

Analysis of Dengue Infection with Hepatic Dysfunction in the Pediatric Patients: Prospective Analysis

Zahida Inkisar Khan

Assistant Professor, Department of Pediatrics, Dr. Kiran C. Patel Medical College and Research Institute, Bharuch, Gujarat

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Corresponding author: Dr Zahida Inkisar Khan

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Abstract

Background and Aim: Infection with dengue is a significant public health issue in the majority of tropical regions of the world, with the Indian subcontinent and other south east Asian nations having the highest risk. The clinical profile of dengue, however, has only been the subject of a relatively small number of researches. Hence the aim of the present study was to analyze the clinical correlates like clinical features, laboratory parameters, morbidity and mortality.

Material and Methods: Patients for the research analysis were selected as per criteria. For the study to be statistically significant, a sample size of 200 was taken. Patients with dengue seropositivity were chosen, clinically evaluated for hepatomegaly and jaundice, and given liver function tests, full blood counts, abdominal ultrasounds, and analyses of PT, APTT, Widal, HBsAg, and HCV.

Results: 200 patients with dengue infection were hospitalised, and 84 were diagnosed as having probable dengue, 94 as having warning signs, and 22 as having severe dengue. Of the patients, 55% had hepatomegaly. 93.6% of patients with warning signs and 100% of those with severe dengue were found when the groups were compared. 74% of patients with probable dengue, 98% with warning signs, and 100% with severe dengue experienced thrombocytopenia.

Conclusion: Dengue outbreaks are more frequent in developing nations like India. Early detection of the same would help to avoid life-threatening complications as hepatic impairment in dengue is temporary and reversible. This may aid in lowering dengue infection-related morbidity and mortality. More research is needed to examine how hepato protective medications affect morbidity and death.

Keywords: Dengue, Liver function test, Hepatic analysis, Paediatric analysis

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Introduction

India is one of the seven nations in the South-East Asia region that have been identified as consistently reporting dengue fever/dengue hemorrhagic fever (DF/DHF) outbreaks, and it may soon develop into a significant hub for dengue infection [1,2]. Infection with dengue is a significant public health issue in the majority of tropical regions of the world, with the Indian

subcontinent and other south east Asian nations having the highest risk. The most widespread arbovirus disease in the world is dengue [3]. Dengue virus, a member of the Flaviviridae family, has at least four different antigenic types: DEN 1, DEN 2, DEN 3, and DEN 4. In recent decades, dengue illness has become significantly more common on a global scale.

Unchecked urbanisation, overcrowding, inadequate healthcare facilities, increased travel to dengue-endemic areas, inadequate vector management, low climate change awareness, and unchecked population growth are only a few of the factors contributing to the spread of dengue [3-5].

It is well recognized that dengue infections can manifest clinically in a variety of ways, from asymptomatic sickness to catastrophic result. The frequency of unusual symptoms has increased [6]. These include acute respiratory distress syndrome, encephalitis, Guillain-Barre syndrome, dengue hepatitis, and myocarditis [7].

Hepatic dysfunction ranges from mild injury with increased transaminase activity, hepatomegaly, and fulminant hepatic failure to severe damage with jaundice. Depending on the clinical presentation, hepatic dysfunction might range in severity [8]. Hepatic dysfunction may result from a variety of conditions, including inadequate perfusion, metabolic acidosis, and disseminated intravascular coagulation. Ischemia is the outcome, which severely damages the liver [9].

However, only a small number of studies have focused on the clinical characteristics of dengue. The current study's objective was to investigate clinical correlations, including those between clinical traits, laboratory data, morbidity, and mortality.

Materials and Methods

A hospital based observational study was conducted at department of pediatrics of medical college and government hospital, or the period of one year. A total of 200 pediatric patients hospitalized with dengue infection were included in the study. The patients parents were informed about the study and informed consent was obtained from all the parents before undergoing the study. The ethical institute of the college was informed about the study and prior clearance certificate was obtained prior to the start of the study.

The exclusion and inclusion criteria were as followed:

All cases with valid serological evidence.

Exclusion Criteria: The study was excluded due to associated infections known to cause hepatic involvement, such as leptospirosis, enteric fever, hepatitis, and malaria.

Evaluation method: Patients with dengue seropositivity were chosen and clinically assessed for hepatomegaly and jaundice as well as submitted to full blood counts, liver function tests, abdominal ultrasounds, and analyses of PT, APTT, Widal, HBsAg, and HCV.

Study Design

The present research is the prospective COHORT study. Patients for the research analysis were selected as per criteria. For the study to be statistically significant, a sample size of 200 was taken.

Methods

On pre-designed performa, a thorough history of clinical characteristics was documented, including the symptoms of dengue fever. Automated counter method was used to complete the CBC. On the day of admission, tests for liver function were performed. As part of our hospital's regular diagnostic process, an abdominal USG was performed. Software called SPSS-24 was used for the statistical analysis.

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

The study included 200 paediatric patients in total. Males made up 120 of the study group, while females made up 80, giving a male to female ratio of 1.2:1. There was a little male predominance. Children between the ages of 5-7 years old were the most common age range for dengue infection presentation. The gender distribution of

children with dengue virus infection was not statistically significant and had a mean age of 9 years.

200 patients with dengue infection were hospitalised, and 84 were diagnosed as having probable dengue, 94 as having warning signs, and 22 as having severe dengue. Of the patients, 55% had hepatomegaly. 93.6% of patients with warning signs and 100% of those with severe dengue were found when the groups were compared. 74% of patients with probable dengue, 98% with warning signs, and 100% with severe dengue experienced thrombocytopenia. In 148 patients with dengue, serum SGOT levels were elevated. When SGOT levels were compared between the groups, they showed that 50 patients had probable dengue, 76 had

warning indications, and 200 had severe dengue. In 58% of patients with dengue infection, the SGPT level was elevated. When SGPT levels were examined between the groups, they showed that 36 patients had probable dengue, 62 had warning signs, and 18 had severe dengue.

In 12% of patients with dengue infection, serum total protein was decreased. When the groups were compared, 12.7% of those with warning signs and 54.5% of those with severe dengue experienced a decline in blood protein. In 3% of dengue infection patients, serum albumin was lower. When compared between the groups, 4.3% of people with warning signs and 9% of people with severe dengue experienced a reduction in serum albumin.

Table 1: Comparison between Groups with Respect to Serum SGOT

SGOT	PD	D + WS	SD	Total
Normal	34	18	0	52
Increased	50	76	22	148
Total	84	94	22	200

Table 2: Comparison between Groups with Respect to Serum SGPT

SGPT	PD	D + WS	SD	Total
Normal	48	32	4	84
Increased	36	62	18	119
Total	84	94	22	200

Discussion

One of the most prevalent diseases in the world spread by mosquitoes is dengue infection. Dengue virus, mostly of the four serotypes DEN 1, DEN 2, DEN 3, and DEN 4, is the responsible agent [10]. It can appear in a variety of ways, from being asymptomatic to having serious problems. According to recent research, the incidence among kids has increased [11].

Patients with severe dengue and those who had warning signals were more likely to develop hepatomegaly. In the current study, hepatomegaly affected 55% of people with probable dengue, % with warning signs, and % with severe dengue [12]. Hepatomegaly can therefore be a tool for determining the severity of the condition. In a research conducted in Indonesia, 47.2%

of cases had hepatomegaly [13]. When the liver is damaged, SGPT levels rise and are mostly linked to hepatocytes. Heart and skeletal muscle, hepatocytes, kidneys, and brain tissue all contain SGPT, which is elevated when these tissues are damaged. The early febrile phase of dengue can be identified by liver enzymes. Seventy-four percent of dengue patients had elevated serum SGOT. When the groups were compared, those with probable dengue (74%), those with warning signs (98%), and those with severe dengue (100%) all experienced an increase in SGOT. Deranged liver enzyme levels were also found by Srivenultha *et al* [14] and Brij Mohan *et al* [15] studies.

Patients who have jaundice have a bad prognosis and are more likely to get severe dengue. Other studies found a high incidence of severe dengue because there was less public awareness and delayed treatment. In a research done in Nagpur, 24 percent of the 50 severe dengue cases developed jaundice.

Capillary leakage and liver damage are two possible causes of hypoalbuminemia. In the recent study, 12% of participants exhibited hypoalbuminemia. 16.5% of participants in Manzhi Wong *et al* study's had hypoalbuminemia. Vitamin K dependent clotting factors affect prothrombin time. Severe dengue is seen as abnormal PT. In the recent study, 11% of individuals with dengue illness had elevated prothrombin times. When the groups were compared, 6.4% of those with warning signs and 72% of those with severe dengue experienced an increase in PT.

Conclusion

Dengue outbreaks are more frequent in developing nations like India. Early detection of the same would help to avoid life-threatening complications as hepatic impairment in dengue is temporary and reversible. This may aid in lowering dengue infection-related morbidity and mortality. More research is needed to examine how hepato protective medications affect morbidity and death.

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