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CLINICAL SPECTRUM OF DENGUE INFECTION IN CHILDREN AT A TERTIARY CARE HOSPITAL

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ABSTRACT **INTRODUCTION:** The frequency of dengue and its complications has hyperbolic over the past few years, particularly in rural Karnataka. Owing to the wide spectrum of clinical presentation, unpredictable clinical evolution and outcome, especially in children, early prediction of Dengue infection during any febrile illness, using clinical and laboratory markers, is essential for initiating early appropriate management and to prevent morbidity and mortality. **METHODOLOGY:** Informed consent was taken from parents before enrolling in study. A clinical history, physical examination and relevant baseline investigations were done for all the cases. A pre- structured proforma was used to record the clinical data and laboratory parameters from individual case selected for the study. **RESULTS:** Among the clinical predictive markers, the sensitivities of myalgia, nausea/vomiting, anorexia, flushing and hepatomegaly were 58%, 57%, 44.5%, 43% and 39.5% while the specificities for above features were 58%, 83.75%, 61.25%, 82.5% and 66.25% respectively. **CONCLUSION:** The clinical predictive markers were of myalgia, nausea/vomiting and flushing.

KEYWORDS : Clinical Spectrum, Dengue Infection, Children

INTRODUCTION:

The incidence of dengue has been on a rise especially over the past 2 decades across all variants viz., Dengue fever, Dengue hemorrhagic fever and dengue shock syndrome. The number of cases in southeast Asia alone have increased in the last 3 to 5 years. In India too, there has been an increased proportion with severe disease. In India these epidemics are more frequent, cyclical, and ever expanding into rural areas.[1] Although the distinct clinical features are suggestive of dengue diagnosis but they can present with varied manifestations. Factors such as virus-vector and host-virus relationship contribute to this variability.[2]

The frequency of dengue and its complications has hyperbolic over the past few years, particularly in rural Karnataka. Owing to the wide spectrum of clinical presentation, unpredictable clinical evolution and outcome, especially in children, early prediction of Dengue infection during any febrile illness, using clinical and laboratory markers, is essential for initiating early appropriate management and to prevent morbidity and mortality.[3,4]

CaseFatalityrate(CFR) of SEAR countries is less than 1%,whereas in India,Bhutan,Nepal still have Case Fatality Rate(CFR) above 1%. The current study is aimed to identify the statistical significance of these clinical and laboratory predictive markers in Dengue fever in children of rural Karnataka which may help us in early recognition and prompt initiation of appropriate treatment to limit disease related morbidity and mortality.[5,6]

METHODOLOGY:

Informed consent was taken from parents before enrolling in study. A clinical history, physical examination and relevant baseline investigations were done for all the cases. A pre- structured proforma was used to record the clinical data and laboratory parameters from individual case selected for the study. The patients were managed according to WHO dengue management protocol.

We followed the WHO dengue management protocol. The following Symptoms/Signs as Clinical predictors were noted- lethargy, rashes, myalgia , petechiae nausea ± vomiting, arthralgia , hepatomegaly > 2cm hypotension, hemorrhage, positive tourniquet test fluid accumulation and abdominal pain

LABORATORY PREDICTORS

The following laboratory predictors were recorded- Haematocrit , WBC , Platelet , LFT , PT & aPTT and USG abdomen.

*DIAGNOSTIC TESTS FOR DENGUE by *(Dengue Day1 Test by J. Mitra & Co.)*

NS1 Antigen and IgM for Dengue* using rapid solid phase immuno-chromatographic test for (1) The qualitative detection of Dengue NS1 antigen and (2) Differential detection of IgM and IgG to Dengue virus in human serum/plasma.

Cut off values for laboratory tests:-

(1)Leucopenia (WBC</= 5000/cumm), (2)Thrombocytopenia (platelet count<1 lakh) (3)Elevated serum AST>40 U/L OR ALT>45U/L,(4) Prolonged PT(Normal range:11-16 s) and (5)prolonged aPTT(Normal range:30-40 s)

USG features suggestive of Dengue were:-

Gall bladder wall edema, Ascites, Pleural effusion and Organomegaly. Data was entered, charts and tables were generated using Microsoft Excel and Microsoft Word. Qualitative variables were presented as percentages and Quantitative variables presented as Mean ±SD.

Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of the items for predicting Dengue infection was determined for each assigned cut-off value. Chi-Square test and Z-test were the statistical tests used to calculate the p value. 'p' value<0.05 considered statistically significant.

RESULTS:

In both the positive and negative serology groups ,the maximum number of cases were seen in age group 6-10 yrs. Least number of cases were found in age group 16 to 18yrs. The mean age was 9.71 yrs.

Table 1:Age distribution

Age	Serology+ve (n=200)	%	Serology-ve (n=80)	%
1y-5yr	29	10.36	11	3.93
6yr-10yr	86	30.71	34	12.14
11r-15yr	66	23.57	31	11.07
16yr-18yr	19	6.79	4	1.43
total	200	71.43	80	28.57

Total number of males in the study were 157 and females were 123 with a male to female ratio of 1.22 : 1 in dengue positive cases.

Table 2: Gender distribution

Gender	No. Of cases	Serology+ve	%	serology - ve	%	total%
Male	157	110	55	47	56	56.07
Female	123	90	45	33	43	43.93

Most of the children admitted had fever of less than 3 days duration. The mean duration of fever in the study was 3.14±1 days

Table 3: Duration of fever at admission

Duration of fever at admission	Serology +ve	sserology -ve
1-3 days	146	58
4-6 days	54	22

Table 4: Comparison of clinical characteristics

Clinical parameter	Serology+ve	%	Serology – ve	%	Pvalue	Statistical significance
Anorexia	89	44.5	31	38.75	0.380	Ns
Nausea	114	57	13	16.25	<0.001	S
Flushing	86	43	14	17.5	<0.001	S
Rash	67	33.5	19	23.75	0.110	Ns
Myalgia	116	58	30	37.5	0.002	S
Arthralgia	23	11.5	17	21.25	0.035	S
Rop	28	14	14	17.5	0.459	Ns
Headche	62	31	33	41.25	0.102	Ns
Pain abdomen	81	40.5	19	23.75	0.008	S
Bleeding manifestation	27	13.5	3	3.75	0.017	S
Lethargy	12	6	7	8.75	0.408	Ns
Facial puffiness	79	39.5	23	28.75	0.091	Ns
Ascites	66	33	7	8.75	<0.000	S
Pleural effusion	27	13.5	3	3.75	0.017	S
Hepatomegaly	79	39.5	27	33.75	0.370	Ns
Hepatic tenderness	39	19.5	4	5	0.002	S
Torniquet test	17	8.5	0	0	0.007	S
Hypotension	11	5.5	3	3.75	0.544	Ns

Among the 200 serology positive dengue cases the most common clinical predictive markers were fever (100%) which is an inclusion criteria followed by myalgia, nausea/vomiting and flushing. These markers were statistically seen less in serology negative group. However, anorexia, rash, retro-orbital pain (ROP), headache, lethargy, facial edema, hepatomegaly and hypotension were found to be non-specific and did not show statistical difference between the two groups. In comparison with serology negative dengue cases, serology positive dengue cases had more ascites(33% vs. 8.75 %, p<0.0001) flushing (43% vs. 17.5%, p<0.001), myalgia (58% vs. 37.5%, p<0.05), Hepatic tenderness(19.5% vs 5%, p<0.05), pain abdomen/tenderness (40.5% vs. 23.75%, p<0.05)

Among the clinical predictive markers, the sensitivities of myalgia, nausea/vomiting, anorexia, flushing and hepatomegaly were 58%, 57%, 44.5%, 43% and 39.5% while the specificities for above features were 58%, 83.75%, 61.25%, 82.5% and 66.25% respectively. Although positive tourniquet test, hypotension, clinical fluid accumulation, bleeding manifestations, hepatic tenderness had high specificities, they lacked good sensitivity.

Table 5: Sensitivities and specificities of clinical predictive markers

Clinical parameters	Sensitivity	Specificity	Accuracy
Anorexia	44.50	61.25	89.18
Nausea/vomiting	57.00	83.75	114.24
Flushing	43.00	82.50	86.24
Rash	33.50	76.25	67.22
Myalgia	58.00	62.50	116.18
Arthralgia	11.50	78.75	23.23
Retro orbital pain	14.00	82.50	28.24
Headache	31.00	58.75	62.17
Pain abdomen/tenderness	40.50	76.25	81.22
Bleeding manifestations	13.50	96.25	27.28
Lethargy/restlessness	6.00	91.25	12.26
Facial edema	39.50	71.25	79.20
Ascites	33.00	91.25	66.26
Pleural effusion	13.50	96.25	27.28
Hepatomegaly	39.50	66.25	79.19
Hepatic tenderness	19.50	95.00	39.27
Tourniquet test	8.50	100.00	17.29
Hypotension	5.50	96.25	11.28

DISCUSSION:

Although high incidence of dengue has been described in children, very few studies have been exclusively on them. The highest number of cases were found in the age group of 6-10 yrs which is similar to a study done by kulkarni et al and Vanita ss et al.[7] However, a the present has a lowest incidence among the same age group. The mean age is 9.82 ± 4.23years in serology positive dengue group whereas the mean age in serology negative dengue group 9.4 ±3.76 years.

The incidence of male children that were affected is slightly more in our study. The ratio of M:F being 1.28:1. Similar observations were made by others also showed increased preponderance among male.

In the present study, the most common clinical presentations in serology positive dengue group were fever(100%) which is an inclusion criteria in our study followed by myalgia(58%), nausea/vomiting (57%), anorexia(45%), flushing(43%), hepatomegaly(40%) and pain abdomen/tenderness(41%) which is similar to other studies. The following pattern of clinical presentation during febrile phase of dengue fever have been observed in other studies.

A tourniquet test was performed with children by inflating a blood pressure cuff on the upper arm between the systolic and diastolic blood pressures for 5 min. Positive tourniquet test was defined if there are more than 20 petechiae in a defined 2.5-cm2 area The platelet count and tourniquet test did not consistently correlate with each other. The tourniquet test was positive in 17(8.5%) cases out of 200 dengue cases. Other studies have noted varying results in this test.

The evaluation of immediate micro and macro environments of the patients habitat revealed following observations. Storage of water in containers was present. Artificial storage water as in flower vases, plant pots and coconut shell were also noticed. The scope for mosquito breeding was present. Those chidren got infected in the immediate monsoon or post monsoon months, being responsible for increase in the number of cases in that period. Efforts were made to educate parents about disease from which their children was suffering and the possible modes of spread, the environmental factors that might have been responsibe, the ways and means to prevent spread of disease, like use of personal anti-mosquito measures are effective against mosquitoes in the field, avoiding mosquito bites through the use of insecticides, repellents, body covering with clothing, screening of houses, and destruction of A. aegypti breeding sites. If water storage is mandatory, a tight-fitting lid or a thin layer of oil can prevent egg laying or hatching. A larvicide, such as Abate [O,O′-(thiodi- p-phenylene) O,O,O,O′-tetramethyl phosphorothioate], available as a 1% sand-granule formation and effective at a concentration of 1 ppm, may be added safely to drinking water.

In the present study, in comparison with serology negative dengue group cases, serology positive dengue group had more nausea/vomiting (57% vs 16.25%, p<0.001), flushing (43% vs. 17.5%, p < 0.001) , myalgia (58% vs. 37.5%, p=0.002) which is similar to other studies.

Tzong-Shiann Ho et al[8] in their study at Southern Taiwan found in comparison with laboratory-confirmed dengue negative cases, dengue-positive patient had more headache (32.4% vs. 14%, p < 0.01) and nausea/vomiting (33.5% vs. 15.8%, p < 0.01).

Kalyanarooj et al [9] in their study at Bangkok in 1997 reported dengue positive patients compared with dengue negative cases to have more anorexia(85% vs 65%, p<0.01), nausea(49% vs 68%, p<0.05), vomiting(70% vs 52%, p<0.05) and a positive tourniquet test(43% vs 21%, p<0.01).

Among the clinical predictive markers in our study, the sensitivities of myalgia, nausea/vomiting, anorexia, flushing and hepatomegaly were 58%, 57%, 44.5%, 43% and 39.5% while the specificities for above features were 62.5%, 61.25%, 61.25%, 82.5% and 66.25% respectively which was similar to other studies.[10] Positive tourniquet test had highest specificity (100%). However, the sensitivity was too low (8.5%) for acute dengue infection. Tzong-Shiann Ho et al[8] in their study at Southern Taiwan reported the sensitivities of skin rash, myalgia, nausea/vomiting and positive tourniquet test were 59.2%, 46.8%, 53.5% and 34.2%, while the specificities for above features were 75.4%, 53.5%,66.7% and 100%, respectively. Kalyanarooj et al[9] in their study at Bangkok in 1997 reported the sensitivities of anorexia, nausea, vomiting and positive tourniquet test of 85%, 68%, 70% and 43% respectively and found no statistically significant difference in headache, abdominal pain and bleeding.

CONCLUSION:

The clinical predictive markers were of myalgia, nausea/vomiting and flushing. These markers were statistically seen less in the group with negative Dengue serology Individual clinical predictive markers did not show significant PV, however a combination of nausea/vomiting,

flushing, myalgia and pain abdomen has a PPV of 84.1 % and a NPV of 37.9 %. Positive tourniquet test had positive predictive value of 100%. However, the sensitivity was only 8.5%.

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