Clinical profile and outcome of dengue in paediatric age group

Ravindra Kumar[1], Anil Kumar Jaiswal[2]

[1]Junior Resident, [2]Professor & HOD, Dept. of Pediatrics, Patna Medical College

*Corresponding Author:
Email: raviaaryan@gmail.com

Abstract

Objective: In recent years the incidence of dengue fever (DF)/dengue haemorrhagic fever (DHF) cases reported in India has increased. This study was undertaken to describe clinical manifestations, trend and outcome of children who were admitted with dengue shock syndrome (DSS)/DF/DHF from May 2014 to Dec 2015 in the department of paediatrics, PMCH, Patna.

Methods: Hundred children with dengue fever hospitalized in the paediatric Department of Patna Medical College and Hospital Patna were taken for the study.
The patients were diagnosed, managed and scrutinised according to a usual protocol.

Findings: The Children amid 5-15 years were most commonly afflicted (50%). The least affected sub-group were infants (5%). 91 percent were diagnosed as classical dengue fever. Children with DHF were around 8% and in DSS 1% cases presented. The most common symptoms seen were fever (86%), vomiting (35%), poor intake (24%), abdominal pain (18%) and substantial bleeding (14%). In 30% of cases Hepatomegaly was present. 25% of cases had petechiae alone. 10% had confirmation of substantial bleeding manifestation. The commonest observed bleeding was gastrointestinal bleeding. The morbidities observed were liver dysfunctions (35%), renal dysfunction (6%), coagulopathy (5%) and severe respiratory distress syndrome (15%) and disseminated intravascular coagulation (2%). In the study, mortality was 3%.

Conclusion: Better transport facilities and improved case management and awareness is needed to further decrease mortality of DHF/DSS cases.

Keywords: Dengue haemorrhagic fever; Dengue shock syndrome; Mortality.

Introduction

The Dengue fever is the most significant mosquito borne viral disease and is widespread in more than hundreds of countries.[1] About half of the world's population is supposed to live in regions at risk for transmission, and recent evaluations show that around 400 million contagions arise yearly, out of which hundreds of million are clinically detectable.[2] In ASEAN group of countries dengue is the a major cause of paediatric morbidity and impermanence.[3] Over a long time in India Dengue fever has been testified, but Dengue hemorrhagic fever was first reported in 1963 from Calcutta city.[3] Currently no vaccine is present, and neither antiviral drugs nor immune modulatory agents have been shown to be operative in reducing morbidity or improving disease consequence.[4]

The mortality due to dengue is mainly due to DSS, however it can be reduced to less than 1% with proper and judicious replacement of fluid losses to the extravascular compartment.[5,6]

The diagnosis of dengue can be done clinically by signs and symptoms.[7] Clinical features may vary in children and adults. Some features, were more frequent in adults like petechiae, melena, headache, retro-orbital pain, joint pain, myalgia, nausea and vomiting.[8]

In 2009, the World Health Organization (WHO) revised the classification system for dengue, defining two major entities dengue and severe dengue to replace the more complicated dengue fever/dengue haemorrhagic fever (DF/DHF) system.[9,10]

Material and Methods

The criteria for diagnosing dengue are fever, arthralgia, headache plus thrombocytopenia.
The criteria used for diagnosing Dengue Hemorrhagic Fever are:
1. history of fever of less than 10 days duration
2. purpuric spots or mucosal bleeding,
3. hepatomegaly,
4. hypotension (any two), plus
5. thrombocytopenia or
6. elevated hematocrit (any one).

For the diagnosis of dengue shock syndrome (DSS), in addition to the formerly cited criteria, the existence of hypotension or narrow pulse pressure was essential. Thrombocytopenia was categorized as
1. Mild – platelet counts less than 100,000/cumm (part of case definition of DHF) and
2. Moderate - platelet count less than 50,000/cumm and
3. Severe- platelet count less than 20,000/ cumm

An authorization from the institution's ethical committee was taken ill patients underwent a thorough clinical assessment and relevant investigation.

Disease severity was assessed according to the WHO grading system:
– Grade I: Positive tourniquet test
– Grade II: Spontaneous bleeding
– Grade III: Circulatory failure
– Grade IV: Undetectable blood pressure and pulse

Grades III and IV DHF also stated to as DSS. All children were treated with fluids and
Blood products according to standard WHO guideline. Severe cases of DHF were admitted in PICU.
Complete blood count was done in all case Haemoglobin, haematocrit, platelet count and total leucocyte count)
Hemoconcentration was spotted by serial hematocrit measurement.
LFT, X – Ray chest (PA View) and USG (whole abdomen) was done in selected patients. RFT, ABG, blood culture etc. were done according to clinical Condition. Serological diagnosis was supported out with Panbio IgM Capture ELISA with antibody titres (>1.1) inferred as positive results.

Results

During the observation period hundred cases of dengue fever were admitted. Out Of these, 53 were males. Children between 5-15 years were utmost commonly plagued (50%). The least affected sub-group were infants (5%). The earliest child affected was 10 months old. The common symptoms seen were fever (86%), vomiting (35%), poor intake (24%), abdominal pain (18%) and bleeding (10%). 91 percent were diagnosed as classical dengue fever, 8 percent of all children were of DHF and 1% presented in DSS. Majority of patients had platelet counts less than 100,000/cumm (part of case definition of DHF). 40% of cases had platelet count more than 50,000/cumm, while 60% of cases had platelet count less than 50,000/cumm. The difficulties seen were liver dysfunction (35%), coagulopathy (5%), renal dysfunction (6%), and acute respiratory distress syndrome (15%) and disseminated intravascular coagulation (2%). Mortality in the study was 3%.

Discussion

In a study by Faridi et al, 76% of all cases of DHF/DSS were aged 6 years or more.[11] In a study by Ratageri et al, dengue fever was present in 18%, DHF in 60% and DSS in 22% of cases.[8] Ratageri et al reported fever (100%), vomiting (82%), abdominal pain (61%), restlessness (65%), headache (22%), and hepatomegaly (87%).[8]

In a study by Ratageri et al, commonest bleeding manifestations were GI bleeding (22%) and petechiae (18%).[8] Gastrointestinal tract was reported as the commonest site of bleeding (61%) in a study by Ahmed et al.[12] In our study, gastrointestinal bleeding in the form of melena and hematemesis was seen in 10% of cases. The main pathogenic feature of dengue is an increase in vascular permeability leading to loss of plasma from blood vessels, which causes hemoconcentration, low blood pressure and shock.

A number of haematological parameters have been considered as potential predictors, most commonly the platelet count.[13] Platelet counts tend to fall over the

illness course, reaching a nadir shortly after defervescence, before demonstrating a rapid recovery response.[14] Lower counts (<50× 10^9/l; normal range 150 to 400*10^9/l) are seen more frequently in severe disease,[15] and are considered a risk factor for bleeding.[16] However, the correlation between thrombocytopenia and haemorrhage is weak, with lower platelet counts correlating more closely with the severity of vascular leakage in one study.[17]

In the study by Kamath et al, platelet counts less than 50,000/cumm were noted in 62.3%.[18] DHF patients with a platelet count less than 50,000/cumm were found to have a six-fold higher mortality than those with platelet counts more than 50,000/cumm.[19] In the present study, no deaths occurred in children with platelet counts more than 50,000/cumm. Shivbalan et al found alanine transaminase (ALT), tender hepatomegaly, abdominal pain, abdominal distension and respiratory distress to be important predictors for bleeding in dengue.[20]

Liver involvement is common in dengue, and liver enzymes are frequently higher in infections of all severity grades. More marked derangements are usually associated with more severe disease profile.[21] In addition, liver enzyme levels tend to peak late in the disease course, typically during the 2nd week, limiting their usefulness as prognostic markers.[22] Hypoproteinaemia is well recognised during the critical phase, and correlate with the severity of leakage;[23] however, like haemoconcentration, hypoproteinaemia is difficult to identify without serial measurements or a known baseline value for an individual. In our study, hepatic dysfunction was seen in 12 children (14.8%). It was noted that patients who did not survive had severe liver function deformities. In our study, along with coagulopathy in the form of prolonged PT and PTT, respiratory distress was also linked with poor outcome.

Conclusion

Common age group upset in our earning was 5-15 years. Majority (91%) of the patients present in classical dengue fever. The bad prognostic factors were respiratory distress and coagulopathy. Enlarged awareness, better transport facilities and case management according to the WHO guidelines, is needed to further reduce mortality of DHF/DSS cases.

References

1. WHO. Dengue/dengue haemorrhagic fever. Weekly Epidemiological Report 75. 2000;24:193-200.
2. Bhatt S, Gething PW, Brady OJ, Messina JP, Farlow AW, Moyes CL, Drake JM, B Nrownstein JS, Hoen AG, Sankoh O, Myers MF, George DB, Jaenisch T, Wint GR, Simmons CP, Scott TW, Farrar J, Hay SI: The global distribution and burden of dengue. Nature 2013,496:504-507.
3. Cho-Min-Naing. Assessment of dengue hemorrhagic fever in Myanmar. Southeast Asian J Trop Med and Pub Hlth. 2000;31(4):636-41.

4. Agarwal R, Kapoor S, Nagar R et al. A clinical study of the patients with dengue hemorrhagic fever during the epidemic of 1996 at Lucknow, India. Southeast Asian J Trop Med and Pub Hlth 1999;30(4):735-40.

5. Wills BA, Nguyen MD, Ha TL, Dong TH, Tran TN, Le TT, Tran VD, Nguyen TH, Nguyen VC, Stepniewska K, White NJ, Farrar JJ: Comparison of three fluid solutions for resuscitation in dengue shock syndrome. N Engl J Med 2005,353:877-889.

6. Lam PK, Tam DT, Diet TV, Tam CT, Tien NT, Kieu NT, Simmons C, Farrar J, Nga NT, Qui PT, Dung NM, Wolbers M, Wills B: Clinical characteristics of dengue shock syndrome in Vietnamese children: a 10-year prospective study in a single hospital. Clin Infect Dis 2013,57:1577-1586.

7. Kittigul L, Pitakarnjanakul P, Sujirarat D, et al. The differences of clinical manifestations and laboratory findings children and adults with dengue virus infection. J Clin Virol. 2007;39(2):76-81.

8. Ratageri VH, Shepur TA, Wari PK, et al. Clinical profile and outcome of dengue fever cases. Indian J Pediatr. 2005;72(8).

9. Dengue: Guidelines for Diagnosis, Treatment, Prevention, and Control, New edn. TDR/World Health Organization, Geneva; 2009.

10. Alexander N, Balmaseda A, Coelho IC, Dimaano E, Hien TT, Hung NT, Janisch T, Kroeger A, Lum LC, Martinez E, Siqueira JB, Thuy TT, Villalobos I, Villegas E, Wills B: Multicentre prospective study on dengue classification in four South-east Asian and three Latin American countries.

11. Faridi MMA, Aggarwal A, Kumar M, et al. Clinical and biochemical profile of dengue haemorrhagic fever in children in Delhi. Trop Doct. 2008;38(1):28-30.32.

12. Ahmed S, Arif F, Yahya Y, et al. Dengue fever outbreak in Karachi 2006 - a study of profile and outcome of children under 15 years of age. J Pak Med Assoc. 2008.

13. Potts JA, Rothman AL: Clinical and laboratory features that distinguish dengue from other febrile illnesses in endemic populations. Trop Med Int Health 2008,13:1328-1340.

14. Trung DT, le Thao TT, Dung NM, Ngoc TV, Hien TT, Chau NV, Wolbers M, Tam DT, Farrar J, Simmons C, Wills B: Clinical features of dengue in a large Vietnamese cohort: intrinsically lower platelet counts and greater risk for bleeding in adults than children. PLoS Negl Trop Dis 2012, 6:e1679.

15. Brasier AR, Ju H, Garcia J, Spratt HM, Victor SS, Forshey BM, Halsey ES, Comach G, Sierra G, Blair PJ, Rocha C, Morrison AC, Scott TW, Bazan I, Kochel TJ: A three-component biomarker panel for prediction of dengue hemorrhagic fever. Am J Trop Med Hyg 2012, 86:341-348.

16. Krishnamurti C, Kalayanarooj S, Cutting MA, Peat RA, Rothwell SW, Reid TJ, Green S, Nisalak A, Endy TP, Vaughn DW, Nimmannitya S, Innis BL: Mechanisms of hemorrhage in dengue without circulatory collapse. Am J Trop Med Hyg 2001,65:840-847.

17. Wills B, Tran VN, Nguyen TH, Truong TT, Tran TN, Nguyen MD, Tran VD, Nguyen VV, Dinh TT, Farrar J: Hemostatic changes in Vietnamese children with mild dengue correlate with the severity of vascular leakage rather than bleeding. Am J Trop Med Hyg 2009, 81:638-644.

18. Kamath SR, Ranjit S. Clinical features, complications and atypical manifestations of children with severe forms of dengue hemorrhagic fever in South India. Indian J Pediatr. 2006;73(10):889-95.

19. Chua MN, Molanida R, de Guzman M, et al. Prothrombin time and partial thromboplastin time as a predictor of bleeding in dengue hemorrhagic fever. Southeast Asian J Trop Med Publ Health. 1993;24(Suppl 1):141-3.

20. Shivbalan S, Anandnathan spontaneous bleeding in Dengue. Indian J Pediatr. 2004;71(1):33-6.

21. Wichmann O, Gascon J, Schunk M, Puente S, Siikamaki H, Gjorup I, Lopez-Velez R, Clerinx J, Peyerl-Hoffmann G, Sundoy A, Genton B, Kern P, Calleri G, de Gorgolas M, Muhlberger N, Jelinek T: Severe dengue virus infection in travelers: risk factors and laboratory indicators. J Infect Dis 2007, 195:1089-1091.

22. Trung DT, le Thao TT, Hien TT, Hung NT, Vinh NN, Hien PT, Chinh NT, Simmons C, Wills B: Liver involvement associated with dengue infection in adults in Vietnam. Am J Trop Med Hyg 2010, 83:774-780.

23. Wills BA, Oragui EE, Dung NM, Loan HT, Chau NV, Farrar JJ, Levin M: Size and charge characteristics of the protein leak in dengue shock syndrome. J Infect Dis 2004, 190:810-818.