A Retrospective Study of Pediatric Dengue Cases in a Tertiary Care Hospital

Kuldeep Singh Ahlawat[1], Amit Kumar Mital[2*], Neeraj Sharma[3], Ved Pal Mahla[4]

[1]Assistant Professor, Department of Pediatrics, World College of Medical Sciences & Research, Jhajjar, Haryana, India.

[2]Assistant Professor, Department of Pediatrics, World College of Medical Sciences & Research, Jhajjar, Haryana, India. Email : mittal1.amit@gmail.com
*Corresponding author

[3]Assistant Professor, World College of Medical Sciences & Research, Jhajjar, Haryana, India.
[4]Professor, Department of Psychiatry,SGT College of Medical College, Budhera, Gurugram, Haryana, India.

Abstract

Background: Dengue fever causes a high burden of disease and mortality across tropical and subtropical regions in Southeast Asia, Africa, the Western Pacific, and the Americas. The present study was conducted to determine dengue fever in children reported to tertiary care centre. **Methods:** 70 reported cases of dengue fever in children of both genders were diagnosed based detection of DENV NS1 antigen ELISA, anti-JEV- and anti DENV-specific IgM antibodies in serum samples and in cerebrospinal fluid (CSF). Clinical and laboratory features were recorded. **Results:** ICU admission was seen in 45, average ICU days was 4.2 days, number of days of fever was 4.5, fever was present in 70, rashes in 45, headache in 36, vomiting in 24, respiratory distress in 30, pain abdomen in 54 and loose stools in 32. The difference was significant (P< 0.05). The mean hematocrit (%) was 34.2, platelets (per 103 /μl) was 2.64, white blood cells (per103 /μl) was 9.12, neutrophils was 5.02, lymphocytes was 2.13, urea (mmol/L) was 4.12, creatinine (μmol/l) was 68.4, alanine transaminase (IU/l) was 76.5, urine protein (mg/dL) was 12.5 and urine red blood cells was 2.1. **Conclusion:** Dengue fever in common in children, Assessment of laboratory tests may be helpful in early detection and prompt management of cases.

INTRODUCTION

Dengue fever causes a high burden of disease and mortality across tropical and subtropical regions in Southeast Asia, Africa, the Western Pacific, and the Americas.[1] Dengue virus comprises five serotypes, DENV-1, DENV-2, DENV-3, DENV-4 and DENV-5, which are transmitted by Aedesaegypti mosquitoes. An estimated 2.5 billion people worldwide are at risk of dengue.[2] More than 50 million dengue infections are estimated to occur annually, of which approximately 500,000 result in hospital admissions for severe dengue in the form of dengue haemorrhagic fever (DHF) or dengue shock syndrome (DSS), principally among children.[3]

The first dengue fever in India was reported during 1956 from Vellore and the first dengue haemorrhagic fever occurred in Calcutta in 1963. In India the annual incidence is estimated to be 7.5 to 32.5 million.3 In Odisha, a state of Eastern India, the first outbreak was reported in 2010, followed by extensive outbreaks in 2011, affecting a large number of people.[4]

Among symptomatic dengue cases a wide variety of clinical manifestations are seen, ranging from mild febrile illness to severe and potentially fatal disease.[5]

Only a small proportion of patients progress to more severe disease, typically manifesting with a transient systemic vascular leak syndrome around the time of defervescence; plasma leakage occurs, usually accompanied by altered haemostasis and thrombocytopenia. Leakage may be profound, particularly in children, sometimes resulting in life-threatening dengue shock syndrome (DSS).[6] Other severe complications, such as severe liver, cardiac or neurological involvement, may also occur but are less frequent. With expert supportive care mortality rates have been reduced to very low levels, in many centres of excellence down to less than 1 % for those with severe disease.[7] The present study was conducted to determine dengue fever in children reported to tertiary care centre.

MATERIALS AND METHODS

The present study comprised of 70 reported cases of dengue fever in children of both genders. All were enrolled after obtaining written consent from their parent. Inclusion criteria were age < 16 years, documented axillary temperature ≥ 38.0 °C within 48 h of admission.

Data such as name, age, gender etc. was recorded. A thorough clinical examination was performed. Dengue diagnosis was based detection of DENV NS1 antigen ELISA, anti-JEV- and anti DENV-specific IgM antibodies in serum samples and in cerebrospinal fluid (CSF) specimens. Laboratory test comprised of haematocrit, platelet counts, white blood cell (WBC) counts, urea, creatinine, and alanine aminotransferase (ALT) results, and the presence of urinary protein or red blood cells (RBC). Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table 1: Distribution of patients

Total- 70		
Gender	Boys	Girls
Number	40	30

[Table 1] shows that out of 70 patients, boys were 40 and girls were 30.

Table 2: Assessment of parameters

Parameters	Number	P value
ICU admission	45	-
Average ICU days	4.2	-

No of days of fever	4.5	-
Fever	70	0.041
Rash	45	
Headache	36	
Vomiting	24	
Respiratory distress	30	
Pain abdomen	54	
Loose stools	32	

[Table 2, Figure 1] shows that ICU admission was seen in 45, average ICU days was 4.2 days, number of days of fever was 4.5, fever was present in 70, rashes in 45, headache in 36, vomiting in 24, respiratory distress in 30, pain abdomen in 54 and loose stools in 32. The difference was significant (P< 0.05).
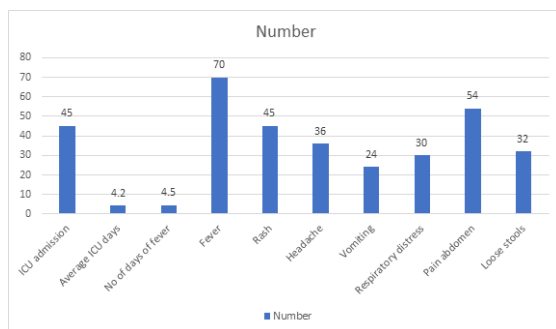

Figure 1: Assessment of parameters

Table 3: Assessment of laboratory parameters

Parameters	Mean
Hematocrit (%)	34.2
Platelets (per 103 /µl)	2.64
White blood cells (per103 /µl)	9.12
Neutrophils	5.02
Lymphocytes	2.13
Urea (mmol/L)	4.12
Creatinine (µmol/l)	68.4
Alanine transaminase, IU/l	76.5
Urine protein mg/dL	12.5
Urine red blood cells	2.1

[Table 3] shows that mean hematocrit (%) was 34.2, platelets (per 103 /µl) was 2.64, white blood cells (per103 /µl) was 9.12, neutrophils was 5.02, lymphocytes was 2.13, urea (mmol/L) was 4.12, creatinine (µmol/l) was 68.4, alanine transaminase (IU/l) was 76.5, urine protein (mg/dL) was 12.5 and urine red blood cells was 2.1.

DISCUSSION

Dengue is an arboviral disease caused by infection with any one of four related dengue virus (DENV) serotypes.8 It is currently the most important mosquito-borne viral pathogen affecting humans, and is emerging as a major threat to global health. Best estimates indicate that some 3 billion people live in parts of the world where they are at risk of infection and that around 96 million symptomatic episodes and approximately 20,000 deaths occur each year.[9] As yet, neither vaccines nor specific therapies are available although both areas are currently the focus of intense research efforts.[10] According to the WHO the case fatality rate for dengue is roughly 5%. Aedesalbopictus was found to be the most abundant vector in the areas surveyed, followed by Aedesaegypti. DENV-2 is the prevailing serotype.[11] The case fatality rate in patients with severe dengue infection which consists of dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) can be as high as 44%.[12] The present study was conducted to determine dengue fever in children reported to tertiary care centre.

In present study, out of 70 patients, boys were 40 and girls were 30. Phakhounthong et al,[13] in their study there were 3225 patient admissions during the study year, of which 1361 (42.2%) met the inclusion criteria. Of these, 136 (10.0%) were not enrolled, leaving 1225 febrile episodes in 1180 children, with 1144 children having a single episode, 31 children having two episodes, one child having three episodes, and four children having four episodes. The patients were mainly diagnosed as having lower respiratory tract infection (38.3%), undifferentiated fever (25.5%), or diarrhoeal disease (19.5%). Out of 1180 enrolled children, there were 69 deaths, the causes of which were: clinical pneumonia with no organism/virus identified (12 cases, 27.5%), dengue virus infection (eleven cases, including one with coexistent melioidosis, two with co-existent scrub typhus, and four with co-existent clinical pneumonia, 15.9%), and melioidosis (four cases, 5.8%). 941 non-dengue episodes and 86 episodes with no samples available were excluded from this analysis. Further details can be found in the original report. Out of 198 confirmed dengue episodes, 43 episodes required ICU admission, with 29 of those classified as severe dengue based on their clinical signs, supported by two independent clinical opinions. Nine additional severe dengue episodes were included from non-ICU admissions, making a total of 38 episodes of severe dengue.

We observed that ICU admission was seen in 45, average ICU days was 4.2 days, number of days of fever was 4.5,

fever was present in 70, rashes in 45, headache in 36, vomiting in 24, respiratory distress in 30, pain abdomen in 54 and loose stools in 32. Kumar et al,[14] in their study there were 52% of the cases of dengue fever, 16.6% of cases were dengue fever with warning signs and remaining 31.4% of patients were severe dengue. Common Clinical symptoms at admission were fever (100%), vomiting (77%), respiratory distress (56.25%), generalised weakness (54.1%) and pain abdomen (33.3%). Less common symptoms were loose stools (6.25%), periorbital puffiness (6.25%), altered sensorium (4.1%), oliguria (2%) and bleeding manifestations (2%). Out of these dengue children 70.8% of these children improved without complication, 20.8 % of children improved with complication, in the form of ARDS, acute liver failure, DSS, meningitis, 6.25 % of these children went DAMA and 2 % of children expired.

Tamibmaniam et al,[15] used simple logistic regression and identified three parameters, including vomiting, pleural effusion, and low systolic blood pressure, to predict severe dengue based on the 2009 WHO criteria. This study did not specifically focus on children and included only female patients. The sensitivity and specificity achieved in its decision algorithm were 81% and 54%, respectively.

CONCLUSION

Authors found that dengue fever in common in children, Assessment of

laboratory tests may be helpful in early detection and prompt management of cases.

REFERENCES

1. Mallhi, Hussain T. Clinico-laboratory spectrum of dengue viral infection and risk factors associated with dengue hemorrhagic fever: a retrospective study. BMC Infectious Diseases. 2015;15:399.

2. Mandal SK, Ganguly J, Sil K, Chatterjee S, Chatterjee K, Pankaj S et al. Clinical profiles of Dengue fever patients in a teaching hospital of Eastern India. National Journal Med Res. 2013;3(2):173-6.

3. Balasubramanian S, Anandnathan K, Shivabalan S, Dutta M, Amalraj E. Cut-off haematocrit value for haemoconcentration in dengue haemorrhagic fever. J Trop Pediatr. 2004;50:123-4.

4. Goyal V, Gili GS, Singh J, Singh P, Singh Y, Singh S, et al. Clinical spectrums of dengue fever in a tertiary care centre with particular references to atypical presentation in the 2011 outbreak at bathinda, Punjab, India. 2013;5(4);363-7.

5. Gulati S, Maheshwari A. Atypical manifestations of dengue. Tropical Med Int Health. 2007;12(9):1087- 95.

6. Nimmagadda S S, Mahabala C, Booloor A, Raghuram P M, Nayak A. Atypical manifestation of dengue fever where do we stand today. Journal Clinical Diagnostic Res.2014;8(1);71-3.

7. Patil G, Joshi VA, Hungund BR. Clinical spectrum and epidemiology of patients with dengue fever attending a tertiary care hospital in north Karnataka: a cross sectional study. Indian J Applied Res. 2015;5(3):298-302.

8. Jakribettu RP, Booloor R, Thaliath A, George SY, George T, Pandokarai M, et al. Correlation of clinicohaematological parameters in pediatric dengue. Journal Tropical Medicine. 2015:1-7.

9. Kamath RS, Suchitra R. Clinical features, complications and atypical manifestations of children with severe forms of dengue hemorrhagic fever in India. Indian J Paediatrics. 2006;73:889-94.

10. Oli AN, Obialor WO, Ifeanyichukwu MO, Odimegwu DC, Okoyeh JN, Emechebe GO, Adejumo SA, Ibeanu GC. Immunoinformatics and Vaccine Development: An Overview. Immunotargets Ther. 2020;9:13-30.

11. Mishra S, Ramanathan R, Agarwalla SK. Clinical profile of dengue fever in children: a study from Southern Odisha, India. Scientifica. 2016 Apr 24;2016.

12. Pothapregada S, Kamalakannan B, Thulasingham M, Sampath S. Clinically profiling pediatric patients with dengue. Journal of global infectious diseases. 2016 Jul;8(3):115.

13. Phakhounthong K, Chaovalit P, Jittamala P, Blacksell SD, Carter MJ, Turner P, Chheng K, Sona S, Kumar V, Day NP, White LJ. Predicting the severity of dengue fever in children on admission based on clinical features and laboratory indicators: application of classification tree analysis. BMC pediatrics. 2018 Dec;18(1):1-9.

14. Kumar AMK, Patil TR, Veerabadhraiah S. Retrospective study of clinical profile and outcome of pediatric dengue cases in a teaching hospital. Int J ContempPediatr 2017;4:226- 30.

15. Tamibmaniam J, Hussin N, Cheah WK, Ng KS, Muninathan P. Proposal of a clinical decision tree algorithm using factors associated with severe dengue infection. PLoS One. 2016;11(8):e0161696.