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Research Article

Study of prevalence and Hepatic dysfunction in Dengue fever in children

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Abstract: Dengue is a major international health concern that is prevalent in tropical and sub-tropical countries. It is estimated that worldwide nearly 2.5 billion people continue to live at risk of contracting the infection while 50 million cases and 24,000 deaths tend to occur in 100 endemic countries. The objective of the study was to assess the prevalence, hepatic dysfunction during current outbreak of dengue fever in children. Prospective study was conducted on all the laboratory confirmed cases of dengue fever during the outbreak from May 2015 to July 2015 among 300 children admitted to 4 major hospitals in Bangalore, Karnataka, India. This study reveals the prevalence of hepatic dysfunction in 14.3% of the cases. Among the gender and age, majority of them were males with 65% and in the age group of 6-10 years with 4%. The commonest symptom and signs was jaundice in 3.3% and hepatomegaly in 10.3% of the cases. The commonest liver function tests altered were elevated liver enzymes in 10.6% of the cases. Based on the group, hepatic dysfunction was observed in 12.6% of the severe dengue cases and 1.6% of the dengue with warning signs. Among these severe hepatic dysfunction was seen in 3.3% with no death. This study concludes prevalence of hepatic dysfunction was seen 14.3% with severe hepatic dysfunction in 3.3% and presence of the hepatic dysfunction more in severe dengue, suggesting any febrile child with hepatic dysfunction, dengue infection should be suspected.
Keywords: Dengue fever, jaundice, hepatic dysfunction.

INTRODUCTION

Dengue infection is a emerging disease and is a major health problem in our country. Globally the incidence of dengue has increased in the recent years. The WHO estimates that presently about two fifths of the world population is at risk for this viral infection [1] Dengue fever was first reported by Benjamin Rush in 1780 as “break bone fever.” It is a mosquito borne viral infection with four serotypes causing severe dengue fever, dengue with warning signs, and dengue without warning signs [2]. It is estimated that worldwide nearly 2.5 billion people continue to live at risk of contracting the infection while 50 million cases and 24,000 deaths tend to occur in 100 endemic countries. Recovery from infection by one serotype offers lasting immunity against that particular serotype, but subsequent infections by other serotypes increase the risk of developing severe dengue [3]. Risk of mortality in treated cases of is less than 1% while mortality rate among untreated cases escalates to 20% [4]. India is one of the seven countries in the South-East Asia region regularly reporting incidence of dengue outbreaks due to its high incidence which constantly threatens the health care system. The first confirmed case of dengue infection in India dates back to 1940s, and since then more and more new states have been reporting the disease which mostly strikes in epidemic proportions often inflicting heavy morbidity and mortality [5].

Unusual manifestations involving liver and central nervous system in dengue infection have been reported [6,7] The degree of liver dysfunction in children with dengue infection varies from mild injury with elevation of transaminases to severe injury with jaundice and liver cell failure [8-11]. Mechanisms of liver injury in dengue may be due to direct effects of the virus or host immune response on liver cells, circulatory compromise, metabolic acidosis and/or hypoxia caused by hypotension or localized vascular leakage inside the liver [9,11,14,18].

The incidence of hepatic dysfunction is more in Dengue shock syndrome and Dengue hemorrhagic fever [6, 8-17]. Aminotransferase levels are useful in predicting the occurrence of hepatic dysfunction and spontaneous bleeding [8]. In recent studies from India and Thailand, dengue infection was the most important cause of acute hepatic failure in children contributing to 18.5% and 34.3% of the cases respectively [15,16].

Hence early recognition and prompt initiation of appropriate supportive treatment can

decrease the morbidity and mortality. Most of the data reported on abnormal liver functions in dengue are retrospective [6, 10, 12, 13]. The aim of this study was to assess the prevalence, hepatic dysfunction in dengue fever in children.

MATERIAL AND METHODS

This hospital-based descriptive study with prospective data collection were carried out at the 4 major hospitals Sri Lakshmi Multispeciality Hospital, Narayana Superspeciality Hospital, Mallige Hospital, Maruti Hospital, Bangalore, Karnataka, India during the latest outbreak of dengue fever for a period of 3 months from May 2015 to July 2015.All the admitted patients were enrolled on a structural protocol which included symptoms, signs, diagnosis, complications, NS1antigen, IgM, IgG dengue antibodies by ELISA technique, platelet count and other relevant investigations, treatment, duration of stay and outcome. LFT was done with photometer 5010.Relevant data was entered in a proforma and analyzed. The diagnosis of dengue fever was based on the WHO criteria [3].

Inclusion criteria;

- Children with age group of 0-18 years
- Admitted with symptoms of dengue fever based on WHO criteria
- NS1 antigen and IgM dengue antibody-positive cases by ELISA technique

Exclusion criteria;

- Children with IgG dengue antibody positive
- Children with malaria and enteric fever

RESULTS

A total of 300 cases admitted to the 4 major hospitals in Bangalore during current outbreak from May 2015 to July 2015 were statistically analyzed. Among 300 patients studied, the prevalence of hepatic dysfunction was seen in 14.3 % (43/300). With reference to the sex, majority of the hepatic dysfunction were seen in males with 65%. With reference to the age groups, majority of the hepatic dysfunction were observed in the age group of 6–10 years with 4 %(12/300) followed by in the age group of 3-6 years with 3.6%(11/300). With reference to the hepatic dysfunction, commonest symptom and sign were jaundice in 3.3 % (10/300) and hepatomegaly in 10.3 % (31/300).

The liver enzymes aspartate transaminase (AST) in 10.6 % (32/300), alanine transaminase (ALT) in 10.6% (32/300), alkaline phosphatase in 10.6% (ALP) (32/300) of the cases. With reference to the group according to WHO classification, hepatic dysfunction was observed in 12.6% (38/300) of the severe dengue cases and 1.6% (5/300) of the dengue with warning signs cases. With reference to the severity, severe hepatic dysfunction was seen in 3.3% (10/300) of the cases in the form of bleeding manifestations, jaundice, and encephalopathy. With reference to the death, none of the patients died in this study.

Table 1: Age and sex pattern of hepatic dysfunction

Age in years	Male	Female	No of hepatic dysfunction
0-1	1	1	2 (0.6%)
1-3	5	3	10 (3.3%)
3-6	6	5	11 (3.6%)
6-10	7	5	12 (4%)
10-18	7	3	8 (2.6%)
Total	26	17	43

Table 2: Severity of dengue fever

	Hepatic dysfunction
Dengue without warning signs	0
Dengue with warning signs	5/300(1.6%)
Severe dengue	38/300(12.6%)
Total	43

DISCUSSION

Dengue is a major international health concern that is prevalent in tropical and sub-tropical countries. The objective of the study was to assess the prevalence, hepatic dysfunctions during current outbreak of dengue fever in children. This study shows, the prevalence of hepatic dysfunction was 14.3%, in contrast to report by several authors [8-11] with 36.4%-96% of the cases. With reference to the age and gender majority of the cases were in the age group of 6-10 years with 4% followed by 3-6 years with 3.6. %, and predominantly seen in male children with 65% of the cases. This may be due to outdoor activities of these children, where chances of getting bitten with mosquitoes are more.

Among the hepatic dysfunction jaundice was seen in 3.3% similar pattern was seen in study by several authors [8-18] with 2%-25%, hepatomegaly was noticed in 10.3% of the cases in contrast to report by several authors[8-13] with 36.4%-96% of the cases.

The liver enzymes were elevated in 10.6% of the cases which is less than other studies reports 36.4%-96% [8-11]. With reference to the group according to WHO classification, hepatic dysfunction was observed in 12.6% of the severe dengue cases and 1.6% of the dengue with warning signs cases. With reference to the severity, severe hepatic dysfunction was seen in 3.3% of the cases in the form of bleeding manifestations, jaundice, encephalopathy, ascites.
With reference to the death, none of the patients died in this study.

Table- 3: Findings of hepatocellular dysfunctions

Parameter	Dengue without warning signs	Dengue with warning signs	Severe dengue
Jaundice	0	0	10/300(3.3%)
Bleeding manifestations	0	0	9/300(3%)
Hepatomegaly	0	10/300(3.3%)	31/300(10.3%)
Tender hepatomegaly	0	4/300(1.3%)	8/300(2.6%)
Encephalopathy	0	0	2/300(0.6%)
Total serum bilirubin >2mg/dl Mean total S. bilirubin (mg/dl)	0 0.5	0 0.7	10/300(3.3%) 2.6
Elevated ALT (U/l) Mean ALT Range	0 33 22-40	8/300(2.6%) 124 73-194	32/300(10.6%) 313 123-752
Elevated AST (U/l) Mean AST Range	0 35 20-42	8/300(2.6%) 252 124-456	32/300(10.6%) 299 111-752
Elevated Alk Ph (U/l) Mean AP Range	103 53 45-120	8/300(2.6%) 406 300-465	32/300(10.6%) 399 299-541
Abnormal serum albumin Mean serum albumin (gm/dl) Range	0 3.5 3.5-4.1	0 3.4 3-3.9	0 3.3 2.9-3.6
Abnormal serum globulin Mean serum globulin(gm/dl) Range	0 2.6 2.4-2.8	0 2.8 2.5-3.4	0 3.2 2.5-3.8
Abnormal total protein Mean total protein (gm/dl) Range	0 6 5-7	0 5.5 4-7	0 5 3.8-7
Prolonged INR (>1.5)	0	0	10/300(3.3%)
Ascites	0	0	10/300(3.3%)
Gallbladder thickening (>5mm)	0	5/300(1.6%)	9/300(3%)

CONCLUSION

This study concludes prevalence of hepatic dysfunction was seen 14.3% with severe hepatic dysfunction in 3.3% and presence of the hepatic dysfunction more in severe dengue, suggesting any febrile child with hepatic dysfunction, dengue infection should be suspected.

REFERENCES

1. World Health Organization; Dengue and Dengue Hemorrhagic fever. Available in www.who.int/media centre/factsheets./ fs117/en/accessed on 19.4.2013.
2. Guzmán MG, Kourí G; Dengue: An update. Lancet Infect Dis., 2002; 2: 33–42.
3. Centers for Disease Control and Prevention ; Imported dengue— United States, 1997 and 1998. MMWR Morb. Mortal Wkly Rep., 2000; 248-53
4. World health Organization. Dengue and dengue hemorrhagic fever. Fact Sheet. No. 117, 2002. Available from: http//www.who.int/mediacentre/factsheet s/fs117/en/
5. Dengue in Kerala: A critical review. ICMR Bulletin. 2006; 36: 13–22.
6. Wiwanitkit V. Liver dysfunction in dengue infection, an analysis of the previously published Thai cases. J Ayub Med Coll Abbottabad, 2007; 19(1): 10-11
7. Soundravally R, Narayanan P, Vishnu Bhat B; Fulminant hepatic failure in an infant with severe Dengue infection. Indian J Pediatr 2010; 77(4): 435-7.
8. Petdachai W; Hepatic dysfunction in children with dengue shock syndrome. Dengue Bulletin 2005; 29:112-7.
9. Mohan B, Patwari AK, Anand VK.; Hepatic dysfunction in childhood dengue infections. J Trop Pediatric, 2000; 46(1): 40-3.
10. Wahid SF, Sanusi S, Zawawi MM, Ali RA; A comparison of the pattern of liver involvement in dengue hemorrhagic fever with classic dengue fever. Southeast Asian J Trop Med Pub Health, 2000; 31(2): 259-63.
11. Itha S, Kashyap R, Krishnani N; Profile of liver involvement in dengue virus infection. Natl Med J India, 2005; 18(3): 127-30.
12. Wong M, Shen E; the Utility of liver function tests in Dengue. Ann Acad Med, 2008; 37(1): 823.
13. Kamath SR, Ranjith 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.
14. Seneviratne SL, Malavige GN, de Silva HJ; Pathogenesis of liver involvement during dengue viral infections. Trans R Soc Trop Med Hyg, 2006; 100(7): 608-14.
15. Kumar R, Tripathi P, Tripathi S; Prevalence of dengue infection in north Indian children with acute hepatic failure. Ann Hepatol, 2008; 7(1): 59-62.
16. Poovorawan Y, Hutagalung Y, Chongsrisawat V; Dengue virus infection: a major cause of acute hepatic failure in Thai children. Ann Trop Paediatr, 2006; 26(1): 17-23.
17. World Health Organization. Dengue Haemorrhagic Fever: Diagnosis, treatment, prevention and control. Second edition. Geneva: World Health Organization; 1997.
18. Nimmannitya S, Thisyakorn U, Hemsrichart V; Dengue hemorrhagic fever with unusual manifestations. Southeast Asian J Trop Med Public Health, 1987; 18(3): 398-405.
19. Wichmann O, Hongsiriwon S, Bowonwatanuwong C; Risk factors and clinical features associated with severe dengue infection in adults and children the 2001 epidemic in Chonburi, Thailand. Trop Med Int Health. 2004; 9(9): 1022-9.
20. Faridi MMA, Aggarwal A, Kumar M, Sarafrazul A; Clinical and biochemical profile of dengue haemorrhagic fever in children in Delhi. Trop Doct 2008; 38(1): 28-30.
21. Dhooria GS, Bhat D, Bains HS; Clinical profile and outcome in children of Dengue hemorrhagic fever in north India. Iran J Pediatr, 2008; 18(3): 222-8.
22. Chairulfatah A, Setiabudi D, Ridad A, Colebunders R; Clinical manifestations of Dengue fever in children in Bandung, Indonesia. Ann Soc Belge Med Trop, 1995; 75(4): 291-5.