse pressure.[10] DHF and DSS are potentially deadly but patients with early diagnosis and appropriate therapy can recover with no sequelae.
In our study majority of the patients were males compared to females and the male to female ratio was 2:1. Deshwal et al and Vibha et al too observed a male predominance in their studies with 72.8% and 70% male patients respectively.[6,7]

Present study showed hemoglobin (Hb) ranging from 6 gm% to >15 gm%, 39 cases showed Hb of 9-11.9 gm%, followed by 34 cases showed Hb of 12-14.9 gm%, 11 had Hb of 6-8.9 gm% and 16 had Hb of 15-17.9 gm%. In the study by Meena et al hemoglobin ranged from 7.5-17.5 g/dl; mean hemoglobin value was 12.6 g/dl.[8] Dongre et al observed hemoglobin level from 3.6 gm/dl to 16.7gm/dl with a mean of 11.9 gm/dl.[11]

In the present study, total leukocyte count ranged from 1500 to >11000 cells/mm3. In Deshwal et al study leucopenia was noticed in around 20.19% of cases.[6] In Meena et al study total leukocyte count ranged from 1310 to16700 cell/mm3, with mean total leukocyte count of 4701 cells/cumm.[8] Most of the patients observed had thrombocytopenia from day 4 of fever onset.

Hematocrit and platelet count is traditionally used as prognostic markers for course and treatment of dengue fever. In the present study, hepatomegaly was noted in 30 % and splenomegaly was seen in 18% of cases. This was similar to study done by Shekar et al in which thrombocytopenia was seen in 61% cases[12]. While in studies done by Gajera et al platelet count <1 lakh/mm3 was seen in 81% and 67.39% cases respectively.[13]Though platelet count is taken as an indicator for onset of bleeding manifestation, many patients have bleeding manifestations without significant drop in platelet count.[13,14]

Effective disease prevention program should include vector control by chemical, biological or environmental measures.[15] Purpose of the control is to reduce the vector density below which epidemic disease activity will not occur.[16] Understanding demographic differences in infection rates and severity of dengue has important implications for planning and implementation of effective public health prevention and control measures.

CONCLUSION

Hemoconcentration, leucopenia, thrombocytopenia, and raised liver enzymes SGOT and SGPT along with reactive/ plasmacytoid lymphocytes on peripheral smear gives enough clues to test for dengue serology so that dengue cases can be diagnosed in their initial stages. This facilitates early treatment and aggressive fluid replacement therapy with good nursing care so that fatality rates can be reduced. This would minimize morbidity and mortality arising out of serious complications of dengue fever.

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