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Spectrum of hepatic manifestations in dengue fever and relation to the outcome in children: A clinical study

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Abstract:
Background: Infection with the dengue virus has become a major public health concern in the last few years because the magnitude of the symptoms has increased dramatically.. There are many different signs of hepatic involvement by dengue, ranging from a hepatic enlargement to deranged liver enzymes and fulminant hepatic failure.
Material and Methods: A prospective study was done between April 2022 to March 2023, at the department of paediatrics,Government General Hospital and Kurnool Medical College, Kurnool, Andhra Pradesh.This was a prospective Cohort Study.Around 125 children who tested positive for dengue serology and admitted were recruited in the study. Children who tested positive for Dengue Serology were thoroughly examined clinically for fever and hepatomegaly.
Results: All of the subjects had high grade fever. Fever was most documented in children between 5 to 8 years old.. .The fever was high grade with headache and retrooebital pain.Hepatomegaly was the most common clinical sign documented. The presence of thrombocytopenia was noted in 88% of cases. Serum total bilirubin levels were raised in 12percent of subjects with severe dengue illness.
Conclusion: Dengue fever epidemics have been linked to uptrend in hepatic involvement in developing countries like India.. Since hepatic impairment is transient and reversible in dengue, early diagnosis and treatment aids in preventing potentially fatal outcome.

Keywords: Children, hepatic impairment, and clinical relationship with dengue

INTRODUCTION

Dengue fever remains as the most important arthropod borne viral disease in humans.dengue fever is the most prevalent in Indian subconand tropical regions,The flavivirus family includes four subfamilies, one of which includes dengue virus. There are four distinct DEN varieties. Dengue fever has become more commonplace in many parts of the world in recent decades [1, 2]. Unchecked population growth, unchecked urbanization [3], crowding, insufficient healthcare, increased travel to epidemic areas, ineffective vector management, climatic change, and a lack of public education are all factors in the spread of dengue fever [4, 5].

The occurrence of unusual clinical signs have increased recently. Among the illnesses that fit this description are acute respiratory distress syndrome, encephalitis, Guillain-Barré syndrome, dengue hepatitisand myocarditis. Mild hepatic dysfunction is characterized by increased transaminase activity and hepatomegaly, while severe hepatic dysfunction is characterized by jaundice and fulminant liver failure. Depending on the clinical presentation, the severity of hepatic dysfunction may range widely [6-8].

Clinical presentations of dengue virus infection have been reported to span the spectrum from no symptoms at all to very catastrophic outcomes. The frequency with which uncommon clinical manifestations appear has increased. Depending on how the disease presents itself clinically, the severity of hepatic dysfunction may differ from patient to patient [9, 10].dengue assosiated acute liver failure has high mortality due to complications such as decreased hepatic perfusion, metabolic acidosis, and disseminated intravascular coagulation. Hepatic dysfunction is attributed to decreased perfusion,direct damage by the virus and immune mediated injury [11,12].

Dengue hepatitis should be suspected when fever, jaundice, and hepatomegaly occur in regions where dengue fever and dengue hepatitis are both prevalent [13, 14]. In order to make an early diagnosis and minimize morbidity and mortality, it is important to be aware of the symptoms of dengue's involvement in the liver. However, there is a paucity of research on the impact of dengue fever on the liver. With that in mind, the relevant study was conducted. The potential for hepatic impairment in dengue-infected youngsters was one of the study's primary motivations. The goal is to learn more about the links between clinical factors such symptoms, diagnostic findings, and health outcomes.

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MATERIALS AND METHODS:

Study was done between April 2022 to March 2023, at the Government General Hospital and Kurnool Medical College, Kurnool, Andhra Pradesh. . Hundred and twenty children with Dengue fever who were admitted with a positive dengue serology were included in the study. The subjects were examined for hepatomegaly and jaundice. Routine investigations like complete blood picture , liver function tests and ultrasound abdomen PT, APTT, HBsAg, HCV, and Widal were done to all the study subjects.

InclusionCriteria:

- All cases with symptoms and corroborative serological evidence of infection were selected

ExclusionCriteria:

- Leptospirosis, enteric fever, chronic liver disease and malaria which are other causes of hepatitis.

RESULTS

The study was conducted in the pediatrics department. The WHO criteria for the diagnosis of dengue infection were met in cases between the ages of 2 months and 12 years who tested positive for the serological IgM dengue antibody.

Table 1: details on the patient's diagnosis

Sr. No.	Diagnosis	Frequency
1.	Probable dengue	78
2.	Dengue with warning signs	30
3.	Severe dengue	17
	Total	125

Of the 125 individuals with a dengue infection who were admitted to the hospital, 30 were found to have a probable dengue infection, 30 had warning signs and 17 had severe dengue.

Table 2: Cases distributed based on gender

Genderof thechild			
Diagnosis	Male	Female	
	N	N	Total
PD	49	29	78
D+WS	18	12	30
SD	12	5	17
Total	79	46	125

The risk of dengue fever infection was practically the same for male and female children and adolescents.

Table 3: Analyzing the differences between groups according to the existence of hepatomegaly

	Diagnosis	
Liverspan	PD	D+WS
Normal	115	10
Increased	10	
Total	125	125

Hepatomegaly was present in 55% of the patient population. When the patients from each group were compared to one another, it was determined that 100% of patients had severe dengue, and 90% of patients showed warning indications. There were 125 cases of dengue that had been serologically proved and among them, 78 were diagnosed with probable dengue, 30 were diagnosed with warning signs and 17 were diagnosed with severe dengue. Six children with severe dengue fever and DIC succumbed to the illness. In those particular cases, the levels of the hepatic enzymes were grossly elevated.

DISCUSSION:

This research was conducted with the intention of determining the clinical correlates of hepatic dysfunction in children who were diagnosed with dengue infection. These clinical criteria include clinical features, lab investigations , morbidity, and death. The World Health Organization (WHO) recommended the following classification of dengue infection into three categories: dengue with probable symptoms, dengue with severe symptoms, or dengue with warning indications.The following observation were made. All the subjects presented with fever . In the majority of

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cases, it occurred in children between 5 to 8 years. Hepatomegaly was the most frequently observed clinical manifestation. There was a decrease in the number of platelets in 88% of the cases. 15% of the subjects who had a severe dengue infection showed an increased total bilirubin level in their serum[10,11].

Dengue patients reported an increased prevalence of high serum SGOT in 74% of cases. All the subjects in the three groups showed high SGOT levels. The level of SGPT was found to be elevated in 58% of individuals who were diagnosed with dengue infection. Individuals who had probable dengue, warning indications, and severe dengue all exhibited an increase in SGPT, which was found to be the case when the groups were compared [12, 13].

The level of SGPT was found to be higher in 28.0% of individuals who were diagnosed with dengue infection. Patients with 9.5% of probable dengue, 32% with warning signs, and 82% with severe dengue all exhibited a rise in SGOT when the groups were compared. 11% of patients diagnosed with dengue fever had abnormally high prothrombin times. When the two groups were compared, researchers found that 6.4% of people with warning signals and 72% of people with severe dengue showed an increase in PT [14, 15]. Individuals who had severe dengue and individuals who had warning signals were more likely to develop hepatomegaly than other patients. 55% of the participants in the current study who had probable dengue, % of those who had warning signs, and % of those who had severe dengue had hepatomegaly. As a result, one can utilize the degree of hepatomegaly to determine how severe the condition is. In a research conducted in Indonesia, 47.2% of the patients were found to have hepatomegaly [16, 17]. When these tissues are harmed, SGPT levels rise. The early febrile stage of dengue can be diagnosed with the help of enzymes found in the liver. Seventy-four percent of dengue patients had elevated levels of SGOT in their bloodstream. When the groups were compared, there was an increase in SGOT in all three categories: probable dengue, warning signs, and severe dengue. This was the finding. Researchers Brij Mohan *et al*. and SrivenuItha *et al*. both found aberrant levels of liver enzymes in their respective studies [17-19].

According to the findings of a study that was carried out in Nagpur, jaundice was present in 24% of the 40 severe dengue cases [20]. Injuries to the liver or leaks in the capillaries can also lead to hypoalbuminemia. In the most recent study, 12 percent of individuals were found to have hypoalbuminemia. According to the findings of the research conducted by Manzhi Wong *et al*., 16.5% of the participants developed hypoalbuminemia. The time it takes for prothrombin to complete its cycle is affected by clotting factors that are vitamin K-dependent. Dengue fever to an extreme is regarded to be the cause of abnormal PT. In the most recent study, researchers found that patients with dengue fever had elevated prothrombin times in 11% of their cases. When the two groups were examined, it was discovered that 6.4% of people who had warning symptoms and 72% of persons who had severe dengue had an increase in their PT [21-23].

According to the findings of a study that was carried out in Nagpur, dengue fever encompasses cases of severe dengue as well as cases of dengue fever with a warning among patients whose prothrombin times were high. According to the findings of another study that was carried out in Chennai, the vast majority of children under the age of five who suffered from severe dengue were infants [23, 24]. In the course of our research, 19.2% of the total of 120 individuals were diagnosed with hypoproteinemia. Those between the ages of 3 and 5yrs are most likely affected. According to the results of our research, 62.4% of patients had dengue fever, 26.5% had dengue with warning signs, and 100% of patients with severe dengue had hypoproteinemia. This suggests that liver function is more abnormal in severe dengue. Hypoalbuminemia was seen in 35% of the people who took part in our investigation[25-27].

CONCLUSION

In developing nations such as India, the frequency of dengue fever outbreaks is higher. Involvement of liver leading to hepatic dysfunction is a well recognized complication of dengue fever. Since the hepatic impairment caused by dengue is only transitory and reversible, early detection of the same would help to avert life-threatening complications caused by the disease. Dengue associated acute liver failure has a high mortality due to complications such as Encephalopathy, Bleeding diasthesis, Renal failure and Metabolic acidosis.

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Conflict of interest None

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