

CLINICAL PROFILE AND OUTCOME OF DENGUE INFECTION IN A SECONDARY CARE HOSPITAL

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**Abstract**

Background: Classic dengue fever is an acute febrile disease with headaches, musculoskeletal pain, and rash, but the severity of illness and clinical manifestations vary with age and virus type. **Objective:** To identify the clinical profile of the patients with dengue infection and to study the correlation between the clinical profile and the severity of the dengue infection. **Materials and Methods:** It is an observational study conducted at a multispeciality teaching Hospital (Kavery Medical Centre and hospital). The study population (cohort) was selected from the hospital in patients who are admitted in paediatric intensive care unit as well as paediatric ward. **Result:** Maximum number of children admitted with dengue hemorrhagic fever/dengue shock syndrome were in age group of 8 to 12 years and overall male female ratio is the same. Among the study population (47 children) as per World Health Organization classification of Dengue, five children (10.6%) had dengue fever, 21 children (44.6%) had Dengue Haemorrhagic fever and 21 (44.6%) had Dengue shock syndrome. Male children constituted 51 % and female children 49%. **Conclusion:** Of symptoms retro-orbital pain, rashes, hematemesis, malena and reduced urine output were statistically significant with $p < 0.05$ in diagnosing DHF/DSS. Of the signs, narrow pulse pressure, hypotension, altered sensorium and rapid weak pulses had very strong evidence against null hypothesis in correlation with DSS. Tourniquet test was statistically significant in correlation with DHF ($p < 0.05$) and was not significantly associated with DSS.

INTRODUCTION

Dengue is a mosquito borne febrile viral illness and has a worldwide distribution. Since its first recognition during the last quarter of eighteenth century, outbreaks has been reported from both developed and developing countries with Asia always remaining the area of highest endemicity.^[1,2] In humans, dengue infection causes a spectrum of illness ranging from relatively mild, nonspecific viral syndrome known as dengue fever (DF) to severe hemorrhagic disease and death. The severe hemorrhagic form of disease is called dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), a leading cause of hospitalization and death among children in Asia.^[3] Dengue virus belongs to the family Flaviviridae (single stranded nonsegmental RNA viruses) and has four distinct serotypes: DEN-1, DEN-2, DEN-3 and DEN-4. Dengue is transmitted to humans by the *Aedes aegypti* or more rarely the *Aedes albopictus* mosquito, which feed during the day. Dengue virus serotypes are distinguishable by complement fixation and neutralization tests. Infection with one serotype confers long term

immunity to that serotype and therefore, a person can be infected up to four times. In fact, subsequent infection with other serotypes results in a severe illness. Humans are the main reservoir for the dengue virus. Urbanization, substandard living conditions, lack of vector control and climatic changes are some of the important causes for dengue infection.^[4]

Thus we need some novel clinical criteria and biochemical markers for early diagnosis of Dengue infection and early institution of treatment which will help to reduce morbidity and mortality. With this background, we have done an observational study to find the association between clinical profiles, biochemical markers and severe form of dengue infection and its outcome.

MATERIALS AND METHODS

It is an observational study conducted at a multispeciality teaching Hospital (Kavery Medical Centre and hospital). The study population (cohort) was selected from the hospital inpatients who are admitted in Paediatric intensive care unit as well as Paediatric ward. The study was conducted over a

period of one and a half years from January 2009 to June 2010. Ethical clearance was taken from institutional Ethical committee.

Inclusion Criteria

Positive Dengue Titre – primary or secondary.

Age: up to 12 years

Methods: We examined children admitted from January 2009 to June 2010 fulfilling the Inclusion Criteria Detailed history and clinical examination was done. Hematological investigations – hematocrit, platelet counts, sodium levels, hepatic enzymes (SGOT & SGPT), Elisa for Dengue IgG & IgM and Radiological features were analysed with the help of X-ray chest and Ultrasound abdomen.

Haematocrit and Platelet count (CBC) were analysed with Excel 2280 Drew Scientific Analyser. Sodium levels were analysed with Sensa Core ST – 100Na/K/Cl Electrolyte Analyser.

SGOT & SGPT were analysed with BS – 400 Chemistry Analyser.

Arterial Blood Gas Analysis was done with ABL 520 Radiometer, Copenhagen.

Dengue IgG and IgM

Analysis of Dengue IgG and IgM was done using ImmunoComb II Dengue IgM & IgG BiSpot Kit.

X-Ray Chest

Chest x-ray was taken in supine in infants and in children more than one-year chest X-Ray was taken in erect position using the machine – Fuji CR Computerized Radiography.

Ultrasonogram Abdomen

Ultrasonogram abdomen was taken for all patients. Ultrasonography was performed with an ultrasound machine (EsaoteMegaz GPX multi frequency Probe 3 – 10 MHz) and features like hepatomegaly,

splenomegaly, gallbladder wall thickening, ascites, pleural effusion was looked for.

Treatment: Treatment was given to all patients as per WHO management protocols and the outcome was analysed – Discharged alive/ sequeale / death.

Statistical Analysis: The data are reported as the mean +/- SD or the median, depending on their distribution. The differences in quantitative variables between groups were assessed by means of the unpaired t test. The chi-square test was used to assess differences in categoric variables between groups. A p value of < 0.05 using a two-tailed test was taken as being of significance for all statistical tests. All data were analysed with a statistical software package. (SPSS, version 13.0 for windows).

RESULT

Among the study population as per World Health Organization classification of Dengue 10.6% were dengue fever, 44.6% were Dengue Haemorrhagic fever and 44.6% were Dengue shock syndrome, of which male children constituted 51 % and female children 49%. Male female ratio was 1.5:1 in Dengue fever, 1.3: 1 in Dengue Haemorrhagic fever and 1: 1.3 in Dengue shock syndrome. Maximum cases were in age group of 4 to 7 years and in 8 to 12 years’ age group. In older children between 8 - 12 years of age, female preponderance with male: female ratio of 1: 1.5 was seen. In children < 8years, male preponderance with male: female ratio of 1.7: 1 was found. Overall there was no difference in male: female ratio (1.04:1) [Table 1].

Table 1: Age and Sex Distribution

Age (years)	Male	Female	Total
<1	2	1	3
1 to 3	2	3	5
4y to 7	11	5	16
8to 12	9	14	23
Total	24	23	47
Mean +/-	7.0172	7.5172	7.2672
SD	3.51329	3.50529	3.51500

Maximum numbers of DHF & DSS were in 8 – 12 years’ age group. In this study twenty-three children (49%) were between the age group of 8-12 years, 16 (34%) were between 4 to 7 years, infants constituted 3 (6.4%) and 5 (10.6%) were between 1 – 3 years. Below 4 years of age, none had dengue fever alone in this study population and 50% had Dengue Haemorrhagic fever and other 50% had Dengue shock syndrome [Table 2].

Table 2: Age wise Distribution of study subjects

Age (years)	DF	DHF	DSS	Total
<1	0	1	2	3
1 to 3	0	3	2	5
4y to 7	2	6	8	16
8to 12	3	11	9	23
Total	5	21	21	47

The commonest hemorrhagic manifestation in the present study was mucosal bleed (55.3%), malena (57.4%), and hematemesis (23.4%). The common clinical manifestations were fever and vomiting (100%), reduced urine output (97.8%), myalgia and malaise (89%), headache (81%), abdominal pain (78.7%), rashes (48.9) and retro orbital pain (38%). Among symptoms, retro-orbital pain (p<0.0001), rashes (p=0.005), hematemesis (p=0.01),

mucosal bleed (p=0.0002), malena (p=0.0002) and reduced urine output (p<0.0001) were statistically significant with p <0.05 in diagnosing DHF/DSS[Table 3].

Table 3: The patients' symptoms studied for DF, DHF and DSS

Symptoms	DF	DHF	DSS	Total
Fever	5	21	21	47
Headache	5	17	17	39
Myalgia	5	20	17	42
Rash	0	4	19	23
Retro- orbital pain	0	6	14	20
Abdominal Pain	3	17	17	37
Mucosal Bleed	0	8	18	26
Haemetemesis	0	2	9	11
Malena	0	8	18	26
Vomiting	5	21	21	47
Reduced Urine Output	1	21	21	43

Thirty-five (74.3%) children presented between 4th and 7th day of fever. Twenty children (43%) presented on 5th day of fever, nine children (19.1%) before 3 days and three children presented (6.4%) after 7 days of fever. [Table 4].

Table 4: Duration of Fever on admission Vs Dengue

No: of days of fever on admission	DF	DHF	DSS	Total
1 - 3 days	1	3	5	9
4 - 7 days	4	15	16	35
8 - 10 days	0	3	0	3
Total	5	21	21	47

Of the signs peri-orbital puffiness, pedal edema, and hepatomegaly were found in all cases. Splenomegaly in 15%, purpuric spots in 49%, tourniquet test in 36% and abdominal distension in 61.7% were the other significant findings. Of the signs tourniquet test was statistically significant in correlation with DHF (p<0.05) and in DSS there was no statistical significance. In 2- tailed significant test significant correlation existed between purpuric spots and DHF with p<0.0001. Of the signs narrow pulse pressure, hypotension, altered sensorium and rapid weak pulses were present only in DSS and not in DHF or DF and hence statistical significance could not be assessed and there is very strong evidence against null hypothesis[Table 5].

Table 5: Signs among study subjects

Signs	DF	DHF	DSS	Total
Peri orbital puffiness	5	21	21	47
Purpuric spots	0	4	19	23
Tourniquet Test	0	14	3	17
Hepatomegaly	5	21	21	47
Splenomegaly	0	3	4	7
Rapid weak pulses	0	0	21	21
Narrow Pulse Pressure	0	0	20	20
Hypotension	0	0	21	21
Altered sensorium.	0	0	19	19
Abdominal Distension	0	8	21	29

DISCUSSION

In the present study 47 children between the age group of 0 – 12 years with dengue fever (DF), Dengue Haemorrhagic fever (DHF) and Dengue shock syndrome (DSS) admitted in pediatric ward and PICU of Kavery Medical Centre and Hospital were evaluated for clinical, biochemical profile. Among the study population as per World Health Organization classification of Dengue 10.6% had dengue fever, 44.6% had Dengue Haemorrhagic fever and 44.6% had Dengue shock syndrome. Male children constituted 51 % and female children 49%. Male female ratio is 1.5:1 in DF, 1.3: 1 in Dengue Haemorrhagic fever and 1: 1.3

in Dengue shock syndrome. Of the 24 male children three had DF, twelve had DHF and nine had DSS. Of the 23 female children two had DF, nine had DHF, and twelve had DSS. The youngest was 7 days old neonate. Three (6.4%) children were infants, of whom one presented with Dengue Haemorrhagic fever and two with Dengue shock syndrome. In this study there was a higher percentage (87.1%) of DHF&DSS as most of children were referred patients. In older children between 8 - 12 years of age group there were 23 children of whom 9 were males and 14 were female children and male female ratio of 1: 1.5 with a female preponderance. In < 8years age group there were 24 children of whom 15 were males and 9

were female children and male female ratio of 1.7: 1 with a male preponderance. In the age group of 4 – 7 years sixteen children were admitted of whom 11 were males and five were female children. In the age group of 1 – 3 years of the five children who got admitted two were males and three were female children and in infancy of the three, two were males and one was a female child. Overall there was no difference in male female ratio (1.04:1). Other studies showed male predilection with male female ratio of 1.6:1 in Chandrakanta et al study⁵ and 1.2:1 in Prasonk Witayathawornwong et al study.⁶ Severe forms of Dengue (DSS) were more noticed in females which was similar to Vinod H. Ratageri et al study.⁷ In this study twenty-three children (49%) were between the age group of 8-12 years, 16 (34%) were between 4 to 7 years, infants constituted three (6.4%) and five (10.6%) were between 1 – 3 years. Below 4 years of age none had dengue fever alone and 50% were Dengue Haemorrhagic fever and other 50% had Dengue shock syndrome. In the age group of 4 – 12 years five (12.8%) out of 39 children had DF, 34 (87.1%) out of 39 children constituted DHF/DSS. Twenty-four (51%) children were less than 7 years of age, of which three presented during infancy. Two presented with dengue fever, 10 with Dengue Haemorrhagic fever, and 12 with Dengue shock syndrome. The mean (\pm SE) age of admission was 7.01 ± 0.51 years in this study as compared to Shah GS et al & Chandrakanta et al study 5,8 which had a mean age of 8.3 years & 5.9 ± 3.1 years. The median & mode were 7 & 12 years respectively. The minimal and maximal age at presentation was 7 days & 12 years respectively. The common clinical manifestations were fever and vomiting (100%), reduced urine output (97.8%), myalgia and malaise (89%), headache (81%), abdominal pain (78.7%), rashes (48.9) and retro orbital pain (38%). The commonest hemorrhagic manifestation in the present study is mucosal bleed (55.3%), malena (57.4%), and hematemesis (23.4%). Of symptoms retro-orbital pain, rashes, hematemesis, malena, mucosal bleed and reduced urine output were statistically significant with $p < 0.05$ in diagnosing DHF/DSS. Thirty five (74.3%) children presented between 4th and 7th day of fever (Table: 7). This was similar to Anju Aggarwal et al study and Shah GS et al study 8,9 where 85% and 77% of children presented with 3 – 7 days of fever respectively. Twenty children (43%) presented on 5th day of fever, nine children (19.1%) before 3 days and three children presented (6.4%) after 7 days of fever. Of the signs peri-orbital puffiness, pedal edema, and hepatomegaly was present in all cases, splenomegaly in 15%, purpuric spots in 49%, tourniquet test in 36%, and abdominal distension in 61.7% cases. Of the signs narrow pulse pressure, hypotension, altered sensorium and rapid weak pulses were present only in DSS and not in DHF or DF and hence statistical significance could not be

assessed and there is very strong evidence against null hypothesis. Narrow pulse pressure could not be recorded in neonate. Altered sensorium was present in 19 (40%) children and all were DSS i.e. 90.5% of children of DSS. No one had seizures in this study. Clinical profile was almost similar to other studies of Anju Aggarwal, et al, L. Kabilan et al, Shah GS et al, Chandrakanta et al, Vinod H. Ratageri et al.^[5,7,8,9,10] but convulsions were reported in 8% of children in Anju Aggarwal et al study.^[9] 45% of children in Chandrakanta et al study.^[5] and 24% in L. Kabilan et al study.^[10] which was not present in this study.

CONCLUSION

Maximum number of children admitted with dengue hemorrhagic fever/ dengue shock syndrome were in age group of 8 to 12 years and overall male female ratio is the same. Of symptoms retro-orbital pain, rashes, hematemesis, malena and reduced urine output were statistically significant with $p < 0.05$ in diagnosing DHF/DSS. Most children presented between 4th and 7th day of fever with 43% presenting on 5th day of fever. Of the signs, narrow pulse pressure, hypotension, altered sensorium and rapid weak pulses had very strong evidence against null hypothesis in correlation with DSS. Tourniquet test was statistically significant in correlation with DHF ($p < 0.05$) and was not significantly associated with DSS.

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