



Bioscene

Bioscene

Volume- 21 Number- 03

ISSN: 1539-2422 (P) 2055-1583 (O)

www.explorebioscene.com

Transaminitis in Dengue Fever Patients Attending a Tertiary Care Hospital in Western Uttar Pradesh

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Abstract

Introduction: Transaminitis is a condition where serum aspartate transaminase and alanine transaminase increase indicating liver dysfunction. One such disease where liver involvement might be observed is dengue, which is a mosquito-borne viral infection. The aim of the study was to find out the prevalence of transaminitis among patients with dengue fever in a tertiary care centre. **Methods:** A descriptive cross-sectional study was conducted at a tertiary care center in western Uttar Pradesh from October 1, 2023 to April 15, 2024 following ethical approval from the Institutional Review Committee. Prior to collecting the data, informed written consent was obtained from the participants. To confirm dengue infection a rapid immuno-chromatography test was done. Serum aspartate transaminase and alanine transaminase levels were measured using the routine Reitman and Frankel's enzymatic method. The study included dengue-confirmed patients from the medical outpatient department and admitted patients in medical ward of the center. Exclusion criteria comprised patients with known prior liver diseases, chronic diseases and pregnant patients. Convenience sampling was employed as the method of participant selection. The point estimate was calculated at a 95% Confidence Interval. **Results:** Among 200 dengue infected patients, the prevalence of transaminitis was 174 (87%) (37.92-47.13, 95% Confidence Interval). The highest frequency of dengue positive was observed among the 18-35 years age group, which was 97 (52.0%) with male predominance 140 (70.0%). **Conclusions:** The prevalence of transaminitis among patients with dengue fever in a tertiary care centre was found to be lower than other studies done in similar settings.

Keywords: Alanine transaminase, Aspartate transaminase, Dengue

Introduction

Transaminitis is a condition characterized by an increase in serum aspartate transaminase (AST) and alanine transaminase (ALT).¹The elevation of serum

transaminases occurs when the hepatocytes are damaged by various diseases making transaminases a useful marker for assessing hepatic involvement and the severity of different diseases.

Dengue fever is more prevalent in Southeast Asia and is transmitted by the *Aedes aegypti* mosquito.² It typically presents with flu-like symptoms but can progress to severe dengue when a person previously infected with one dengue virus serotype is reinfected with another serotype.² Severe dengue can lead to complications such as bleeding, endothelial leakage, and organ involvement including cardiomyopathy, encephalopathy, and hepatic injury⁵. In cases of dengue, the presence of transaminitis suggests hepatic involvement, with serum AST levels typically being higher than ALT levels during the early stages of the infection^{3,4}.

The aim of the study was to find out the prevalence of transaminitis among patients with dengue fever in a tertiary care centre.

Methods & Materials

This descriptive cross-sectional study was conducted on the patients presented to SMS&R, Sharda University, Greater Noida, Uttar Pradesh from 1 Oct 2022 to 15 April 2023, and the ethical approval was obtained from the Institutional Review Committee. Patients diagnosed with dengue were enrolled in the study after their informed written consent. Dengue-confirmed patients from the medical outpatient department (OPD) and admitted patients in the medical ward of the centre with complete data were included in the study. Patients with known prior liver diseases or any other chronic diseases and pregnant patients were excluded. Convenience sampling method was used.

Blood samples were collected from patients who were confirmed to have dengue. The serum was immediately separated from the blood samples. This study utilized a rapid test based on the immune-chromatography principle to detect NS1 Ag, IgM and IgG. Detection of NS1 Ag and IgM (either one or both) confirms dengue infection and is consistent with the acute phase of the infection. NS1 Ag was detected on the first day after exposure while IgM was detected between 3 to 7 days following dengue infection. After 14 days following exposure all patients would have developed IgG antibodies to the dengue virus which persist throughout their life. Detection of only IgG signifies that the patient had a past dengue infection. Serum AST and ALT levels were measured in a Cobas fully automated analyzer using the routine Reitman and Frankel's enzymatic method. For the diagnosis of transaminitis, serum AST and ALT levels should be greater than 40 U/L based on the hospital laboratory reference ranges.

The data was entered into Microsoft Excel 2016 and then analyzed using IBM SPSS statistics version 23.0.,The point estimate was calculated with a 95% confidence interval.,Out of 200 dengue patients, transaminitis was found in 174 individuals, which accounts for 87% of the total sample (95% CI: 37.92-47.13).Increased serum AST levels were observed in 174 patients, accounting for 87% of the total, while elevated ALT levels were seen in 168 patients, which is 84% of the total.,The highest frequency of transaminitis among dengue-positive patients was observed in the 18-35 years age group, with 104 individuals representing 52%, and male predominance was noted with 140 males, accounting for 70.0% of the total.

Distribution of transaminitis among dengue patients based on demographic factors (n= 200).

Table 1

Age group (years)	n (%)
<18	2 (1.0)
18-35	104 (52.0)
36-55	42 (21.0)
56-75	22 (11.0)
>75	4 (2.0)
Gender	
Male	140 (70.0)
Female	60 (30.0)

Among transaminitis patients, 76(38%) and 58 (29.0%) complained symptoms of nausea and vomiting, respectively. Decreased platelet count was seen among 160 (80.0%) of the patients. Increased direct bilirubin level was seen in 116 (58.0%) .

Table 2

Clinical symptoms and laboratory parameters in transaminitis among dengue patients (n= 200).

Clinical symptoms

N%

Nausea		76 (38.0)
Vomiting		56 (29.0)
Hepatomegaly		4 (2.0)
Petechia/purpura		60 (30)
Laboratory findings		
<hr/>		
Low platelet count		160 (80.0)
Increased creatinine		30 (15)
Increased total serum bilirubin		32 (16)
Increased direct serum bilirubin		116 (58)

Discussion

The prevalence of transaminitis among the total participants was 174 (87%), with AST levels higher than ALT.⁹In other similar studies, it was observed that abnormal serum aminotransferases showed a similar trend of increased AST/ALT in dengue fever but with a higher frequency than in our population. Transaminitis in dengue infection could be attributed to the direct effect of the dengue virus on hepatocytes or the host's immune response to the viral infection.

The primary targets of the dengue virus are the receptors present on hepatocytes and Kupffer cells, leading to cellular apoptosis, mitochondrial dysfunction, immune response and accelerated endoplasmic reticular stress.⁸Severe dengue may result from exaggerated immune reactions to recurrent infections, stimulating a cytokine storm and causing the concentrations of different cytokines to reach peaks⁶.

The higher level of AST compared to ALT in dengue infection could be due to the release of enzymes from the damaged myocytes aiding in the differentiation of dengue infection from acute hepatitis caused by Hepatitis A, B and C due to their reverse AST/ALT pattern.^{6,7} Jaundice is associated with severe hepatic disease and is a poor prognostic factor in itself with hyper-bilirubinemia observed in 16.0% of the cases and increased direct bilirubin in 58% of the cases.

High bilirubin may serve as a poor prognostic marker in dengue infection, while hepatomegaly was only seen in 2.0% of cases lower than in other studies with a much higher frequency in adult dengue patients^{7,10}. This study has certain limitations, including the inability to measure the types of dengue virus due to cost factors and unavailability and the inability to follow up on whether serum transaminases declined with the improvement of acute dengue infection due to the cross-sectional nature of the study. Additionally, the recruitment of patients from a single tertiary center may limit the generalization of the results to the entire population highlighting the need for further analytical investigation to establish the association between transaminases and the severity of dengue infection.

Conclusions

The prevalence of transaminitis among patients with dengue fever in a tertiary care centre was found to be lower than other studies done in similar settings.

Conflict of Interest : None

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