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Liver Profile in Children with Dengue Viral Infection

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***Abstract**: Background: The degree of liver dysfunction in children with dengue infection varies from mild injury with elevation of transaminases to severe injury with jaundice and liver cell failure**.** This study was undertaken to study the liver profile in children with dengue infection.*
Methods: It is a cross sectional observational study conducted in serologically positive dengue fever in children aged between 1-12years. Hepatic function was studied in all suspected cases over a period of 1 year from December 2016 to November 2017.
Results: Out of 52 cases 35 had dengue fever,14 had Dengue with warning signs, 3 had severe dengue.Liver function tests showed AST levels elevated more than 45U/L in 27(77.1%) DF, 13(92.8%) DHF, 3 (100%) DSS patients. ALT levels were elevated more than 45U/L in 21(60%) DF, 10 (71.4%) DHF, 3 (100%) DSS patients. More than 10 fold increase in levels of both AST and ALT was seen in severe dengue. Total protein levels less than 6g/dl was seen in 3 (5.7%) cases. Serum bilirubin levels were more than 1.5mg/dl in 1 case with severe dengue
Conclusions: The spectrum of hepatic involvement in dengue varies from jaundice to elevation of liver enzymes. Significant rise of liver enzymes helps in recognition of severe forms of dengue infection (DHF and DSS).

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I. Introduction

Dengue infection, the most prevalent arthropodborne viral illness in children associated with liver involvement. Clinical expression of DF varies from mild febrile illness to Dengue hemorrhagic fever and Dengue shock syndrome.Although dengue virus is a non hepatotropic virus, hepatomegaly is commonly seen in dengue along with a rise in serum aminotransferases.The severity of liver dysfunction varies according to the type of clinical presentation and is more common in children with severe dengue fever. Hepatic dysfunction is attributed to a direct viral effect on liver cells or as a consequence of desregulated host immune response[1].Aminotransferase levels are useful in predicting the occurrence of hepatic dysfunction and spontaneous bleeding[2].In recent studies from India and Thailand, dengue infection was the most important cause of acute hepatic failure in children contributing to 18.5% and 34.3% of the cases respectively[3].Hence early recognition and prompt initiation of appropriate supportive treatment. Therefore alterations in the liver function test may serve as an early marker for timely diagnosis and identification of patients who might develop severe complications like Dengue shock syndrome, hepatic encephalopathy, Dengue hemorrhagic fever and septicemia, thus serve as an early biochemical predictor of severity of outcome of Dengue fever. Fever, malaise, vomiting, liver enlargement and elevated liver enzymes may be misdiagnosed as infective hepatitis and vice versa.
Aim and objectives: 1) To study the liver profile in children with dengue viral infection.

II. Materials and methods

Study designs-Hospital based study
Duration of study:1 year from December 2016 to November 2017 .
Inclusion criteria: Patients with symptoms of dengue fever along with positive serology for dengue
Exclusion criteria: Patients with other liver disease and other conditions causing dearrangement of liver profile. Malaria, enteric fever, Hepatitis A and Hepatitis B were excluded by history,examination and investigations.

Methods

A prospective observational study was conducted on children of age group of 1-12 years admitted in paediatrics ward, Gauhati Medical Colege, presenting with signs and symptoms of dengue fever and positive dengue serology. The diagnosis of dengue infection was based on clinical features like fever of 1 to 5 days duration, body aches, headache, arthralgia, vomiting, skin rash, petechiae,mucosal bleeds, hepatomegaly, jaundice, abdominal pain and serologically confirmed by NS1 antigen or IgM ELISA.Ethical approval was obtained from ethical committee.A detailed history and thorough clinical examinations were done in all cases.Data collection was based as a predesigned proforma which included demographic and clinical findings.

All cases were subjected to appropriate investigations like complete blood picture, liver function tests. The study group was divided into dengue fever without warning signs (DF), dengue fever with warning signs or dengue haemorrhagic fever (DHF) and severe dengue or dengue shock syndrome (DSS) according to revised WHO 2009 criteria[4]. Written consents of the parents were obtained.

III. Results

During the one year study period 52children were admitted with serologically confirmed dengue in the tertiary level care hospital, Gauhati Medical College . All patients were serologically positive for dengue infection. The study group included 35(67.3%)of patients as dengue fever without warning signs, 14(26.9%) as dengue fever with warning signs (dengue haemorrhagic fever) and 3 (5.8%) cases as severe dengue (dengue shock syndrome)
Total number of cases 52

Table 1: Distribution of dengue cases

Dengue cases	Number	%
Dengue fever	35	67.3
Dengue with warning signs (DHF)	14	26.9
Severe dengue (DSS)	3	5.8

Table 2: Liver function tests of dengue patients.

Dengue cases	Dengue fever (n=35)	Dengue with warning signs (DHF) n=14	Severe dengue (DSS)(n=3)
Raised AST	27(77.1%)	13(92.8%)	3(100%)
Raised ALT	21(60%)	10(71.4%)	3(100%)
Totalserum bilirubin >1.5mg/dl	0	0	1(33.3%)
Total protein<6g/dl	0	1(7.14%)	2(66.6%)

Liver function tests showed AST levels elevated more than 45U/L in 27(77.1%) DF, 13(92.8%) DHF, 3 (100%) DSS patients. ALT levels were elevated more than 45U/L in 21(60%) DF, 10 (71.4%) DHF, 3 (100%) DSS patients. More than 10 fold increase in levels of both AST and ALT was seen in severe dengue. Total protein levels less than 6g/dl was seen in 3 (5.7%) cases. Serum bilirubin levels were more than 1.5mg/dl in 1 casewith severe dengue.

IV. Discussion

Liver involvement in dengue may be characterised by various manifestations such as hepatomegaly,pain in the right hypochondrium, varying degrees of jaundice and an increase in liver enzymes principally AST and ALT. The incidence of hepatic dysfunction is seen more in dengue shock syndrome and dengue haemorrhagic fever. The enzymes, aspartate aminotransferase (AST) and alanine aminotransferase (ALT), are released into the bloodstream upon injury and so these enzymes are believed to be sensitive indicators of liver damage. In the present study the liver enzymes were elevated significantly in DHF and DSS as has been shown in numerous studies.In the present study there was more than 10 fold increase in the levels of both AST and ALT in severe dengue. Other researchers have also observed similar results in dengue infection.DeSouza and colleagues observed alterations of AST and ALT levels in 63% and 45% ofpatients respectively.They noted that the average levels of AST and ALT were significantly higher in DHF patients than in DF patients, an observation supported by other studies[5].HimaBinduet al and similar other studies also observed levels of AST and ALT were significantly higher in DHF patients than in DF patients[6,7,8,9].Mohan B et al and similar other studies also reported that all cases with DHF and DSS had raised AST and ALT and the mean levels of these enzymes was significantly higher as compared to DF[10].

V. Conclusion

The spectrum of hepatic involvement in dengue varies from jaundice to elevation of liver enzymes.Significant rise of liver enzymes helps in recognition of severe forms of dengue infection (DHF and DSS).Presence of fever, malaise, vomiting, liver enlargement and elevated liver enzymes should arouse the suspicion of dengue hepatitis.

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