



"STUDY OF SERUM AMINOTRANSFERASE LEVELS IN DENGUE FEVER"

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ABSTRACT Dengue infection, an arthropod-borne viral hemorrhagic fever, continues to be a major challenge to public health, especially in South-East Asia. It has a wide geographical distribution and can present with a diverse clinical spectrum. The liver dysfunction could be a direct viral effect or an adverse consequence of dysregulated host immune response against the virus. Hepatic involvement can be characterized by manifestations of acute hepatitis, with pain in the right hypochondrium, hepatomegaly, jaundice, and raised aminotransferase levels. Several outbreaks of dengue infection have been reported from India. However, large clinical studies documenting hepatic involvement in dengue infection, especially in adults, are scarce.

KEYWORDS : Dengue fever, Dengue warning signs, aminotransferases, thrombocytopenia

AIMS & OBJECTIVES:

The aim of this study was to assess the serum aminotransferase levels in patients with dengue infection presenting to a tertiary-care hospital.

MATERIALS AND METHODS

DESIGN: Descriptive study

SETTING: Medical wards, Department of Medicine, Guntur Medical College, Government Hospital, Guntur

SUBJECTS: Patients admitted in Medical Wards in which the investigator is posted and it's corresponding wards (I and IV, II and V, III and VI) of Guntur Government Hospital during the period 1st August 2019 to 31st July 2020.

SAMPLE SIZE: 166

INCLUSION CRITERIA: Dengue IgM positive.

EXCLUSION CRITERIA:

- Age <18 years,
- Malaria
- Typhoid.
- Leptospirosis,
- History of alcohol abuse.
- Chronic liver disease,
- Viral hepatitis (Hepatitis A, Hepatitis B, Hepatitis C).

INVESTIGATIONS:

The following investigations were done with special emphasis;

Dengue serology: Done by immunochromatographic method.

Liver function test: AST and ALT was estimated by IFCC (International Federation of Clinical Chemistry) without pyridoxal phosphate activation. Total bilirubin, total protein, albumin and ALP were estimated by colorimetric assay.

Routine investigations

Hemoglobin percentage, total count, ESR, Packed cell volume (PCV), Platelet count, PT and APTT, blood urea, serum creatinine, and blood sugar estimation was done.

STATISTICAL ANALYSIS

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± (standard deviation)SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance.

The following assumptions on data is made, Assumptions:

1. Dependent variables should be normally distributed.

2. Samples drawn from the population should be random, Cases of the samples should be independent

Analysis of variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients, Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS:

The study was done in Guntur General Hospital, Guntur. 166 Dengue IgM positive patients were included in the study after they had fulfilled the inclusion and exclusion criteria. Of 166 patients reactive for dengue virus specific IgM antibody, dengue virus-specific IgG antibody was also positive in 41 (24.71%) patients. As per WHO classification, 137 (82.5%) patients were classified as dengue fever, 20 (12%) as dengue with warning signs, and 9 (5.4%) as severe dengue.

Fever and headache was present in all the dengue subgroups. Occurrence of retro-orbital pain, arthralgia, myalgias, vomiting, pain abdomen and hemorrhagic manifestation were statistically significant in DWS and SD compared to classical Dengue fever patients.

Hepatic dysfunction, in the form of raised total bilirubin values was present in 31.2% (52/166), raised direct bilirubin in 62.6% (104/166), decreased total protein in 37.8% (63/166), hypoalbuminaemia in 40.3% (67/166), raised AST in 99.3% (165/166), raised ALT in 96.6% (161/166) and raised ALP in 68.2% (114/166) patients.

AST levels were 270.63 ± 255.33 U/L and was significantly higher than ALT levels (166.21 ± 167.28 U/L) and ALP levels (126.38 ± 65.63).

The mean (\pm SD) total bilirubin, direct bilirubin, total protein and albumin values were 1.20 ± 0.77 mg/dl, 0.67 ± 0.59 mg/dl, 6.58 ± 0.79 g/dl and 3.52 ± 0.42 mg/dl respectively. Table 1. show the elevation in transaminases level in different dengue subtypes. Most patients had modest elevation of liver enzymes in dengue subgroups. Liver dysfunction was more severe in DWS and SD. Two patients had AST levels more than 10 times the upper normal limit in DWS. Patients with SD had significantly elevated AST levels and ALT levels more than 10 times.

Table 1: Comparison of liver enzymes in dengue subgroups

Variables	Diagnosis			'P' Value
	DF (n=137)	DWS (n=20)	SD (n=9)	

AST (0-42 U/l)				
<1ULN	2(1.5%)	0(0%)	0(0%)	<0.001**
1-3 ULN	28(20.4%)	0(0%)	0(0%)	
3-10 ULN	107(78.1%)	18(90%)	0(0%)	
>10 ULN	0(0%)	2(10%)	9(100%)	
ALT (0-48 U/L)				
<1 ULN	7(5.1%)	0(0%)	0(0%)	<0.001**
1-3ULN	64(46.7%)	0(0%)	0(0%)	
3-10 ULN	66(48.2%)	20(100%)	1(11.1%)	
>10ULN	0(0%)	0(0%)	8(88.9%)	
ALP 20-125U/L				
<1ULN	98(71.5%)	12(60%)	0(0%)	<0.001**
1-2 ULN	34(24.8%)	7(35%)	6(66.7%)	
>2ULN	4(2.9%)	1(5%)	3(33.3%)	

OUTCOME: - All patients recovered from dengue infection in DF and DWS groups, 3 patients died in S.D. group.

DISCUSSIONS:

The aspartate aminotransferase (AST) levels in dengue infection tend to be greater than alanine aminotransferase (ALT) levels (1,2). In our study too, aspartate aminotransferase (AST) levels (270.63±255.33 U/L) tend to be greater than alanine aminotransferase (ALT) levels (166.21±167.28 U/L). This pattern is similar to that we see in alcoholic hepatitis but differs from that seen in other viral 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 myocytes during dengue infection (3). We noted a greater degree of hepatic injury in the DWS & SD group (significantly deranged liver parameters) as compared to the DF group, suggesting that the degree of liver injury may be related to the severity of dengue infection. Similar data have been suggested by Souza et al (4). However, in two other studies, the degree of elevation of liver enzymes in the DF and DWS groups was not significantly different.(5,6)

The AST and ALT levels for dengue patients correlated significantly with bleeding severity in the critical and convalescent periods ($P < 0.001$) Both liver enzyme levels demonstrated weak negative correlation with The lowest thrombocyte count and plasma fibrinogen level recorded during the same period and weak positive correlation with the APTT ($P < 0.05$) in the critical and convalescent periods. The PT showed a weak association with transaminase levels only in the convalescent period (7).

In the present study, AST and ALT levels was significantly higher in patients with sequential dengue infection as compared to those with primary infection. Serum aminotransferase elevation is seen in all patients with dengue infection, directly correlating with severity of infection

CONCLUSION:

Serum aminotransferase levels are significantly raised in all forms of dengue infection and it directly correlates with severity of infection. Serum aspartate aminotransferase was significantly raised compared to alanine aminotransferase levels in all forms of dengue infection. The degree of affection of serum albumin and prothrombin time which are absolute indicators of liver cell function correlated with severity of dengue infection.

SUMMARY

Hepatic dysfunction is very common in all forms of dengue infection, with AST rising significantly more than ALT. A greater degree of hepatic injury is observed in DWS group and SD group as compared to the DF group. Serum bilirubin, AST, ALT and coagulation profile are significantly deranged in patients with hemorrhage as compared to those without. AST and ALT are significantly higher in patients with sequential infection. Serum aminotransferase levels appear to have a directly proportional correlation with grading of dengue. Bleeding gums was the most common form of bleeding manifestation observed in dengue patients.

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