Assessment of Liver Dysfunction in Acute Dengue Infection

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ABSTRACT
Background: Dengue is a febrile illness caused by infection with 1 of 4 dengue viruses transmitted by the Aedes mosquito. Liver involvement in the form of abnormalities in liver function test is commonly seen in dengue fever. The present study was conducted to assess liver dysfunction in acute dengue infection.
Materials & Methods:72 patients of dengue infection of both genderswere categorized in to classical dengue fever (DF) (group I), Dengue hemorrhagic fever (group II), Dengue shock syndrome (group III) as per WHO criteria. Dengue infection was detected using Rapid test (Immunochromatography) for Dengue NS1 Antigen/IgM Dengue. Assessment of SGOT, SGPT, T. Bilirubin, serum albumin, S. alkaline phosphatase and INR level was done
Results: Out of 72 patients, males were 56 and females were 16. The mean SGOT level was 690.4 U/L, SGPT was 284.2 U/L, T. bilirubin was 0.96 mg/dl, s. albumin was 4.11 g/dl, alkaline phosphatase level was 115.6 U/L, INR was 1.4. The mean SGOT level was 564.2 U/L, 610.2 U/L and 690.4 U/L, SGPT was 114.5 U/L, 214.5 U/L and 284.2 U/L, T. bilirubin was 0.45 mg/dl, 0.60 mg/dl and 0.96 mg/dl, s. albumin was 3.21 g/dl, 3.89 g/dl and 4.11 g/dl, alkaline phosphatase level was 78.2 U/L, 102.4 U/L and 115.6 U/L, INR was 1.1, 1.3 and 1.4 in group I, II and III respectively.
Conclusion: Liver dysfunction with raised SGOT/SGPT was seen in almost all patients. More raised values were seen in patients with dengue shock syndrome.
Key words: alkaline phosphatase, dengue, bilirubin

Introduction

Dengue is a febrile illness caused by infection with 1 of 4 dengue viruses transmitted by the Aedes mosquito, with dengue virus 2 having the highest risk for severe infection.[1] It is an arboviral disease of a significant burden in tropical countries with an increasing prevalence: the global estimate of dengue infections was approximately 75 million in 1997 and approximately 150 million in 2008. This increase is secondary to poor hygiene, inadequate health systems, and increased international travel, which has facilitated Aedes mosquito proliferation. Seventy percent of cases are in Asia, with India alone having 34% of the global total.[2]

Clinical manifestations in adult patients may differ from child patients, and the data are still limited. Severe infection, DHF, or dengue shock syndrome (DSS) were more prevalent in adults than in children. Liver involvement is common in dengue infection, including hepatomegaly, jaundice, abnormal liver enzymes (60%), and acute severe hepatitis with an at least 10 times elevated level of transaminase.[3]

Liver involvement in the form of abnormalities in liver function test is commonly seen in dengue fever. The liver function abnormalities vary from mild elevation in transaminase and bilirubin to a picture mimicking viral hepatitis or acute liver failure (≥10X transaminase, deranged INR).[4] In most of the cases the liver involvement remains asymptomatic but jaundice and acute liver failure has also been very well seen in patients with severe dengue. Hepatic dysfunction is caused by a direct effect on liver cells or as a consequence of deranged host immune response against the virus.[5] Other factors including pre-existing liver damage and the use of hepatotoxic drugs etc. may also play a role. Elevated liver enzymes in dengue are an early marker of dengue infection. It is also a predictor for assessing the disease severity.[6]The present study was conducted to assess liver dysfunction in acute dengue infection.

Materials & Methods

The present study comprised of 72 patients of dengue infection of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were categorized in to classical dengue fever (DF) (group I), Dengue hemorrhagic fever (group II), Dengue shock syndrome (group III) as per WHO criteria. Dengue infection was detected using Rapid test (Immunochromatography) for Dengue NS1 Antigen/IgM Dengue. Assessment of SGOT, SGPT, T. Bilirubin, serum albumin, S. alkaline phosphatase and INR level was done. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 72		
Gender	**Male**	**Female**
Number	56	16

Table I, graph I shows that out of 72 patients, males were 56 and females were 16.

Graph I Distribution of patients

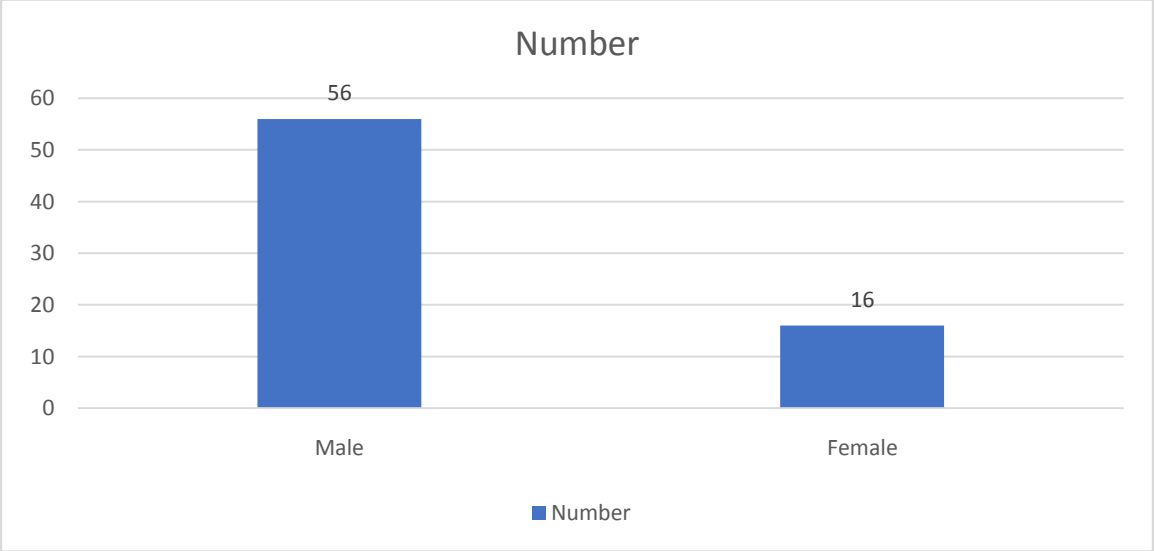


Table II Liver function tests

Liver function tests	Mean	SD
SGOT (U/L)	690.4	114.5
SGPT (U/L)	284.2	87.5
T. Bilirubin (mg/dl)	0.96	0.17
S. Albumin (g/dl)	4.11	1.2
S. Alkaline Phosphatase (U/L)	115.6	45.9
INR	1.4	0.8

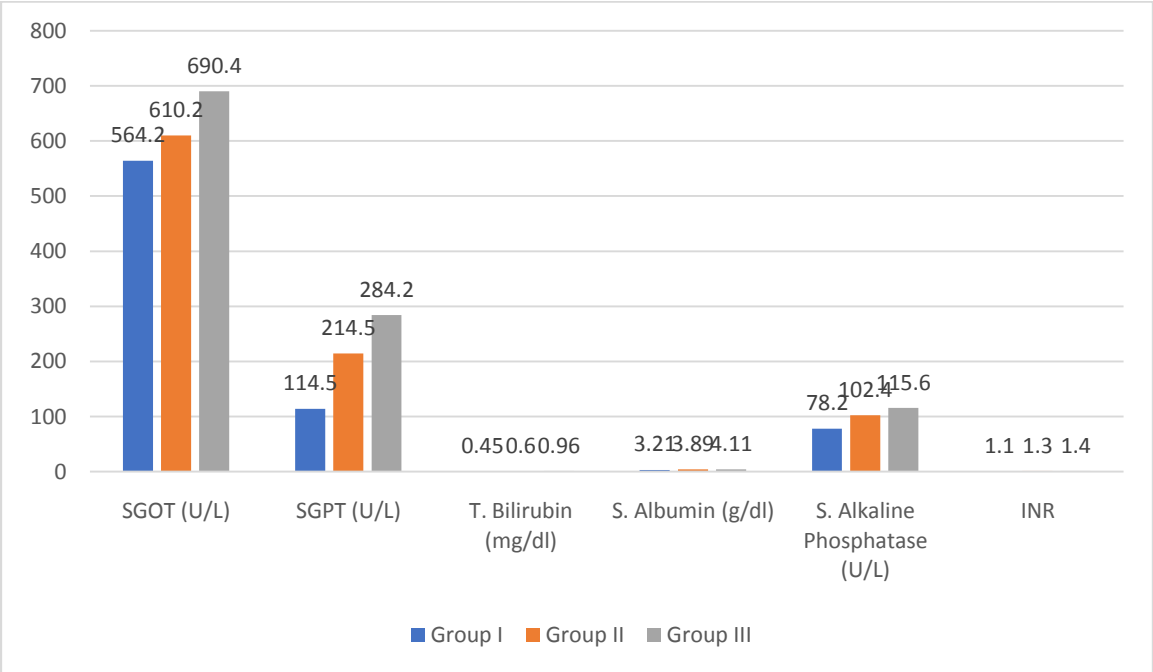
Table II shows that mean SGOT level was 690.4 U/L, SGPT was 284.2 U/L, T. bilirubin was 0.96 mg/dl, s. albumin was 4.11 g/dl, alkaline phosphatase level was 115.6 U/L, INR was 1.4.

Table IIILiver function tests in various groups

Liver function tests	Group I	Group II	Group III	P value
SGOT (U/L)	564.2	610.2	690.4	0.05
SGPT (U/L)	114.5	214.5	284.2	0.04
T. Bilirubin (mg/dl)	0.45	0.60	0.96	0.01
S. Albumin (g/dl)	3.21	3.89	4.11	0.05
S. Alkaline Phosphatase (U/L)	78.2	102.4	115.6	0.01
INR	1.1	1.3	1.4	0.05

Table III, graph II shows that mean SGOT level was 564.2 U/L, 610.2 U/L and 690.4 U/L, SGPT was 114.5 U/L, 214.5 U/L and 284.2 U/L, T. bilirubin was 0.45 mg/dl, 0.60 mg/dl and 0.96 mg/dl, s. albumin was 3.21 g/dl, 3.89 g/dl and 4.11 g/dl, alkaline phosphatase level was 78.2 U/L, 102.4 U/L and 115.6 U/L, INR was 1.1, 1.3 and 1.4 in group I, II and III respectively. The difference was significant (P< 0.05).

Graph IILiver function tests in various groups



Discussion

Dengue fever is the most common cause of arboviral disease worldwide. It is one of the most important causes of febrile illness in India and other tropical countries.[7] Almost 2.5billion people in 100 endemic countries are believed to be susceptible, so are the large numbers of travelers to these endemic countries.[8] Various factors have been implicated for increasing disease burden in tropics and spread of disease globally.[9] These factors include poor hygiene, broken health system and booming international travels. Dengue virus was isolated in India for the first time in 1945.[10] The present study was conducted to assess liver dysfunction in acute dengue infection.

In present study, out of 72 patients, males were 56 and females were 16.Soni et al[11] in their study patients were classified as classical dengue fever (DF) 88.3% dengue haemorrhagic fever (DHF) 7.5% and dengue shock syndrome (DSS) 4.3%. The mean age was 43.13(+15.50) years and male: female ratio was 2:1. Deranged serum glutamicoxaloacetic transaminase (SGOT) and/or Serum glutamic pyruvic transaminase (SGPT) was present in 98.9% of patients. The mean Total Bilirubin, SGOT, SGPT, albumin, ALP (alkaline phosphatase) and INR (International Normalized Ratio) values were 0.95mg/dl, 687.28U/L, 293.65U/L, 3.71g/dl , 112.14U/L and 1.30 respectively. The mean value of SGOT was significantly higher than SGPT. The degree of rise of SGOT, SGPT, INR, Bilirubin and ALP was significantly more in DHF and DSS, as compared to DF. 28patients (10%) had evidence of coagulopathy (INR >1.5) and 6patients had evidence of hepatic encephalopathy.

We found that mean SGOT level was 690.4 U/L, SGPT was 284.2 U/L, T. bilirubin was 0.96 mg/dl, s. albumin was 4.11 g/dl, alkaline phosphatase level was 115.6 U/L, INR was 1.4. Treeprasertsuk et al[12]showed that the mean age of 127 adult dengue patients was 26.4±11.5 years, and 66% of them had a severe form of dengue infection. Most of them (96%) had no underlying liver disease. Abnormal transaminase levels, including AST and ALT, were commonly found. These accounted for 88% and 69% of patients respectively, with the

average ratio of AST to ALT of 1.8:1 (Table 1). In addition, our study found that the dengue-infected patients with abnormal ALT had significantly older age and had a longer duration of fever of at least 7 days.

We found that mean SGOT level was 564.2 U/L, 610.2 U/L and 690.4 U/L, SGPT was 114.5 U/L, 214.5 U/L and 284.2 U/L, T. bilirubin was 0.45 mg/dl, 0.60 mg/dl and 0.96 mg/dl, s. albumin was 3.21 g/dl, 3.89 g/dl and 4.11 g/dl, alkaline phosphatase level was 78.2 U/L, 102.4 U/L and 115.6 U/L, INR was 1.1, 1.3 and 1.4 in group I, II and III respectively.Shukla et al[13] found that 100% patients had an elevated SGOT and 91% had elevated SGPT among patients with dengue.

Conclusion

Authors found that liver dysfunction with raised SGOT/SGPT was seen in almost all patients. More raised values were seen in patients with dengue shock syndrome.

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