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ORIGINAL RESEARCH

An Observational Study to Correlate the Clinical Profile with Laboratory Investigations and Radiological Findings in Dengue Fever at Tertiary Care Center

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ABSTRACT

Background: The demographic pattern and the trend of disease (dengue fever) are largely changing everyyear through the past decade.Early recognition and prompt initiation of appropriate management is vital. The aim of this study to correlate the clinical profile with laboratory investigations and radiological findings in dengue fever at tertiary care center.

Materials& Methods: A cross sectional study done on 50 children less than 12 years of age with clinical signs and symptoms of Dengue- any acute febrile illness in department of Pediatrics, RUHS College of Medical Sciences, Jaipur, Rajasthan, India during one year period. For all suspected dengue fever, the IgM ELISA qualitative test was done at our hospital. Children positive for IgM dengue were taken up for study and followed up for clinical profile.Labinvestigations carried out in these patients include CBC, Haemoglobin, renal functiontest, Liver function test and Dengue IgM serology. Chest X ray was taken todemonstrate pleural effusion. Children positive for IgM were followed up for the clinicalprofile and outcome.

Results: Our study showed that the larger number of cases was in 6 to 12 years.).Males were affected slightly more than females in total and also insubgroupsexceptin DHF III.Itwas not significant (P>0.05).The mean duration of fever was 6.23 days.Pleural effusion was seen 6 patients, of which more cases in dengue feverwith warning sign. Abdominal tenderness was seen in 46% of cases, highest in denguefever with warning signs and lowest in mild dengue which is statistically significant.Ascites was seen in 20 % of cases, highest in dengue fever with warning signs andDHF IV. Hepatomegaly was seen in 30%, highest in DHF IV and lowest in mild dengue which is statistically significant. The splenomegaly was seen in 4% of cases. AST was elevated in 36% of cases. More in DHFIII & DHFIV cases, but it is not statistically significant. ALT was increased in 30% of cases. More elevated cases are in DHFIII which was also not significant.

Conclusion: Early recognition, precise assessment and appropriate treatment as perestablished National guideline based on WHO protocols should reduce the high

mortality rates. There is a probable need for region specific guidelines and their usage for better outcomes.

Keywords: Dengue fever, DHF, DSS, IgM, Fever.

INTRODUCTION

Dengue is a major public health problem throughout the tropical and subtropical regions of the world. Dengue is the most rapidly spreading mosquito-borne disease of mankind, with a 30-times increase in global incidence over the last five decades. According to WHO, about 50–100 million new infections are estimated to occur annually in more than hundred endemic countries, with a intense increase in the number of countries reporting the disease.[1]

During epidemic, infection rate among thosewho have not been previously encountered to the virus are often 40 to 50 % but canalso reach 80 to 90 percent. *Aedes aegypti* is the primary epidemic vector. Primarily anurban disease, dengue and DHF are now spreading to rural areas worldwide.

Dengue hemorrhagic fever is characterized by the acute onset of high feverand with associated signs and symptoms similar to dengue fever in the early febrilephase. There were common hemorrhagic manifestation such as positive tourniquet test(TT), petechiae, easy bruising and/or GI hemorrhage in severe cases. By the end of thepyrexic phase, there is a tendency to develop hypotensive shock (DSS) due to plasmaleakage. The presence of preceding warning signs such as lethargy or restlessness orirritability, persistent vomiting, oliguria and abdominal pain are important forintervention to prevent shock.Plasma leakage and abnormal haemostasis are the main pathophysiologicalhallmarks of Dengue hemorrhagic fever. Rising haematocrit/ haemoconcentration andThrombocytopenia are constant findings before the cessation of fever/ onset of shock.

Dengue hemorrhagic fever occurs most commonly in children with secondary dengueinfection. DHF has also been documented in primary infections with Dengue Virus 1and 3 as well as in infants. We live in a country with resource limited settings add onby public ignorance about the disease and poor access to health care. Severity is highin paediatric age group. Chandrakanta et al[2] describe the varied manifestations of dengue viral infection as seenin hospitalized children in northern India. Manjunath J. Kulkarni et al[3] in their studydescribe various clinical manifestations.

The demographic pattern and the trend of disease are largely changing everyyear through the past decade. Additional studiesabout the disease can lead to change in guidelines and alterations in public healthprograms. Early recognition and prompt initiation of appropriate management is vital.The aim of this study to correlate the clinical profile with laboratory investigations and radiological findings in dengue fever at tertiary care center.

MATERIALS& METHODS

A cross sectional study done on 50 children less than 12 years of age with clinical signs and symptoms of Dengue- any acute febrile illness in department of Pediatrics, RUHS College of Medical Sciences, Jaipur, Rajasthan, India during one year period. For all suspected dengue fever, the IgM ELISA qualitative test was done at our hospital. Children positive for IgM dengue were taken up for study and followed up for clinical profile.

INCLUSION CRITERIA

Children < 12 years of age with acute febrile illness with 2 of the following:

- Headache, Myalgia, Rash, Arthralgia, Bleeding manifestation, Shock, low platelet count, Retro orbital pain and altered sensorium

EXCLUSION CRITERIA

- Fever with other serology positive cases.

METHODS

Using Proforma the Clinical signs & symptoms were collected. Labinvestigations carried out in these patients include CBC, Haemoglobin, renal functiontest, Liver function test and Dengue IgM serology. Chest X ray was taken todemonstrate pleural effusion. Children positive for IgM were followed up for the clinical profile and outcome. The number of children included based on the above criteriawas 50. Children who were seropositive were classified on the basis of National guideline for dengue fever 2014.

STATISTICAL ANALYSIS

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Categorical outcomes were compared between study groups using Chi square test /Fisher's exact test. P value < 0.05 was considered statistically significant.

RESULTS

Our study showed that the larger number of cases was in 6 to 12 years. In all subgroups also themore affected were 6 – 12 age groups. But it was statistically not significant (P>0.05).Males were affected slightly more than females in total and also in subgroups except in DHF III. It was not significant(P>0.05).

Table 1: Demographic variables among study groups

Parameters	Total (N=50)	Mild dengue (N=25)	Moderate dengue (N=16)		Sever dengue (N=9)		P-value
			Dengue Fever With Warning Sign(N=12)	DHF I & II (N=4)	DHF III (N=7)	DHFIV (N=2)	
< 1 Year	5 (10%)	4 (16%)	1 (8.33%)	0 (0%)	0 (0%)	0 (0%)	>0.05
1-5 Years	12 (24%)	6 (24%)	2 (16.66%)	2 (50%)	1 (14.28%)	1 (50%)	
6-12 Years	33 (66%)	15 (60%)	9 (75%)	2 (50%)	6 (85.72%)	1 (50%)	
Mean±SD	6.78±3.45	6.56±3.12	6.24±3.36	7.67±3.10	5.23±3.27	7.3±2.1	>0.05
Gender							
Male	28 (56%)	14 (56%)	7 (58.33%)	3 (75%)	3 (42.85%)	1 (50%)	>0.05
Female	22 (44%)	11 (44%)	5 (41.66%)	1 (25%)	4 (57.14%)	1 (50%)	

The mean duration of fever was 6.23. There is no much variation among subgroups, which is not statistically significant. The headache was present in 14% of patient. The myalgia and arthralgia was 10% and 4 % respectively (table 2).

Table 2: Comparison of symptoms across diagnosis

Parameters	Total (N=50)	Mild dengue (N=25)	Moderate dengue (N=16)		Sever dengue (N=9)		P-value
			Dengue Fever With Warning Sign (N=12)	DHF I & II (N=4)	DHF III (N=7)	DHFIV (N=2)	
Fever	50 (100%)	25 (100%)	12 (100%)	4 (100%)	7 (100%)	2 (100%)	1.000
Mean duration of fever (days)	6.23	6.32	6.16	6.08	5.87	5.14	>0.05

Headache	7 (14%)	2 (8%)	1 (8.33%)	0 (0%)	2 (2.85%)	2 (100%)	1.00
Myalgia	5 (10%)	3 (12%)	0 (0%)	0 (0%)	2 (2.85%)	0 (0%)	1.00
Arthralgia rash	2 (4%)	2 (8%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1.00

Pleural effusion was seen 6 patients, of which more cases in dengue feverwith warning sign. Abdominal tenderness was seen in 46% of cases, highest in denguefever with warning signs and lowest in mild dengue which is statistically significant.Ascites was seen in 20 % of cases, highest in dengue fever with warning signs and DHF IV. Hepatomegaly was seen in 30%, highest in DHF IV and lowest in mild dengue which is statistically significant. The splenomegaly was seen in 4% of cases (table 3).

Table 3: Comparison of sign across diagnosis

Parameters	**Total (N=50)**	**Mild dengue (N=25)**	**Moderate dengue (N=16)**		**Sever dengue (N=9)**		**P-value**
			Dengue Fever With Warning Sign (N=12)	**DHF I & II (N=4)**	**DHF III (N=7)**	**DHFIV (N=2)**	
Pleural effusion	6 (12%)	0 (0%)	4 (33.33%)	0 (0%)	1 (14.28%)	1 (50%)	1.00
Abdominal tenderness	23 (46%)	6 (24%)	10 (83.33%)	1 (25%)	5 (71.42%)	1 (50%)	<0.05*
Ascites	10 (20%)	0 (0%)	6 (50%)	0 (0%)	2 (28.57%)	2 (100%)	1.00
Hepatomegaly	15 (30%)	2 (8%)	8 (66.66%)	0 (0%)	3 (42.85%)	2 (100%)	<0.05*
Splenomegaly	2 (4%)	0 (0%)	0 (0%)	0 (0%)	1 (14.28%)	1 (50%)	1.00

AST was elevated in 36% of cases. More in DHFIII & DHFIV cases, but it is not statistically significant. ALT was increased in 30% of cases. More elevated cases are in DHFIII which was also not significant (table 4).

Table 4: Comparison of elevation of AST& ALT among study groups

Parameters	**Total (N=50)**	**Mild dengue (N=25)**	**Moderate dengue (N=16)**		**Sever dengue (N=9)**		**P-value**
			Dengue Fever With Warning Sign (N=12)	**DHF I & II (N=4)**	**DHF III (N=7)**	**DHFIV (N=2)**	
Elevated AST	18(36%)	10 (40%)	2 (16.66%)	1(25%)	4 (57.14%)	1(50%)	>0.05
Elevated ALT	15 (30%)	8 (32%)	2 (16.66%)	0(0%)	4 (57.14%)	1 (50%)	>0.05

DISCUSSION

As discussed in the literature, the demographic pattern and the trend of illness are largely changing every year through the past decade. Dengue patients may be asymptomatic or symptomatic. Clinical manifestations vary from undifferentiated fever to DHF & DSS.[4-7] The clinical manifestations depend on various factors such as the virus strain, immune status of the host, age, and primary or secondary infection.

Dengue infection occurs in all age groups of human population and paediatric age group was found to have mostly affected. Paediatric age groups are also at high risk for morbidity and

mortality. In the recent past it has been observed that there is a paradigm shift of high incidence of dengue infection from paediatric age group to adolescent and adult.

As per the National classification, in our study the frequency of Dengue fever & DF with warning was 74%, Dengue hemorrhagic fever 8% and Dengue shock syndrome 18%. Ratagerietal[8] reported DF(18%), DHF(60%), DSS (22%). Narayanan et al[10] study shown DF (72.78%), DHF (18.6%), DSS(8.4%). Kalyanaroojetal[9] reported DF(including DFB)(53%), DHF(including DSS) (47%). Present study is comparable with other studies. Incidence of DSS was increased when comparing the study by Narayanan et al (2001)[10]. It may be due to increasing endemicity, environmental factors and changing virulence of the viruses.

ManjunathJ.Kulkarnietal[3] shows children in 6–12yrs age group constituted 45.8% of cases forming the most commonly affected group. Fahad Javaid Siddiquietal[11] Study shows older children appeared 5.5times more likely to be affected than their younger (0–5years) counter parts. These are comparable with our present study.

In our results showed that males are more affected than female (male 55.4% compared to female 44.6%), but disease severity more in female. It is comparable with other studies.[10,12,13]

Maimoona M. Ahmed[14] study shows elevated both AST & ALT in 64% of patients. Sharmaetal. From India[15] reported elevated transaminases in 90% of patients. Shubhankar Mishra[16] reported increased AST & ALT in 47.4 & 30.9% respectively. In the present Study AST is elevated in 36% of the cases. ALT is elevated in 30% of the cases. Mortality rate is drastically reduced by early recognition, precise assess men and appropriate fluid management as per WHO protocol.

CONCLUSION

We concluded that symptoms like vomiting, hematemesis, skin bleeds, altered sensorium, hepatomegaly, elevated SGOT, SGPT, gall bladder wall thickening, ascites, pleural effusion following the period of fever defervescence strongly indicate Dengue hemorrhagic fever and dengue shock syndrome.

Early recognition, precise assessment and appropriate treatment as perestablished National guideline based on WHO protocols should reduce the high mortality rates. There is a probable need for region specific guidelines and there usage for better outcomes.

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