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A study of various hepatic manifestations in dengue fever and their correlation with severity of dengue fever

Hariprasad.S[1], Neha Sukhani[2*], Muralidhar.T[3]

[1]Associate Professor, Department of General Medicine, Raichur Institute of Medical Sciences, Raichur, Karnataka, India
[2]Associate Professor, Department of General Medicine, Raichur Institute of Medical Sciences, Raichur, Karnataka, India
[3]Senior Resident, Department of General Medicine, Raichur Institute of Medical Sciences, Raichur, Karnataka, India

Abstract
Background: Dengue is the most crucial of the arboviral infections amongst humans. The incidence of Dengue fever and Dengue hemorrhagic fever has drastically increased in the recent years. The higher involvement of younger ages and increase in the incidence of epidemics are indicators of higher occurrence of infection. The mortality rate from complications is as high as 20%, while if they are properly managed, the mortality rate reduces to less than 1%. The present study was conducted with the aim to determine various hepatic manifestations in dengue fever and their correlation with severity of dengue fever. **Materials and methods**: The present prospective study was conducted on cases of Dengue fever (DF) and Dengue hemorrhagic fever reporting at RIMS Hospital. Adults positive for IgM alone or both IgM and IgG were followed up for clinical profile. Complete blood profile including hematocrit was repeated daily during the acute phase of the illness and chest X-ray was taken to demonstrate pleural effusion amongst the cases. The clinical manifestations and laboratory findings of each group of illness was compared using chi-square or fisher's exact test for proportions and analysis of variance (ANOVA) for continuous data. **Results**: There was a male predominance in the study with 66.7% males having dengue fever. There was statistically no significant difference in the demographic variables. Fever was observed in 60% of the cases with Infection and 100% patients had fever in dengue. Vomiting was observed in 93.3% cases with dengue fever and 100% cases had body pains. **Conclusion**: The incidence of dengue infection in increasing in developing countries like India and different degree of hepatic complications has been observed.
Keywords: Complication, Dengue, Hepatic, Infection

Introduction

Dengue is the most crucial of the arboviral infections amongst humans. The incidence of Dengue fever and Dengue hemorrhagic fever has drastically increased in the recent years[1]. In India, the epidemics are becoming more common[2]. Around the globe, an estimated 2.5 billion population are at risk of infection[3]. It is evaluated that more than 50 million cases occur every year, amongst which 500,000 hospitalisations are due to dengue haemorrhagic fever, with the fatality rate exceeding 5% in some areas [3-6]. The higher involvement of younger ages and increase in the incidence of epidemics are indicators of higher occurrence of infection. The mortality rate from complications is as high as 20%, while if they are managed properly, the mortality rate reduces to less than 1%. Liver dysfunction in dengue may be due to direct viral action on liver cells or as a result of dysregulated host immune response towards the virus[7]. Liver injury is universal in adult subjects with dengue fever. Thus, there is a requirement to keep track of different manifestations and gather data of the disease during each epidemic.

*Correspondence
Dr. Neha Sukhani
Associate Professor, Department of General Medicine, Raichur Institute of Medical Sciences, Raichur, Karnataka, India.
E-mail: nehasukhani.med@hotmail.com

There are at 4 different antigenic types of dengue virus DEN 1, DEN 2, DEN 3, DEN 4 that are members of family Flaviviridae. The present study was conducted with the aim to determine various hepatic manifestations in dengue fever and their correlation with severity of dengue fever.

Materials and methods

The present prospective study was conducted on cases of Dengue fever (DF) and Dengue hemorrhagic fever reporting at RIMS Hospital. A total of 150 adults were analysed in the study who were identified as probable cases by clinical suspicion. For all cases, the rapid IgM-IgG and ELISA test was done. Adults positive for IgM alone or both IgM and IgG were followed up for clinical profile. Subjects below 18 years of age or subjects with leptospirosis were excluded from the study. All the subjects were informed about the study and a written consent was obtained from them. The study was also approved by the institutional ethical board. A detailed history was taken and careful physical examination and laboratory investigations were performed. Laboratory investigations was carried out in these patients that included hemoglobin, total and differential leukocyte count, hematocrit, platelet count, liver function tests and urine examination. Complete blood profile including hematocrit was repeated daily during the acute phase of the illness and chest X-ray was taken to demonstrate pleural effusion amongst the cases. Dengue serology was done using rapid card tests and reported accordingly as NS1Ag, IgM and IgG. The collected data was entered in Microsoft excel spread sheet. The clinical manifestations and laboratory findings of each group of illness was compared using chi-square or fisher's exact test for proportions

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and analysis of variance (ANOVA) for continuous data. Significance was considered if the 'p' value is below 0.05.

Results

There were 100 cases of dengue infection and there were 30 cases of dengue fever, the percentage being 30%. There was a male predominance in the study with 66.7% males having dengue fever. There was statistically no significant difference in the demographic variables. Fever was observed in 60% of the cases with Infection and 100% patients had fever in dengue. Vomiting was observed in 93.3% cases with dengue fever and 100% cases had body pains. There were 16 cases with abdominal pain and 8 cases with Retro-orbital pain in dengue fever. The most common sign was hepatomegaly, observed in 70% cases of infection and 60% cases of dengue fever. Rashes were observed in only 8 cases with dengue fever. There was no case of shock in dengue fever. Statistically no significant difference was observed in symptoms and signs amongst dengue infection and dengue fever cases. (table 1, graph 1)

Table 1: Signs and symptoms of dengue cases

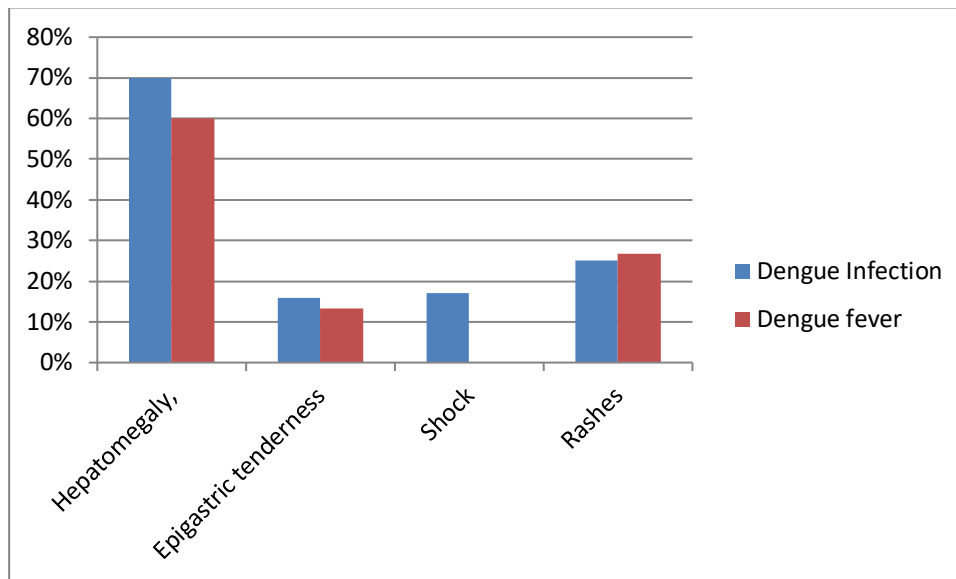| Feature	Dengue Infection	Dengue Fever	P value
Number of cases	100	30	>0.05
Gender			
Male	60%	20 (66.7%)	>0.05
Female	40%	10(33.3%)	>0.05
Symptoms			
Fever	60%	30(100%)	>0.05
Vomiting	95%	28(93.3%)	>0.05
Jaundice	10%	-	
Body pain	70%	30(100%)	>0.05
Headache	42%	22(73.3%)	>0.05
Abdominal pain	37%	16(53.3%)	>0.05
Retro-orbital pain	20%	8(26.7%)	>0.05
Signs			
Hepatomegaly,	70%	18(60%)	>0.05
Epigastric tenderness	16%	4(13.3%)	>0.05
Shock	17%	-	
Rashes	25%	8(26.7%)	>0.05

Figure 1: Signs of dengue Fever cases

Discussion

Dengue infections are one of the commonest mosquito borne conditions of the world. Detection of dengue antigen virus in the hepatocyte shows that such cells can support replication of virus. Histopathological features include centrilobular necrosis, fatty alterations, hyperplasia of the Kupfer cells, acidophil bodies and monocyte alteration of the portal tracts[8-10]. In this study, Fever was observed in 60% of the cases with Infection and 100% patients had fever in dengue. Vomiting was observed in 93.3% cases with dengue fever and 100% cases had body pains. There were 16 cases with abdominal pain and 8 cases with Retro-orbital pain in dengue fever. The most common sign was hepatomegaly, observed in 70% cases of infection and 60% cases of dengue fever. Rashes were observed in

only 8 cases with dengue fever. There was no case of shock in dengue fever. Statistically no significant difference was observed in symptoms and signs amongst dengue infection and dengue fever cases. Fever and vomiting were the most common symptoms and hepatomegaly was the most common sign in our as observed in the previous studies[11,12]. Hepatomegaly was considerably less frequent amongst adults in Philippines and Delhi[13,14].

Hematemesis is the most commonly seen bleeding manifestation in the cases as found in other studies on Indians[12,15]. In a study by Itha et al,[16] amongst 45 patients with dengue fever, 23 were with uncomplicated dengue fever,15 were with dengue haemorrhagic fever and 7 with dengue shock syndrome. 7(15%) patients had jaundice, 11(24%) hepatomegaly and 9 clinically detectable ascites; none had

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splenomegaly. 12 patients(30%) had hyperbilirubinaemia. Serum alanine and aspartate aminotransferase activities were elevated in 43 patients (96%) each, 76% had hypoalbuminaemia. Seven patients died, including 2 with acute liver failure. In another study by Kumar S et al[17]. Fever followed by headache was the most common symptoms at presentation while vomiting and pain abdomen in the early stage suggested hepatic dysfunction. AST and ALT were statistically higher in these patients and in those developing complications like DHF, DSS, hepatic failure, ARDS, ARF and encephalopathy.

Conclusion

The incidence of dengue infection in increasing in developing countries like India and different degree of hepatic complications has been observed. The involvement is reversible at early stages and the complications can be controlled. Early identification is the key to controlling the complications and reducing the morbidity and mortality.

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