Original Research

To assess the hepatic insufficiency in patients with dengue infection

Sushil Falodia[1] , Arjun Vyas[2]

[1]Associate Professor, Department of Gastroenterology, Sardar Patel Medical College, Bikaner, Rajasthan, India;
[2]Senior demonstrator, Department of Pharmacology, Sardar Patel Medical College, Bikaner, Rajasthan, India.

ABSTRACT:
Background: Over the past few years, atypical manifestations of dengue have been reported with multiple organ involvement. **Method:** We carried out a study to assess the Liver Function Test in dengue fever patients. Subjects were divided in two groups. Group I was involved 50 patients of dengue fever and group II was involved 50 healthy subjects of similar age group. **Result:** All the liver function tests were significantly more deranged in the patients group as compared to the Control group. Mean value of liver enzymes both SGOT and SGPT level increase more than ten folds than the control group. Total Bilirubin and Alkaline Phosphatase level were higher in dengue patients than the Control group. **Conclusion:** Hepatic dysfunction was present in dengue infection. The SGOT levels in dengue infection tend to be greater than the levels SGPT level.
Key words: Dengue fever, Total Bilirubin, Serum Glutamic Oxaloacetic Transaminase (SGOT), Serum Glutamic Pyruvic Transaminase. (SGPT), Alkaline phosphatise (ALP)

Corresponding Author: Dr. Arjun Vyas, Department of Pharmacology, Sardar Patel Medical College, Bikaner, Rajasthan, India.

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INTRODUCTION

Dengue is one of the most important mosquito borne viral diseases which is spreading rapidly throughout the world. Around 2.5 billion people in 100 endemic countries are believed to be susceptible, so are the equally significant numbers of travelers to these tropical and subtropical regions.[1,2]
About 50–100 million cases of dengue fever and 500,000 cases of Dengue Hemorrhagic Fever (DHF), resulting in around 24,000 deaths, are reported annually.[3,4] Over half of the world's population resides in areas potentially at risk for dengue transmission, making dengue one of the most important human viral disease transmitted by arthropod vectors in terms of morbidity and mortality.[5]
DENVs are transmitted via the species Aedes aegypti, and less commonly by Aedes albopictus. The Aedes aegypti mosquito with its anthropophilic nature is well adapted for urban thriving and frequently bites several times before completing oogenesis.[6,7]

Dengue virus (DENV) has 4 serotypes (DEN 1-4) and is a member of the Flaviviridae family and the genus Flavivirus[8]. Though initially DEN1 and DEN2 were found around Central America and Africa, and all 4 serotypes found in Southeast Asia, currently all the serotypes have diffused in all tropical and subtropical regions of the world.[1] The serotypes sharing a mere 65% of the genotype among each other produce a uniformly wide array of manifestations, with most of them being asymptomatic.[2]
Hepatic involvement is characterized by right hypochondrium pain, hepatomegaly, jaundice, and elevated aminotransferase levels peaking at ninth day and gradually running to normal within 4 weeks. Although liver is not the main target for this disease, histopathology findings include centrilobular necrosis, fatty alteration, hyperplasia of Kupffer cells, acidophil bodies, and monocyte infiltration of portal tract.[9]

The aim of this study was to assess the hepatic dysfunction in patients with dengue infection presenting to a tertiary-care medical facility in Rajasthan.

MATERIAL AND METHOD
Type of study: case control study

Patients were selected for this study from P.B.M. and associated groups of Hospital, Bikaner (Raj.). Study subjects were divided in two groups.

Group I: Comprised of 50 patients of serologically proven dengue fever.
Group II: Comprised of 50 Subjects with Negative serological test.

Tests for detection of anti-dengue antibodies and/or NS1 antigen test were carried out in all patients. These samples were subjected to immunoenzymatic assay (Panbio dengue IgM-Capture ELISA). When results of either of these tests were positive, patients were considered to be currently infected with dengue virus, while cases in which the results were negative were considered unconfirmed.

Inclusion criteria and Exclusion criteria:
Inclusion criteria included patients more than 18 years of age and infected with dengue virus. Exclusion criteria consisted of patients with pre existing liver disease, scrub typhus, malaria and typhoid fever.

Blood sample will be collected by venipuncture under aseptic conditions and following Biochemical parameters will be assessed.
- i) Total Bilirubin
- ii) Serum Glutamic Oxaloacetic Transaminase (SGOT)
- iii) Serum Glutamic Pyruvic Transaminase. (SGPT)
- iv) Alkaline phosphatise (ALP)

RESULTS
A comparison between the mean values of various liver biochemical tests in dengue infection patients, and the control group is shown in Table 1. All the liver biochemical tests were significantly more deranged in the patients group as compared to the Control group.

In our study Comparison of Total Bilirubin level between Case and controls group showed that the Total Bilirubin level in patients (1.1±0.98) were higher than that of the control group (92±26.38), there was significant variation (p <0.05) between Case and Control group.

Mean value of both liver enzymes SGOT and SGPT level increase more than ten folds than the control group. Both SGOT and SGPT level was significantly higher in patients group. The AST levels in dengue infection tend to be greater than ALT levels.

In present study Comparison of Alkaline Phosphatase level between Case and controls group showed that the levels of alkaline phosphatase (158.80±37.59) in patients were higher than that of the control group (92±26.38), there was significant variation in alkaline phosphatase level (p <0.05) between Case and Control group.

DISCUSSION
The liver injury is not fully manifest in the early stages of dengue fever. The cause for the liver dysfunction is thought to be multifactorial. It is postulated that liver damage may happen secondary to hypoxia, direct effect of virus or immune mediated damage.[10]

The final outcome of hepatic involvement is apoptosis of cells. Biopsies done on patients with dengue fever have revealed patterns such as microvascular steatosis, liver cell necrosis, councilman bodies and portal tract inflammation.[11]

In a study by Amit Soni et al, with regards to AST levels, it was shown that 45.6% had less than 3 fold elevation, 36.7% had 3-10 fold elevation and 16.4% had greater than 10 fold elevation.[12] In this study AST elevation was more than ALT which was similar to our study. The increased AST/ALT ratios can be used to differentiate dengue infection from viral hepatitis where it is infrequently seen.[13] The incidence of AST and ALT elevations more than 10 fold were also comparable to our study.

In a study by Rajoo Singh Chhina et al, alkaline phosphatase levels were elevated in 30.3% of cases with dengue fever and 40% of cases with dengue hemorrhagic fever.[14] This was similar to our study where alkaline phosphatase was significantly elevated in patients group.

S. No.	Parameters	Case group (Mean±SD)	Control Group (Mean±SD)	T	P value
1	Total Bilirubin (mg/dl)	1.891± 1.454	1.1±0.98	2.8995	0.004
2	SGOT/ AST(IU/L)	367.55±170.56	25.93±8.46	14.14	0.0001
3	SGPT/ ALT (IU/L)	300.87±98.54	24.50±5.48	19.80	0.0001
4	ALP (IU/L)	158.80±37.59	92±26.38	10.28	0.0001

Table 1: Showing comparison of various parameters of Liver function test.

Kuo et al. reported that most severely ill patients had higher levels of aminotransferases and lower level of globulin, whereas increases in albumin, alkaline phosphatase (ALP),
bilirubin, and prothrombin were unrelated to the severity of the disease.[15]
Thus, AST, ALT, and globulin are valuable parameters for evaluation of severity of infection.[16,17]
The aspartate aminotransferase (AST) levels in dengue infection tend to be greater than alanine aminotransferase (ALT) levels. [18,19] This differs from the pattern in viral hepatitis but is similar to that seen in alcoholic hepatitis. The exact cause of this is uncertain, but it has been suggested that it may be due to excess release of AST from damaged monocytes during dengue infection.

CONCLUSION

Hepatic dysfunction was present in dengue infection. SGOT and SGPT are significantly higher in patients group. Hyperbilirubinemia may also be observed. Significant elevation in alkaline phosphatase level was found in dengue patient. Limitation of this study is that differentiation between classical dengue fever and dengue hemorrhagic fever was not done. Also, coagulation function of the liver in the form of prothrombin time was not assessed especially in patients with severe elevations of aminotransferases.

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