

Hepatic Dysfunction in Dengue Epidemic

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Abstract

Background: Dengue is a major international health concern that is prevalent in tropical and sub-tropical countries. It is 2nd most common arthropod borne disease in India. There are certain clinical features that are associated with Dengue in addition of the classical features. Previously organ impairment has been only considered under set up of severe disease. On the recent years, several studies have suggested the possibility of early involvement of the liver in dengue. Further due to its atypical presentation often dengue missed out as a differential diagnosis.

Methods: A total of 150 patients were selected to be a part of study after applying inclusion and exclusion criteria. Only those patients were included in the study who had classical features of dengue-fever with chills, body ache, headache, rash, bleeding manifestations and thrombocytopenia and had a positive ELISA test i.e. IgM anti bodies against dengue virus. Patients who had

malaria and enteric fever were excluded from the study. All patients were subjected to a detailed history and a thorough clinical examination. A complete blood count, liver function tests, renal function tests, chest X-ray and USG abdomen were also done.

Results: All cases of DSS had elevated AST, 71.11% cases of DHF had elevated AST level and 51.45% cases of DF had elevated AST level. In our study 26% cases of had elevated ALP level. In present study among 150 patients 19.33% patients had elevated bilirubin level and 15.33% patients had elevated albumin level.

Conclusion: In our study majority of the patients were in adult age group and show female preponderance. Most of the cases belonged to classical dengue fever and dengue hemorrhagic fever. The Aspartate amino transferase (AST) levels in dengue patients was higher than alanine amino transferase (ALT) levels. This differs from the pattern in viral hepatitis but is similar to that

seen in alcoholic hepatitis. This abnormality may act as an early indicator of dengue infection. ALT and AST levels higher in the DHF and DSS as compared to the DF, suggesting that the degree of liver injury may be related to the severity of dengue infection. So hepatic dysfunction is correlates with severity of dengue infection.

Keywords: Dengue, Hepatic, DHF, DSS.

Introduction

Dengue is the most rapidly spreading mosquito-borne viral disease in the world. In the last 50 years, incidence has increased 30-fold with increasing geographic expansion to new countries and, in the present decade, from urban to rural settings. An estimated 50 million dengue infections occur annually and approximately 2.5 billion people live in dengue endemic countries¹. The 2002 World Health Assembly resolution WHA55.17² urged greater commitment to dengue by WHO and its Member States. Of particular significance is the 2005 World Health Assembly resolution WHA58.3 on the revision of the International Health Regulations (IHR)³, which includes dengue as an example of a disease that may constitute a public health emergency of international concern with implications for health security due to disruption and rapid epidemic spread beyond national borders.

Liver injury is nearly universal in-patient with dengue fever. Dengue virus antigen is found in kupffer cells and sinusoidal lining cells in the liver. Detection of dengue antigen in hepatocyte suggests that such cells can support viral replication.

Histopathological finding includes centrilobular necrosis, fatty alterations, hyperplasia of kupffer cells, acidophil bodies and monocytes alteration of the portal tracts. In most cases hepatic involvement prolongs the

clinical course of this self-limiting viral infection and constitutes a sign of worst prognosis.

Hepatic involvement can be a major contributing factor in morbidity and mortality of such patients with dengue fever. So AST and ALT can be a useful early marker to assess the severity of the disease which can thereby lead to early recognition of high risk cases⁴. Hepatic involvement can be a major contributing factor in morbidity and mortality of dengue fever. So by LFT we can early diagnosed the high risk cases. To study the age and sex distribution of dengue infection.

Material and Methods

Type of Study: Hospital based Cross-sectional study

Inclusion Criteria

- Patients more than 14 years of age. Patients with classical features of dengue fever - like fever with chills, body ache, headache, rash, bleeding manifestation and TCP.
- 2) Patients with either of these tests are positive-
- NS1 antigen by serological test
- IgM by MAC ELISA

Exclusion Criteria

- Dengue with any chronic disease like CLD, CKD, CAD.
- Patient with history of intake of any hepatotoxic or similar drugs causing derangements of liver functions.
- Dengue patients having other known infections causing hepatitis such as acute or chronic viral hepatitis, leptospirosis, malaria, enteric fever.

The patients who satisfy the inclusion criteria were evaluated for the following parameters-

- Liver function test
 - Hematological parameters
- USG for abdomen, pelvis and USG for pericardial

effusion, pleural effusion. Liver Function Test- Serum aminotransferase are the sensitive markers of acute hepatic injury. ALT is a cytosolic enzyme while AST is both cytosolic and mitochondrial. Elevations of AST and ALT are seen in dengue. Serologically confirmed cases are divided in 4 group according to serum AST and ALT levels.

Grade A: patients with normal aminotransferase level.

Grade B: at least one of the enzymes raised to less than 3 times.

Grade C: at least one of the enzymes elevated more than 3 times but less than 10 times.

Grade D: If at least one of the enzyme elevations more than 10 times.

Results

Table 1: Socio-demographic profile

Age	14-25	62
	26-40	60
	41-50	20
	>50	8
Male : Female		72 : 78

In our study out of 150 patient's majority of the cases having dengue infection belong to the age group of 14-25 followed by 26-40 years. so it was more common in young adults. 72 males and 78 females. so in our study male to female ratio was 1:1.08.

Table 2: Distribution of study population according to dengue classification.

Diagnosis	Number	%
DF	103	68.66
DHF	45	30.0
DSS	2	1.33
Total	150	100.00%

Out of 150 cases 103 were classic dengue fever, 45 cases were dengue hemorrhagic fever and 2 cases were dengue shock syndrome.

All patients presented with fever and other symptoms observed were arthralgia (72%), backache (84%), retro-orbital pain (73.33%), and abdominal pain (54%), rash (66.66%), vomiting (62.66%), diarrhea (67.33%).

Table 3: Distribution of cases according to their signs.

Signs	Number of cases	percentage
Icterus	16	10.81
Pleural effusion	36	24.32
As cites	20	13.51
Hepatomegaly	52	34.66
Splenomegaly	42	28.00

icterus present in 10.81% patients, pleural effusion in 24.32% cases, as cites in 13.51% cases, hepatomegaly in 34.66% cases and splenomegaly in 28% cases.

Table 4: ALT elevation in patient with dengue infection.

ALT Value	Number of cases	percentage
$\leq 1 \times$	72	48.00
$>1-3 \times$	43	28.66
$>3-10 \times$	27	18.00
$>10 \times$	8	5.33
Total	150	100

43 (28.66%) patients had ALT $>1-3 \times$ UNL (upper normal limit), 27(18%) patients had ALT $>3-10 \times$ UNL and 8(5.33%) patients had $>10 \times$ UNL.

Table 5: AST elevation in patient with dengue infection.

AST value	Number of cases	percentage
$\leq 1 \times$	63	42.00
$>1-3 \times$	36	24.00
$>3-10 \times$	35	23.33
$>10 \times$	16	10.66
Total	150	100

36(24%) patients had AST $>1-3\times\text{UNL}$, 35(23.33%) patients had AST $>3-10\times\text{UNL}$ and 16(10.66%) patients had $>10\times\text{UNL}$.

Table 6: Comparison of the pattern of rise of ALT in patients with DF, DHF, DSS-

ALT value	DF		DHF		DSS	
	No	%	No	%	No	%
$>1-3\times$	31	30.09	12	26.66	0	00
$>3-10\times$	11	10.67	15	33.33	1	50
$>10\times$	4	3.88	3	6.66	1	50
Total	46	44.66	30	66.66	2	100

All cases of DSS had elevated ALT level, 66.66% cases of DHF had elevated ALT level and 44.66% cases of DF had elevated ALT level.

Table 7: Comparison of the pattern of rise of AST in patients with DF, DHF, DSS-

AST	DF		DHF		DSS	
	NO	%	NO	%	NO	%
$>1-3\times$	28	27.18	8	17.77	0	0
$>3-10\times$	20	19.41	14	31.11	1	50
$>10\times$	5	4.85	10	22.22	1	50
Total	53	51.45	32	71.11	2	100

All cases of DSS had elevated AST, 71.11% cases of DHF had elevated AST level and 51.45% cases of DF had elevated AST level. In our study 26% cases of had elevated ALP level. In present study among 150 patients 19.33% patients had elevated bilirubin level and 15.33% patients had elevated albumin level.

Discussion

Dengue fever is the one of the most important Arboviral infections. It has become a major global public health problem. In India, epidemics are becoming more frequent.

In our study, out of 150 patients, 62(41.33%) were between the age of 14-25yrs, 60(40.0%) were between

the age of 26-40yrs, 20(13.33%) were between the age of 41-50yrs and 8(5.3%) were above 60yrs. Male to female ratio was 1:1.08. Most of the cases belonged to classical dengue fever and dengue hemorrhagic fever.

A study conducted by Sarkaret al⁴ showed 84% of the cases in age group of 11-30 years. Another study conducted by Fu Xi Qiu et al⁵ found 81% of the cases were among more than 20 years.

A study conducted by Rajoosingh china et al⁶ showed 81.3% cases of dengue fever, 13.6% cases of dengue haemorrhagic fever and 5.1% cases of dengue shock syndrome. 41.1% had ALT $>1-3\times\text{UNL}$, 48.5% patients had ALT $>3-10\times\text{UNL}$ and 8.4% patients had ALT $>10\times\text{UNL}$. 19.2% patients had AST $>1-3\times\text{UNL}$, 55.1% patients had AST $>3-10\times\text{UNL}$ and 23.4% patients had AST $>10\times\text{UNL}$. All cases of DSS had elevated ALT level, 93.10% cases of DHF had elevated ALT level and 92.5% cases of DF had elevated ALT level. All cases of DSS had elevated AST, 100% cases of DHF had elevated AST level and 97.10% cases of DF had elevated AST level. 50% cases of DSS had elevated ALP, 40% cases of DHF had elevated ALP and 30.3% cases of DF had elevated ALP levels. 19.5% cases had elevated bilirubin and 29.1% cases had elevated albumin.

A study conducted by Luiz Jose de Souza et al⁷ showed 32.1% had ALT $>1-3\times\text{UNL}$, 11.1% patients had ALT $>3-10\times\text{UNL}$ and 1.8% patients had ALT $>10\times\text{UNL}$. 43.9% patients had AST $>1-3\times\text{UNL}$, 16.1% patients had AST $>3-10\times\text{UNL}$ and 3.4% patients had AST $>10\times\text{UNL}$. This correlated with the above-mentioned study.

The Aspartate aminotransferase (AST) levels in dengue patients was higher than alanine aminotransferase (ALT) levels. This differs from the pattern in viral hepatitis but

is similar to that seen in alcoholic hepatitis. This abnormality may act as an early indicator of dengue infection.

AST and ALT levels higher in DHF and DSS as compared to the DF, suggesting that the degree of liver injury may be related to the severity of dengue infection. Similar data have been suggested by Rajoosingh china et al.⁶

Conclusion

In our study majority of the patients were in adult age group and show female preponderance. Most of the cases belonged to classical dengue fever and dengue hemorrhagic fever. The Aspartate aminotransferase (AST) levels in dengue patients was higher than alanine aminotransferase (ALT) levels. These differ from the pattern in viral hepatitis but is similar to that seen in alcoholic hepatitis. This abnormality may act as an early indicator of dengue infection. ALT and AST levels higher in the DHF and DSS as compared to the DF, suggesting that the degree of liver injury may be related to the severity of dengue infection. So hepatic dysfunction is correlates with severity of dengue infection.

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