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Original Research Article

Clinical, laboratory and radiological profile of dengue among pediatric patients admitted in tertiary care hospital

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ABSTRACT

Background: Dengue is found in tropical and subtropical regions around the world, predominantly in urban and semi-urban areas. Dengue mortality can be reduced by implementing early case detection and referral systems for patients; managing severe cases with appropriate treatment; reorienting health services to cope with dengue outbreaks; and training health personnel at all levels of the health system. Many studies that focus on the difference between the frequency of clinical findings in DHF and dengue shock syndrome (DSS) with respect to classical DF has been published. The objectives of the study were to assess signs and symptoms of dengue among patients with severe dengue and patients with dengue fever and to evaluate laboratory and radiological profile among dengue patients.
Methods: This Hospital based cross sectional study was conducted on 70 seropositive cases, admitted in the Paediatrics Department of Gandhi hospital during the period of July to December 2017 for 6months. Data was analyzed by using SPPS Version 17 and student t test was used for inferential statistics.
Results: Out of 70 cases 38 were presented with severe dengue and 32 presented with dengue fever. Average age of presentation is 7.24 years among severe dengue group, 5.52 years among dengue fever group. In group of severe dengue, 60.5% of the cases were female, which was insignificantly more as compared to 40.6% of the cases from group of dengue fever.
Conclusions: All levels of health personnel must be aware of clinical signs and symptoms of all dengue types. Careful monitoring of unusual presentations early recognition severe manifestation and timely intervention can reduce disease specific mortality rate.

Keywords: Dengue fever, Severe dengue, Clinical laboratory and profiles

INTRODUCTION

Dengue fever (DF) is the commonest of the arboviral infections in humans.[1] Dengue is found in tropical and subtropical regions around the world, predominantly in urban and semi-urban areas. Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue. Over the past three decades, there has been a dramatic global increase in the frequency of dengue fever (DF). Up to 50-100 million infections are now estimated to occur annually in over 100 endemic countries, putting almost half of the world's population at risk.[2]

The viruses that cause dengue fever are *Flaviviruses*. There are four closely related but antigenically distinct virus serotypes: DEN-1, DEN- 2, DEN-3, and DEN-4.[3] Dengue viruses cause symptomatic infections or

asymptomatic seroconversion. Symptomatic dengue infection is a systemic and dynamic disease. It has a wide clinical spectrum that includes severe and non-severe clinical manifestations. After the incubation period, the illness begins abruptly and, in patients with moderate to severe disease, is followed by three phases − febrile, critical and recovery. Due to its dynamic nature, the severity of the disease will usually only be apparent around defervescence i.e. during the transition of the febrile to the afebrile phase, which often coincides with the onset of the critical phase.[4] Many DF cases are self-limiting but its complications like haemorrhage and shock can be life-threatening. If untreated, mortality from the complications of DF is as high as 20%, whereas if recognized early and managed properly, mortality is less than 1%. Hence, it will be useful if certain symptoms, signs and laboratory parameters associated with the development of complications are identified so that such cases would receive more attention.[1] For a disease that is complex in its manifestations, management is relatively simple, inexpensive and very effective in saving lives, so long as correct and timely interventions are instituted. The key to a good clinical outcome is understanding and being alert to the clinical problems that arise during the different phases of the disease, leading to a rational approach in case management.[4]

Dengue mortality can be reduced by implementing early case detection and referral systems for patients; managing severe cases with appropriate treatment; reorienting health services to cope with dengue outbreaks; and training health personnel at all levels of the health system.[2] Many studies that focus on the difference between the frequency of clinical findings in DHF and dengue shock syndrome (DSS) with respect to classical DF has been published.

Objectives

- To assess signs and symptoms of dengue among patients with severe dengue and patients with dengue fever.
- To evaluate laboratory and radiological profile among dengue patients.

METHODS

This hospital based cross sectional study was conducted on seropositive cases of dengue in 70 patients admitted in the Paediatrics Department of Gandhi hospital during the period of July to December 2017 for 6months.A protocol was drafted according to the specifications of the Ethics Committee of the hospital. Informed written consent of the parents was obtained before starting the study. 1to14years age group was included with clinical suspicion of dengue fever i.e. acute febrile illness with any of the associated symptoms like: myalgia, headache, retro-orbital pain, bleeding manifestations, abdominal pain, drowsiness, low platelets count, evidence of shock and dengue sero-positive. Dengue sero-negative and all children with identified bacterial or other focus of infection were excluded. Data was analyzed by using SPPS version 17 and student t test was used for inferential statistics.

RESULTS

Out of 70 cases 38 were presented with severe dengue and 32 presented with dengue fever. Average age of presentation is 7.24 years among severe dengue group, 5.52 years among dengue fever group the difference was not significant. In group of severe dengue, 60.5% of the cases were female, which was insignificantly more as compared to 40.6% of the cases from group of dengue fever.

Clinical profile

According to this data, fever was observed for 3-4 days in 52.6% of cases with severe dengue which was comparable with 53.1% of patients with dengue fever and it was observed that among severe dengue patients 50.0% of cases had head ache compared to 46.9% of cases with dengue. 63.2% of cases with severe dengue had myalgia compared to 65.6% of cases with dengue fever. All these differences were not significant. As per this analysis, 60.5% of cases with severe dengue had retro orbital pain which was significantly more as compared to 34.4% of cases with dengue fever. According to this analysis, 71.1% of cases with severe dengue had vomiting which was more as compared to 50.0% of cases with dengue fever but the difference was not statistically significant. 91.9% of patients with severe dengue had abdominal pain which was significantly more as compared to 18.8% of cases with dengue fever. 55.2% of patients with severe dengue had consciousness clear n lucid which was less as compared to 84.4% of cases with dengue fever and the difference was statistically significant. This study states that, 47.4% of patients with severe dengue had rash/ petechie which were insignificantly more as compared to 40.6% of cases with dengue fever. Not a single patient with dengue fever had Hepatomegaly which was significantly less as compared to 100.0% of cases with severe dengue. This study data reveals that, not a single patient with dengue fever had hypotension which was less as compared to 7.9% of cases with severe dengue who had hypotension but the difference was not significant. Above data suggests that, not a single patient with dengue fever had pulse volume feeble or weak thready pulse which was significantly less as compared to 34.2% of cases with severe dengue. This study data indicates that, not a single patient with dengue fever had tachycardia which was significantly less as compared to 34.2% of cases with severe dengue. This analysis suggests that, 65.8% of cases of severe dengue had normal respiratory rate which was significantly less as compared to 100.0% of cases with dengue fever.36.8% of patients of severe dengue had decreased urine output which was significantly more as compared to 12.5% of patients with dengue fever. Study reveals that, not a

single patient with dengue fever had prolonged capillary refill time which was significantly less as compared to 34.2% of cases with severe dengue. This study states that, 65.8% of cases of severe dengue had warm pink extremities which were significantly less as compared to 100.0% of cases with dengue fever. This data indicates that, 42.1% of cases with severe dengue showed tourniquet test positive which was comparable with 40.6% of cases with dengue fever and the difference was not significant (Table 1).

Table 1: Clinical profile of study subjects.

Parameters		Severe dengue (n=38) (%)	Dengue fever (n=32) (%)	P value
Headache	Absent	19 (50)	17 (53.1)	>0.05
	Present	19 (50)	15 (46.9)	
Mayalgia	Absent	14 (36.8)	11 (34.4)	>0.05
	Present	24 (63.2)	21 (65.6)	
Retro orbital pain	Absent	15 (39.5)	21 (65.6)	<0.05
	Present	23 (60.5)	11 (34.4)	
Vomiting	Absent	11 (28.9)	16 (50)	>0.05
	Present	22 (57.9)	16 (50)	
Abdominal pain	Absent	3 (8.1)	26 (81.2)	<0.05
	Present	30 (81.1)	6 (18.8)	
Consciousness	Clear and lucid	21 (55.2)	27 (84.4)	<0.05
	Irritable	5 (13.2)	4 (12.5)	
	Lethargy	7 (18.4)	1 (3.1)	
	Restless	5 (13.2)	0 (0)	
Rash/petechie	Absent	20 (52.6)	19 (59.4)	>0.05
	Present	18 (47.4)	13 (40.6)	
Blood pressure	Normal	35 (92.1)	32 (100)	>0.05
	Hypotension	3 (7.9)	0 (0)	
Tachy cardia	Good volume	25 (65.8)	32 (100)	<0.05
	Feeble and weak thready	13 (34.2)	0 (0)	
Capillary refill time	Brisk	25 (65.8)	32 (100)	<0.05
	Prolonged	13 (34.2	0 (0)	
Extremities between	Cold, clammy	13 (34.2)	0 (0)	<0.05
	Warm Pink	25 (65.8)	32 (100)	
Tourniquet test	Absent	22 (57.9)	19 (59.4)	>0.05
	Present	16 (42.1)	13 (40.6)	

Table 2: Laboratory profiles of study subjects.

Parameters		Severe dengue (n=38)	Dengue fever (n=32)	P value
Haemoglobin		11.91±2.71	10.33±1.91	<0.05
WBC		7846.53±2439.76	8143.13±2488.81	>0.05
Platelet count	Very low	14 (36.8%)	0 (0%)	>0.05
	Low	18 (47.4%)	5 (15.6%)	
	Normal	6 (15.8%)	27 (84.4%)	
Haematocrit	Normal	1 (2.6%)	22 (68.8%)	<0.05
	Raised	23 (60.5%)	10 (31.2%)	
	Significantly raised	14 (36.9%)	0 (0%)	
AST	Normal	04 (10.5%)	32 (100%)	<0.05
	Raised	34 (89.5%)	0 (0%)	
ALT	Normal	0 (0%)	31 (96.9%)	<0.05
	Raised	38 (100%)	1 (3.1%)	

Laboratory profile

Mean HB was 11.91 in group of severe dengue, which was more as compared to 10.33 of dengue fever group and difference was statistically significant. According to this data, mean total white blood count was 7846.53 in group of severe dengue, which was less as compared to 8143.13 of dengue fever group but difference was not significant. Platelet count was observed low to very low in 84.2% of patients having severe dengue, which was

significantly more as compared to 15.6% of patients with dengue fever. HMCRT was raised to significantly raised in 97.4% of patients having severe dengue, which was significantly more as compared to 31.2% of patients with dengue fever. This study profile states that, not a single patient with dengue fever had AST rose, which was less as compared to 89.5% of patients with severe dengue who had raised AST value and the difference was statistically significant. ALT value was observed raised in 100.0% of patients having severe dengue, which was significantly more as compared to 3.1% of patients with dengue fever (Table 2).

Radiological profile

Present study states that, CRX was not within normal limit in 39.4% of cases with severe dengue which was more as compared to 3.1% of cases with dengue fever. This study profile states that, not a single patient with dengue fever had ultrasonography abdomen abnormal, which was less as compared to 100.0% of patients with severe dengue who had ultrasonography abdomen abnormal (Table 3).

Table 3: Radiological findings among study subjects.

Parameters		Severe dengue (n=38) (%)	Dengue fever (n=32) (%)
USG findings	Normal	0 (0)	32 (100)
	Gallbladder wall thick + Hepatomegaly	7 (18.4)	0 (0)
	Ascitis + Gallbladder wall thick + Hepatomegaly	8 (21.1)	0 (0)
	Hepatomegaly	11 (21)	0 (0)
	Hepatomegaly + Minimal ascitis	7 (18.4)	0 (0)
	Significant ascitis + Gallbladder wall thick	4 (10.5)	0 (0)
	Significant ascitis	1 (2.6)	0 (0)
Chest X-ray	Bilateral pleural effusion	3 (7.3)	0 (0)
	Bilateral pleural effusion (Rt>Lft)	3 (7.3)	0 (0)
	Left side significantly pleural effusion	2 (5.3)	0 (0)
	Minimal effusion on left side	1 (2.6)	0 (0)
	Minimal effusion on right side	1 (2.6)	0 (0)
	Minimal pleural effusion	1 (2.6)	0 (0)
	Right side pleural effusion	4 (10.5)	0 (0)
	Minimal effusion noted	0 (0)	1 (3.1)
	Within normal limits	23 (60.6)	31 (96.9)

DISCUSSION

Dengue is most epidemiologically important mosquito born disease in tropical countries like India. It is causing major outbreaks leading to mortality and morbidity in the continent

70 cases were included in the study. Majority males infected with dengue compared to females. This is similar with many studies, simple attribution to this preponderance is, females covered with clothes in Indian scenario and male children given importance sociologically to bring hospital.[5] The most common age group affected was 8-11 years indicating the school activity of these group and exposure to breeding places of mosquitoes during playing. Severe dengue presented with 7 -8 yrs age group which is similar to Ahmed et al.[6]

Results were analysed and presented according to WHO TDR guidelines 2009. All cases were categorised into severe dengue and dengue fever. In our study 45.71% were non severe and 54.28% as severe dengue cases.

Symptoms like headache and myalgia were almost equal in both groups marginally high percentage of above symptoms has seen in severe dengue group. Retro orbital pain was seen with higher percentage among severe dengue patients. Mishra et al presented similar results.[7]

However headache was found with higher prevalence among non-severe dengue patients in Rehman et al.[8] This variation is because of subjective feeling of patients.

Vomiting, abdominal pain symptoms were marginally high among severe dengue patients. Dengue haemorrhagic symptoms like consciousness, hypotension, feeble pulse, cold calmy extremities were seen among severe dengue group. Similar findings had been observed by Ahmed et al.[5]

Bleeding manifestations were petechiae and rash observed equally between two groups but higher percentages noted among severe dengue patients. Similar findings were reported in studies of Kobilan et al, Mishra et al.[9,10] Literature also states that bleeding signs and symptoms almost equally presented in severe and non-

severe dengue cases. According to this observation probably there is no demarcation between severe and non-severe; health personal must aware with all signs and symptoms and able to tackle all situations.

Majority of severe dengue patients were presented with thrombocytopenia compared to non-severe dengue patients. Studies by Harris et al, Murge et al reported no significant correlation between platelet count and bleeding manifestations.[11,12] In contrast Mittal et al found significant co relation.[13] Raised haematocrit and decreased white blood cell count was observed significantly among severe dengue cases. Agarwal et al reported contrast results.[14] Type of study, subjects involved in the study and drawing of blood sample plays pivotal role for contrast results.

ALT and AST levels were significantly increased among severe dengue cases compared to non-severe cases, similar results were observed by Kalyanarooj et al mayosites involvements leads increase of AST and ALT.[15]

Pleural effusion was noted in all cases of severe dengue cases. Either it may bilateral or unilateral. Majority of non-severe dengue cases didn't show any plural effusion. These findings are similar with studies of Pushpa et al and Malavige et al.[16,17] Hepatomegaly was found in severe dengue cases and ascetic fluid was also seen among severe dengue cases these findings are similar with findings of Joshi et al and Srivastava et al.[18,19]

CONCLUSION

All levels of health personnel must be aware of clinical signs and symptoms of all dengue types. Careful monitoring of unusual presentations early recognition severe manifestation and timely intervention can reduce disease specific mortality rate.

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