|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
PubMed (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Research Article
Volume 3, Issue 8; August: 2019; Page No. 01-04

ASSESSMENT OF LIVER FUNCTION TESTS IN DENGUE FEVER

Dr. Radhey Shyam Gupta
Associate Professor, Department of Medicine, Pacific Medical College & Hospital, Bhillo ka Bedla, Udaipur, India

Article Info: Received 30 April 2019; Accepted 27 June. 2019
DOI: https://doi.org/10.32553/ijmbs.v3i8.437
Address for Correspondence: Dr. Radhey Shyam Gupta, Associate Professor, Department of Medicine, Pacific Medical College & Hospital, Bhillo ka Bedla, Udaipur, India
Conflict of interest: No conflict of interest.

Abstract
Background: The prevalence of dengue viral infection has tended to rise globally in the recent decades. In India the burden and prevalence of dengue viral infection is increasing as trends reported globally. Hence, along with global pandemic concern dengue has become major public health concern in India. Dengue is an emerging epidemic disease and several outbreaks among every state of India is being reported from time to time.
Material & Methods: The present cross-sectional study includes 50 Patients who had dengue IgM antibody positive were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.
Results: 10 (20%) patients had normal serum ALT levels, 13 (26%) patients had serum ALT levels raised less than Two-folds, 12 (24%) patients had serum ALT levels raised more than Two-folds, 11 (22%) patients had serum ALT levels raised more than four-folds and 04 (8%) patients had serum ALT levels raised more than ten folds. Among the total study participants 7 (14%) had normal serum AST levels, 14 (28%) patients had serum AST levels raised less than Two-folds, 14 (28%) patients had serum AST levels raised more than Two-folds, 12 (24%) patients had serum AST levels raised more than four-folds and 03 (6%) patients had serum AST levels raised more than ten folds.
Conclusion: Liver function deterioration in dengue fever was varied from normal range of biochemical markers to raised liver function markers. AST elevation was more statistically significant than ALT. Hyperbilirubinemia and raised alkaline phosphatase levels were reported. Low serum albumin levels were associated with critical phase of the liver disease.
Key words: Dengue fever, Hyperbilirubinemia, AST, ALT.

Introduction:

According to the World Health Organization about forty percent of the world's population reported that in current scenario is at risk for encountering dengue viral infection (1). The prevalence of dengue viral infection has tended to rise globally in the recent decades (2). In Inia the burden and prevalence of dengue viral infection is increasing as trends reported globally. Hence, along with global pandemic concern dengue has become major public health concern in India. Dengue is an emerging epidemic disease and several outbreaks among every state of India is being reported from time to time (3). The etiology behind dengue is reported as vector borne viral diseases which is transferred to humans by the bite of the infected Aedes mosquito. It was also reported that the number of dengue vector (Aedes mosquito) also increased which is also contributing in the high prevalence of dengue viral infections (4).

World health organization also reported that as the high prevalence of dengue infection seen worldwide it requires immediate action and planning to combat the situation. There were also reported of metastasize of dengue viral infection exponentially breeching the geographical borders (5). It is reported that globally more than 2.5 billion of population living in the areas which are endemic for dengue viral infection. Approximately near about 50 million new dengue infections reported each year with estimated mortality of more than 25000 globally (6). The estimated incidence rate of dengue infections are 1% of global population while estimated mortality among them is approximately 20% (2). Due to its high incidence and prevalence rates of dengue viral infections in India, national vector borne diseases control program is initiated for integrated management of vector, surveillance and monitoring and diseases prevention along with treatment (7).

Dengue viral infections were classified among dengue fever, undifferentiated fever and dengue hemorrhagic fever and dengue shock syndrome (8). The classical signs and symptoms of dengue infections were fever, headache, myalgia and arthralgia sometimes bleeding manifestations and also shock was reported. The exact clinical picture is varying from subject to subject which depends on serotype of dengue virus, immunity status and sub type of dengue fever. The complete clinical profile should be evaluated before the treatment protocol to save the patient's life. Dengue fever affects multiple organ systems namely nervous system, heart and liver, which resulting in encephalitis, myocarditis and hepatitis. Hence, present study was conducted to assess the liver function among patients of dengue fever.

MATERIALS & METHODS

The present cross-sectional study was conducted at department of general medicine of NIMS Medical Collage , Jaipur. The study duration was of six months from February 2016 to July 2016. A sample size of 50 was calculated at 95% confidence interval at 5% acceptable margin of error by epi info software version 7.2. Patients who had dengue IgM antibody positive were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.

The data were collected by detailed history, general physical and clinical examination from each patient (more than 15 years of age) after taking the written consent. Patients who had typhoid, malarial diseases, scrub typhus or patients with existing liver disease were excluded from the present study. All study participants were subjected for routine blood investigation for complete blood count and liver function test and ELISA for dengue serology. Data analysis was carried out using SPSS v22. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05.

RESULTS

In the present study we enrolled 50 patients who were aged from 16 to 63 years. The mean age of the enrolled patient was 34.25 ± 8.14 years. There was no patient in the present study who aged less than 15 years of age. Out of total patients diagnosed dengue IgM antibody positive 62% were male and 38% were females. All of these patients with dengue viral fever were subjected for routine blood investigation for complete blood count and liver function test and ELISA for dengue serology. Among the total study participants 10 (20%) had normal serum ALT levels, 13 (26%) patients had serum ALT levels raised less than Two-folds, 12 (24%) patients had serum ALT levels raised more than Two-folds, 11 (22%) patients had serum ALT levels raised more than four-folds and 04 (8%) patients had serum ALT levels raised more than ten folds. Among the total study participants 7 (14%) had normal serum AST levels, 14 (28%) patients had serum AST levels raised less than Two-folds, 14 (28%) patients had serum AST levels raised more than Two-folds, 12 (24%) patients had serum AST levels raised more than four-folds and 03 (6%) patients had serum AST levels raised more than ten folds. (Table 1)

Table 1: Range of aminotransferase elevations in dengue fever.

	ALT (%)	AST (%)
Normal	10 (20%)	7 (14%)
<Two-fold rise	13 (26%)	14 (28%)
Two-four-fold rise	12 (24%)	14 (28%)
Four-tenfold rise	11 (22%)	12 (24%)
>Tenfold rise	04 (8%)	03 (6%)

In the present study, out of total 50 study participants, on the assessment of liver function it was found that, 6 (12%) patients had bilirubin levels raised more than two folds, 15 (30%) patients had raised alkaline phosphatase levels and 7 (14%) patients had raised serum globulins levels. out of total 50 study participants, 29 (58%) patients had normal serum proteins levels and 21 (42%) patients had serum proteins levels below normal range. out of total 50 study participants, 30 (60%) patients had normal serum albumin levels and 20 (40%) patients had serum albumin levels below normal range.

Table 2: Ranges of increased bilirubin, alkaline phosphatase and globulin levels.

Tests		Number of patients (%)
Liver function test parameters	Bilirubin > 2mg/dl	6 (12%)
	Alkaline phosphatase increased	15 (30%)
	Serum globulins increased	7 (14%)
Serum proteins	Low	21 (42%)
	Normal	29 (58%)
	Increased	(0%)
Serum albumin	Low	20 (40%)
	Normal	30 (60%)
	Increased	(0%)

DISCUSSION

In previous researches, it was reported that dengue viral infection has affect the liver and the liver functions were disarranged. However, liver functions are not deteriorated in the early phases of dengue fever. The etiology behind this deterioration was multifactorial because of direct viral injury or hypoxic injury or immune mediated damage (9). In the present study we enrolled 50 patients who were aged from 16 to 63 years. The mean age of the enrolled patient was 34.25 ± 8.14 years. There was no patient in the present study who aged less than 15 years of age. Out of total patients diagnosed dengue IgM antibody positive 62% were male and 38% were females. All of these patients with dengue viral fever were subjected for routine blood investigation for complete blood count and liver function test and ELISA for dengue serology. Among the total study participants 10 (20%) had normal serum ALT levels, 13 (26%) patients had serum ALT levels raised less than Two-folds, 12 (24%) patients had serum ALT levels raised more than Two-folds, 11 (22%) patients had serum ALT levels raised more than four-folds and 04 (8%) patients had serum ALT levels raised more than ten folds. Similar results were obtained in a study conducted by Samanta J et al among patients of dengue viral fever and found that effects of dengue virus infection associated with effects on liver function test and histopathological patterns are suggestive of councilman bodies, micro vascular steatosis and liver cell necrosis (11).

In the present study, among the total study participants 7 (14%) had normal serum AST levels, 14 (28%) patients had serum AST levels raised less than Two-folds, 14 (28%) patients had serum AST levels raised more than Two-folds, 12 (24%) patients had serum AST levels raised more than four-folds and 03 (6%) patients had serum AST levels raised more than ten folds. Similar results were obtained in a study conducted by Jagadishkumar K et al among patients of dengue viral fever and on the assessment of liver function test disturbance in test values was reported. Clinically patients were presented with hepatomegaly, jaundice and right hypochondrium pain (12). Similar results were obtained in a study conducted by Jagadishkumar K et al among patients of dengue viral fever and found that 46% patients had < 3-fold rise in AST, 37% patients had 3-10-fold rise in AST and 17% patients had > 10-fold rise in AST levels. 28% patients had 1-3-fold rise in ALT, 60% patients had 3-10-fold rise in ALT and 9% patients had > 10-fold rise in ALT levels. They found AST elevation was more statistically significant than ALT (13).

In the present study, out of total 50 study participants, on the assessment of liver function it was found that, 6 (12%) patients had bilirubin levels raised more than two folds, 15 (30%) patients had raised alkaline phosphatase levels and 7 (14%) patients had raised serum globulins levels. out of total 50 study participants, 29 (58%) patients had normal serum proteins levels and 21 (42%) patients had serum proteins levels below normal range. out of total 50 study participants, 30 (60%) patients had normal serum albumin levels and 20 (40%) patients had serum albumin levels below normal range. Similar results were obtained in a study conducted by Parkash et al among patients of dengue viral fever and found that 5% patients had serum bilirubin levels raised more than two folds than normal (14). Similar results were obtained in a study conducted by Rajoo Singh Chhina et al among patients of dengue viral fever and found that 30% patients had serum alkaline phosphatase levels raised than normal (17). Similar results were obtained in a study conducted by Brito et al among patients of dengue viral fever and found

that 70 % patients had low total patients serum proteins and 71% of patients had shown hypoalbuminemia (16).

CONCLUSION

We concluded from the present study that liver function deterioration in dengue fever was varied from normal range of biochemical markers to raised liver function markers. AST elevation was more statistically significant than ALT. Hyperbilirubinemia and raised alkaline phosphatase levels were reported. Low serum albumin levels were associated with critical phase of the liver disease.

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