RAJAN SRINIVASAN, *VENKATA RAGHAVA MOHAN, SRINIVASAN VENUGOPAL AND GAGANDEEP KANG
*Division of Gastrointestinal Sciences and *
Community Health,
Christian Medical College, Vellore, India
*venkat@cmcvellore.ac.in

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Factors Affecting Outcome in Children with Dengue in Kolkata

This observational, descriptive study was conducted on 260 dengue patients diagnosed as per the revised 2009 WHO guidelines in a tertiary-care hospital of eastern India between June and November 2015. Children were evaluated for clinical symptoms, signs, and laboratory parameters. Clinical variables viz., rash, nausea/vomiting, bleeding, oliguria, capillary leak and liver enlargement; and laboratory variables viz., rising haemoglobin, haematocrit, thrombocytopenia, blood urea, serum Creatinine, ALT, hypo albuminemia and cholesterol were found to be significantly associated with outcome.

Keywords: *Clinical features, Complications, Dengue virus.*

Children with dengue often present late with serious complications. Most of the previous studies in children have been done using the older WHO classification of dengue [1,2]. We analyzed the clinic-epidemiological profile and the determinant factors affecting outcome in children admitted to Institute of Child Health, Kolkata between 1st June and 30th November, 2015.

This observational study on 260 children, aged 2 months to 15 years, admitted to hospital, was based on the revised WHO 2009 case definition [3]. All children were confirmed to be having dengue by ELISA. Ethical approval was obtained from the Institute Ethics Committee and informed written consent was obtained from the parent or guardian. Patients were divided in three groups [3] - Dengue without warning signs (DF), Dengue with warning signs (DWS) and Severe Dengue (SD). Children were evaluated for clinical symptoms (Headache, nausea/vomiting, cough, abdominal pain, bleeding, rash), signs (Oliguria, hepatomegaly >2cm, capillary leak), pathological (Haemoglobin (Hb), haematocrit, total leucocyte count (TLC), platelet count), biochemical (Urea, creatinine, C-reactive protein, albumin, cholesterol, alanine aminotransferase (ALT)) and radiological (pleural effusion/ascites from chest *X*-ray/Ultrasonography) parameters. We also documented demography, body mass index (BMI) and outcome.

Discrete variables were analyzed by Chi-Square test, and continuous variables by ANOVA. Statistical analysis was performed on SPSS 20.0. *P* value less than 0.05 was considered significant.

Final analysis was performed on 257 children as 3 of them left against medical advice; 2 deaths were recorded during this period. 47% were diagnosed with DF and 42% with DWS. The mean age at presentation was 69 months. Children between 2-8 years were the most commonly affected. Of these, 23% were positive by NS1 ELISA, 14% were positive by IgM ELISA, 38% were positive both for NS1Ag and IgM, 21% were positive both with IgM and IgG and 4% were positive with all NS1Ag, IgM and IgG

TABLE I CLINICAL AND LABORATORY PARAMETERS IN CHILDREN WITH DENGUE (*N*=257)

Parameters	DF (*n*=121)	DWS (*n*=108)	SD (*n*=28)	Total No. (%)
*Rash	91 (75)	64 (59)	12 (43)	167 (65)
Nausea/vomiting	43 (35)	64 (59)	22 (79)	129 (50)
Bleeding episodes	2 (2)	10 (9)	8 (29)	20 (8)
Oliguria	16 (13)	39 (36)	16 (57)	71 (28)
Capillary leak	0	40 (37)	20 (71)	60 (23)
Ascitis	0	27 (25)	14 (50)	41 (16)
Pleural effusion	0	14 (13)	17 (61)	31 (12)
Liver enlargement >2 cm	0	40 (37)	11 (39)	51 (20)
$PCV	36.16 (3.12)	37.54 (4.44)	40.58 (6.4)	37.21 (4.35)
$Platelet count	166137 (86306)	133262 (75800)	78724 (56305)	142857 (83604)
$Cholesterol	107 (26)	100 (30)	83 (28)	102 (29)
$Urea	19.9 (6.9)	20.06 (8.4)	30.62 (10.3)	21.16 (10.23)
$Creatinine	0.35 (0.11)	0.36 (0.12)	0.52 (0.23)	0.37 (0.24)
$ALT	42 (37)	71 (43)	548 (112)	122 (596)
$Albumin	4.14 (0.57)	3.79 (0.71)	3.12 (0.68)	3.88 (0.73)

*Values in No. (%) or $mean (SD); All P ≤0.001 except *P=0.002; ALT – alanine aminotransferase; DF – dangue fever; DWS – dengue with warning signs; SD – severe dengue.*

Rash was present in 65% children with 75% in DF and only 43% in SD. Only 8% had bleeding manifestation with petechiae being most common. 28% had oliguria and 23% had capillary leak (edema, ascites and pleural effusion) (**Table I**). Rash, nausea/vomiting, bleeding, oliguria, capillary leak and liver enlargement (>2 cm) were considered as statistically significant clinical parameters associated with outcome, with *P*<0.05 similar to other studies [6-8] . Chi-square test for trend analysis shows an inverse relationship of rash with dengue severity (*P*=0.001), unlike previous studies.

Rising hemoglobin and hematocrit, thrombo-cytopenia, high urea, creatinine and ALT, hypo-albuminemia and low cholesterol were found to be statistically significant parameters associated with outcome (*P*<0.05) (**Table I**). Rising hematocrit and thrombocytopenia were a predictor of outcome in dengue similar to other studies [4,6,9]. However, thrombo-cytopenia did not predict the occurrence of bleeding in children with dengue as shown in previous studies [10]. Rising hematocrit is associated with albumin and cholesterol accompanying plasma outside the vascular compartment, as previously reported [7,8].

There were a few limitations of this study. The data was analyzed for patients admitted only over a single season between June and November. Isolation of the virus serotypes was also not attempted.

**ISHITA MAJUMDAR, *DEVDEEP MUKHERJEE,
RITABRATA KUNDU, PRABAL NIYOGI AND JOYDEEP DAS**
*Department of Pediatric Medicine,
Institute of Child Health,
11 Dr Biresh Guha Street, Kolkata 700017, West Bengal, India.
devdeep_dm@rediffmail.com

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