ORIGINAL ARTICLE

Biochemical Profile and Degree of Liver Involvement in Dengue Fever

Nilofar Yasmin Mili[1], Shaheen Sikder[2], Abul Basar[3], Ehteshamul Hoque[4]

Abstract :

Dengue disease has emerged globally as the most frequent and medically relevant viral infection transmitted by mosquito bite. Acute hepatitis is a manifestation of dengue virus infection. This study shows the impact of dengue on liver function was studied by biochemical tests on 80 patients out of them 53 male (age 42±12 yrs) and 27 female (age 39±13 yrs). The patients were diagnosed as dengue fever and were admitted in Holy Family Red Crescent Medical college Hospital from June 2014 to December 2016. All the patient were diagnosed by anti-dengue IgM positive by ELISA method. Abnormal level of aspartate aminotransferase (AST), alanine aminotransferase (ALT), bilirubin, alkaline Phosphatase (Alp), gamma-glutamyl transferase (G-GT) and albumin and urinary albumin were observed in 82.5%, 82.5%, 47.5%, 38.75%, 71.25% ,66.25% and, 76.25% of the patients respectively. It is concluded that dengue fever may cause hepatic injury and transaminase elevation similar to that in patients with conventional viral hepatitis. In epidemic or endemic areas, dengue fever should be considered in the differential diagnosis of acute hepatitis.

Introduction:

Dengue viral infection is the most important arboviral infection transmitted by mosquito aedes aegypti and aedes albopictus. The dengue viral infection has been recognized as one of the biggest emerging epidemic of the world[1,2]. As per estimates, over 50 million dengue infection with about 400,000 cases of dengue hemorrhagic fever are reported annually worldwide[3].

Dengue is found in tropical and subtropical regions around the world, predominantly in urban and semi urban areas.The disease is caused by a virus belonging to family flaviviradae that is spread by Ades mosquitoes. Ades aegypti is the primary epidemic vector.

First outbreak was recorded in 1964 and worst outbreak in 2002 in Bangaladesh. There are four virus serotypes DENV-1,2,3 and 4. One serotypes confers lifelong immunity to that virus serotype.3 Dengue viral infection may be presented as classical dengue fever (DF) and its severe form dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS).

The classical form has an incubation period of 4-8 days followed by onset of high grade continuous fever lasting 2 to 7 days in most cases with generalized body ache, myalgia, arthralgia and headache[4]. Any of the following haemorrhagic manifestations including a positive tourniquet

1. Assistant Professor, Department of physiology, Holy Family red Crescent Medical College
2. Assistant Professor, Department of Nephrology, Holy Family red Crescent Medical College.
3. Resident Medical officer, Department of Nephrology, Holy Family red Crescent Medical College Hospital
4. Professor and Head, Department of Nephrology, Holy Family red Crescent Medical College.

test, petechiae, purpura, ecchymosis, epistaxis and GIT bleeding may be present .The hallmark of DHF is the increased vascular permeability resulting in plasma leakage, contracted intravascular volume and shock in severe cases.

Over the past few years, atypical manifestations of dengue have been reported with multiple organ involvement[5]. Hepatic involvement is characterized by right hypochondriac pain, hepatomegaly, jaundice and elevated amino transferase levels peaking at second week and gradually running to normal within 04 weeks [5,6].

We studied the biochemical profile and degree of liver involvement in patients with dengue fever in HFRCMCH, Dhaka, Bangladesh.

Materials and method:

A total of 80 patients attending HFRCMCH, Dhaka, Bangladesh between June, 2014 to December 2016 were included in this study. Dengue was suspected when fever with two or more of the following symptoms were present ie: retro-orbital pain, myalgia, arthralgia, skin rash, nausea/ vomiting and hemorrhagic manifestations. Complete blood counts, liver function tests and dip stick test of urine were carried out.

Test for detection of anti-dengue antibody (IgM) was carried out in all patients by ELISA method. Only anti-dengue antibody (IgM) positive cases were included in this study[5].

The degree of liver involvement was classified into two groups based on the levels of S. bilirubin, ALT, AST, ALP, S. Albumin and Gama-GT. Group A, mild changes in the level and group B, moderate to severe changes in the biochemical markers. In these patients, other causes of hepatitis, mainly hepatitis A, B, C and E were ruled out using appropriate tests.

To assess hypoalbuminaemia we also carried out semi quantitative urine dipstick test to see the proteinuria.Spot urine collection was done by the mid stream clean catch method and tests were performed according to the manufacturers method .Clinically significant proteinuria was defined as mild to moderate (1+ to 2+) and severe>3 +.

Results :

S. Bilirubin: On the basis of s. bilirubin level the patients were graded in to three ; normal (serum bilirubin < 1.2 mg%) , mildly raised (s. bilirubin 1.2 - 3 mg%) and moderate to severely raised (> 3mg%). 42 (52.5%) patients out of 80 had normal serum bilirubin level. On the other hand 27 patient(33.75%) had mildly elevted and 11patients (13.75%) had moderate to severely elevated serum bilirubin level (Table-I).

Table –I: Liver Enzyme In Dengue (n = 80)

	S.bilirubin	SGPT	SGOT	G-GT	ALP
Normal	52.9% (<1.2 mg/dl)	17.5% (<56 iu/l)	17.5% (45- 100 iu/l)	28.75% (<45 iu/l)	61.25% <147 iu/l
Mild	33.75% (1.2 - 3 mg/dl)	37.5% (57-168 iu/l)	31.25% (46-120 iu/l)	47.% (57 - 168 iu/l)	22.5% (147 - 300 iu/l)
Moderate to severe	13.75% (> 3mg/dl)	35% (>169 iu/l)	51.25% (≥ 121 iu/l)	23.75% (>169 iu/l)	16.25% > 301 iu/l

Table- II: Relationship between S. Albumin & Urinary Albumin

	Serum Albumin	Urinary Albumin
Normal	43.75% (> 3.5gm/dl)	23.75% (Nil)
mild to moderately decreased	32.5% (2.5 - 3.5 gm/dl)	56.25% (1 + to 2+)
Severely Decreased	23.75% (< 2.5 gm/dl)	20% (> 3+)

SGPT: There were three groups of patients as per level of the enzyme SGPT as : normal level < 56 iu/l were 14 patients (17.5%), mildly raised (57 -168 iu/l) were 30 patients (37.5%)and moderate to severely raised (>168 iu/l) were 36 patients (35%) (Table-1).

SGOT: SGOT level were graded in to three; Normal (<45 iu/l), mild (46 to 120 iu/l) and moderate to severe (>120 iu/l). 14 (17.5%) patient had normal SGOT level with 25 patients (31.25%) had mildly elevated level and 41 (51.25%) patient had moderate to severely elevated SGPT (Table-1).

Gamma GT & ALP: The gamma-GT level was normal in 23 (028.75%), mildly elevated in 38 (47.5%) and moderate to severely elevated 19 (23.75%) patients.

On the other hand serum alkaline phosphatase was normal in 49 patients (61.25%) and mildly elevated in 18 (22.5%) and moderate to severely elevated in 13 patients (16.25%) (Table-I).

Serum albumin & albuminuria: The albumin level was normal in 35 patients (43.75%), mild to moderately decreased in 26 patients (32.5%) and severely decreased in 19 patients (23.75%) (Table-II).

We also assess the urinary loss of albumin and was absent in 19 patients (23.75%), mild to moderate albuminuria were in 45patients (56.25%) and massive albuminuria was in 16 patients (20%). No cases of encephalopathy or fulminant hepatitis were observed. No deaths due to the disease occurred.

Discussion :

Our data showed that liver involvement was almost universal in patients with dengue infection which is comparable to previous reports from other developing countries[4]. Majority of these patients had mild to moderate liver dysfunction, although one-fifth of the patients had acute hepatitis without significant complications.

In the present study, most of the patients had elevated AST & ALT levels whereas normal in 17.5% cases. SGOT is moderate to severely raised more than SGPT. Ambreen Zubair et al. assess the utility of liver function tests for early recognition and prediction of severity of 353 dengue fever patient. They shows mild elevation of aminotransferase level in 21.2% patient and moderate to severely raised in 78.8% patient. SGOT level raised around two fold than SGPT [8] . This general pattern with aminotransferase increasing more quickly and peaking at higher level is unusual and differs from those during acute hepatitis caused by other hepatotropic viruses[6], but has been described in dengue infection[7]. Given the prominence of musculoskeletal symptoms in dengue, skeletal injury could explain the higher amino transferase level.

Kuo et al. reported that most severely ill patients had higher levels of aminotransferases and lower level of albumin, where as increases in alkaline

Phosphatase, and bilirubin were unrelated to the severity of the disease[7]. Similarly in the present study albumin levels were significantly lower in the severely ill patients. This study shows significant proteinuria in 20% cases.Farhad F. Vasanwala et al. shows significant proteinuria is more in DHF patient than classic DF[9].

The reduction in serum albumin is an important factor in fluid loss in the third space along with urinary loss which is indicative of severity of dengue due to reduction in ingredients of intra-and extravascular pressure. Thus AST, ALT and albumin are valuable parameters for evaluation of severity of infection[6,7].

However, the study has its limitations. Because of small sample size, the exact association of the aminotransferase with different grades of dengue fever could not be ascertained. A larger study is required to truly establish whether the aminotransferase could be used as prognostic marker.

Conclusion:

We concluded that in dengue fever, liver involvement in the form of elevation of transaminases levels occurred in more than 80% of all patient also hypoalbuminaemia occurs due to impaired liver function and secondary glomerulonephrities which leads to increased urinary loss of albumin. In most patients, the effect was mild to moderate and full recovery was usual with supportive treatment. Care must be taken not to make a mistaken diagnosis of viral hepatitis.

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