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### Key Words

Dengue, hepatic dysfunction, dengue infection and hepato protective

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## Clinico Biochemical Profile of Hepatic Involvement Among Children with Acute Dengue Infection in a Tertiary care Hospital A Record Based Study

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### ABSTRACT

The dengue virus is a major public health concern that has been more prevalent recently with complex and unusual symptoms. Dengue is known to impact the liver and can cause a variety of symptoms, including fulminant hepatic failure, increased liver enzymes, and hepatomegaly. Objective: to investigate the clinical correlations between liver dysfunction in childhood dengue infection and factors such as severity, clinical features, other laboratory parameters, morbidity and death. The present study was a Descriptive, Retrospective, Record based study. Records was checked and collected of the children admitted with Dengue infection during the period of january 2022 to December 2022. Data collection and analysis was done during Sep-Oct 2023 after obtaining TAC and IEC clearance. The study was done at department of Paediatric, College of Medicine and Sagore Dutta Hospital, Kolkata, and West Bengal 700058. Total 50 patients were included in this study. In our study, 21 (42%) patients had Probable Dengue (PD) Diagnosis, 22 (44%) patients had Dengue with Warning Signs (D+WS) Diagnosis and 7 (14%) patients had Severe Dengue (SD) Diagnosis. The value of z is 3.3057. The value of p is .00094. The result is significant at  $p < .05$ . There have been reports of dengue outbreaks in developing nations like India that have varied degrees of increased hepatic involvement. Early detection of Dengue hepatic dysfunction should help to prevent potentially fatal complications because it is a temporary and reversible condition. This may lessen the morbidity and mortality brought on by dengue fever. Additional research should be done to analyze the role hepato-protective drugs have in lowering morbidity and mortality rates.

## INTRODUCTION

In most tropical regions of the world, dengue infection poses a serious threat to public health: in the Indian subcontinent and other south-east Asian nations, the risk is highest. The most prevalent arbovirus disease that spreads around the world is dengue. The Flaviviridae family of viruses, which includes the dengue virus DEN 1, DEN 2, DEN 3 and DEN 4, has at least four different antigenic kinds. In recent decades, dengue infection has become far more commonplace worldwide. Unchecked urbanization, overcrowding, poor health services, increased travel to dengue-affected areas, inadequate vector management, climate change and low public knowledge are some of the factors contributing to the disease's development.

It is well recognized that dengue infections can manifest a wide range of clinical symptoms, from asymptomatic sickness to deadly consequences. The frequency of unusual symptoms has increased. These include acute respiratory distress syndrome, myocarditis, dengue hepatitis, encephalitis and Guillain-Barre syndrome. Hepatic dysfunction can range from hepatomegaly, a mild injury with elevated transaminase activity, to fulminant hepatic failure, a severe injury with jaundice. The clinical appearance of hepatic impairment influences its severity.

The reason behind disseminated intra vascular coagulation, metabolic acidosis and insufficient perfusion-related liver damage. This ultimately results in ischemia, which seriously impairs the liver. In endemic locations, the presence of fever, jaundice and hepatomegaly should raise the possibility of dengue hepatitis. Understanding these hepatic involvement symptoms of dengue may assist prevent morbidity and mortality and facilitate early diagnosis. Nonetheless, there aren't as many studies available on dengue-related hepatic impairment. Thus, this study has been conducted with this goal in mind.

## MATERIALS AND METHODS

**Study design and place:** The present study was a Descriptive, Retrospective, Record based study. Records was checked and collected of the children admitted with Dengue infection during the period of january 2022 to December 2022. Data collection and analysis was done during Sep-Oct 2023 after obtaining TAC and IEC clearance. The study was done at Department of Paediatric, College of Medicine and Sagore Dutta Hospital, Kolkata, West Bengal 700058. Total 50 patients were included in this study.

**Sample size:** 50 patients

### Inclusion criteria:

- Every case has serological proof

### Exclusion criteria:

- Associated illnesses such as malaria, enteric fever, hepatitis and leptospirosis that are known to cause hepatic involvement

**Statistical analysis:** For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS 27.0. And Graph Pad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. p-value = 0.05 was considered for statistically significant.

## RESULT

In our study, 21 (42%) patients had Probable Dengue (PD) Diagnosis, 22 (44%) patients had Dengue with Warning Signs (D+WS) Diagnosis and 7 (14%) patients had Severe Dengue (SD) Diagnosis. The value of z is 3.3057. The value of p is .00094. The result is significant at  $p < .05$ . In PD, 12 (48%) patients were Male and 7 (28%) patients were Female. In D+WS, 9 (36%) patients were Male and 10 (40%) patients were Female.

In SD, 4 (16%) patients were Male and 8 (32%) patients were Female. Association of sex with Diagnosis was not statistically significant ( $p = 0.2590$ ). In PD, 28 patients were Normal. IN D+WS, 7 patients were Normal and 19 patients were increased. Association of Liver span with Diagnosis was not statistically significant ( $p = 1.9245$ ). In PD, 2 patients

Table 1: Distribution of Diagnosis

Diagnosis	Frequency	Percent
Probable Dengue (PD)	21	42
Dengue With Warning Signs (D+WS)	22	44
Severe Dengue (SD)	7	14
Total	50	100

Table 2: Association between Sex: Diagnosis

Diagnosis	Male		Female		Total	Chi square	p-value
	N	%	N	%			
PD	12	48	7	28	19	2.7017	0.2590
D+WS	9	36	10	40	19		
SD	4	16	8	32	12		
Total	25	100	25	100	50		

Table 3: Association between Liver span: Diagnosis

Liver span	Diagnosis		Chi square	p-value
	PD	D+WS		
Normal	28	7	31.5692	1.9245
Increased	0	19		
Total	28	26		

Table 4: Association between Outcome: Diagnosis

Outcome	Diagnosis		Total	Chi square	p-value
	PD	D+WS			
Expired	2	4	6	0.3148	0.5747
Recovered	20	24	44		
Total	22	28	50		

were expired and 20 patients were recovered. IN D+WS, 4 patients were expired and 24 patients were recovered. Association of Outcome with Diagnosis was not statistically significant ( $p = 0.5747$ ).

## DISCUSSIONS

One of the most prevalent diseases in the world spread by mosquitoes is dengue infection. Dengue virus, primarily of the four serotypes DEN 1, DEN 2, DEN 3 and DEN 4, is the causal agent. It can cause a wide range of symptoms, from nonexistent problems to potentially fatal ones. There may be an increase in incidence among children, according to recent research<sup>[1]</sup>.

### Hepatic involvement in dengue

**Hepatomegaly:** In dengue patients, hepatomegaly was more likely in those with severe dengue and those with cautionary indicators. In our study, 21 (42%) patients had Probable Dengue (PD) Diagnosis, 22 (44%) patients had Dengue with Warning Signs (D+WS) Diagnosis and 7 (14%) patients had Severe Dengue (SD) Diagnosis. Thus hepatomegaly may be used as a tool to indicate the severity of the disease. The value of  $z$  is 3.3057. The value of  $p$  is .00094. The result is significant at  $p < .05$ . Ole Wichmann *et al.*<sup>[3]</sup> 43%, Gurdeep Dhoria *et al.*<sup>[2]</sup> 60% and Brij Mohan *et al.*<sup>[4]</sup> 74%.

**Liver enzymes:** The rate at which liver enzyme levels have increased may be a useful indicator of how serious the illness will be. A higher level of liver enzymes is associated with a worse prognosis. Levels of SGOT increased during the first week and SGPT increased during the second week, according to a study by Brij Mohan *et al.*<sup>[4]</sup>. By the third week, the levels of both had started to drop. A similar trend was also observed in the rise in serum alkaline phosphatase. Day 3 was when Nimmannitya *et al.*<sup>[5]</sup> discovered that SGOT increased. peaks on day 7 and between three to eight weeks, they returned to normal. Damage to the liver causes an increase in SGPT, which is mostly linked to hepatocytes. Damage to these structures causes SGPT, which is elevated in cardiac and skeletal muscle, hepatocytes, renal and brain tissue. In the early stages of a fever, liver enzymes may serve as a potential sign for dengue.

**SGOT/AST:** The serum SGOT was elevated in 64% of dengue patients. Upon comparing the groups, it was observed that 64% of patients with probable dengue, 88% with warning signs and 100% with severe dengue had an increase in SGOT. Studies by Brij Mohan *et al.*<sup>[4]</sup> and M Narayanan *et al.*<sup>[6]</sup> also showed abnormal liver enzyme levels. SGOT was found to be elevated in

63.4% of cases according to Souza *et al.*<sup>[7]</sup> and to be elevated in 97.9% of cases according to Kuo *et al.*<sup>[8]</sup>.

**SGPT/ALT:** In 48% of patients with dengue infection, the SGPT was elevated. Comparing the groups, patients with probable dengue showed an increase in SGPT in 40% of cases, warning sign patients in 66% and severe dengue patients in 81% of cases. Research by Narayanan and colleagues 6, Srivenu Itha and colleagues<sup>[9]</sup>. In 45% of patients, Luiz Jose Souza *et al.*<sup>[7]</sup> showed an increase in ALT. In 82% of the patients, Kuo *et al.*<sup>[8]</sup> saw an increase in ALT. According to MMA Faridi *et al.*<sup>[10]</sup>, ALT levels increased by 64.6%. Enzyme levels were higher in dengue patients.

**Alkaline phosphatase:** In 28% of patients with dengue infection, the SGPT was elevated. When comparing the groups, 9.5% of patients with probable dengue, 32% with warning signs and 82% with severe dengue showed an increase in SGOT. Examine by Kuo *et al.*<sup>[8]</sup> 16% of elevation in ALP and MMA Faridi *et al.*<sup>[10]</sup> 35.3%

**Jaundice:** Jaundice is linked to a dismal prognosis. It's linked to hepatic fulminant failure. In this study, 10% of individuals who had a severe dengue illness had elevated serum total bilirubin. Research by Patware *et al.*<sup>[4]</sup> 25%, Srivenu Itha *et al.*<sup>[9]</sup> 16% and Dhin The Thrung *et al.*<sup>[11]</sup> 2% showed jaundice.

**Serum albumin:** Liver damage and capillary leakage may be the cause of hypoalbuminemia. Twelve percent of the participants in the current study showed hypoalbuminemia. Hypoalbuminemia was present in 16.5% of the study by Manzhi Wong *et al.*

### Prothrombin time:

- Clotting components that are dependent on vitamin K determine the prothrombin time
- Severe dengue is accompanied with abnormal PT
- In the current study, 11% of dengue infection patients had elevated prothrombin times. Comparing the groups, a rise in PT was seen in 6.4% of those with warning signs and 72% in cases of severe dengue. In 16% of individuals, extension of PT was noted by Sri Venutha *et al.*<sup>[9]</sup>.

**Activated partial thromboplastin time:** Eleven percent of dengue patients had elevated Activated Partial Thromboplastin Time. When comparing the groups, 6.4% of patients with warning signs and 72% of patients with severe dengue experienced an increase in APTT.

**Platelet count:** Seventy-four percent of the people with probable dengue, 100% of cases with severe dengue and 98% with warning signs.

**Clinical outcome:** Out of 50 hospitalized dengue cases with serological confirmation, 42 were diagnosed as probable cases, 47 had warning signs and 11 were severe infections. Due to DIC, two individuals with severe dengue died. In some situations, there were extremely high enzyme levels.

## CONCLUSION

Dengue fever outbreaks are becoming more common in developing countries such as India. Various degrees of hepatic involvement have been documented. Because hepatic impairment in dengue is temporary and reversible, early detection might aid in reducing life-threatening consequences. This may assist to lower morbidity and death associated with dengue infection. Further research on the impact of hepatoprotective medicines in lowering morbidity and death is needed.

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