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A STUDY OF INCIDENCE OF HEPATIC DYSFUNCTION IN DENGUE FEVER AND CORRELATION WITH IT'S SEVERITY IN A TERTIARY CARE CENTRE IN RAJASTHAN

General Medicine

Dr Atul Jain Post-graduation Resident, Department of Medicine, Dr. S.N. Medical College, Jodhpur (Rajasthan).

Dr Naval Kishor Jangid* Post-graduation Resident, Department of Medicine, Dr. S.N. Medical College, Jodhpur (Rajasthan). *Corresponding Author

Dr Narendra Kumar Post-graduation Resident, Department of Medicine, Dr. S.N. Medical College, Jodhpur (Rajasthan).

Dr Arvind Jain Senior professor, Department of Medicine, Dr. S.N. Medical College, Jodhpur (Rajasthan).

ABSTRACT

BACKGROUND: Dengue fever is a mosquito-borne viral disease which is mainly transmitted by female mosquito of Aedes aegypti species. It is widespread throughout the tropics and it includes wide spectrum of disease from subclinical infection to severe flu-like symptoms. **OBJECTIVE:** To find-out incidence of hepatic dysfunctions in dengue fever and to correlate hepatic dysfunctions with severity of dengue fever. **MATERIAL AND METHODOLOGY:** This cross sectional study is based on data collection from case notes of outdoor and indoor patients in department of medicine, dr. S.N. medical college, Jodhpur (Rajasthan). Case selection was based on clinical features of dengue fever and all cases were confirmed by positive ELISA test for IgM antibody. Observation & Result:- Out of 100 patients, most of the patients (77%) were male and belonged to urban locality (68%). The majority of the patients were from age group of 15-30 year (71%). In this study, the mean SGOT and SGPT values have been found to be higher for severe forms of dengue than uncomplicated dengue. The presence of raised liver enzymes in almost all patients, elevation of SGOT more than SGPT should be kept in mind when evaluating patients with suspected dengue. It was observed that mean SGOT and SGPT values were high among the patients having platelet counts <10,000 /mm3.**CONCLUSION:** Finding of this study shows that the levels of SGOT, SGPT and ALP were significantly higher in patients with dengue shock syndrome and high SGOT and SGPT may serve as an early indicator of dengue infection. High SGOT, high SGPT and low platelet counts may indicates progression of dengue fever to dengue haemorrhagic fever /dengue shock syndrome.

KEYWORDS

Dengue fever (DF), dengue haemorrhagic fever (DHF), dengue shock syndrome (DSS), Serum Glutamic Oxaloacetic Transaminase (SGOT), Serum Glutamic Pyruvic Transaminase (SGPT), Alkaline Phosphatase (ALP).

INTRODUCTION

Dengue fever is a one of the most rapidly spreading mosquito-borne viral disease in all over the world, which is mainly transmitted by female mosquito of Aedes aegypti species. It is widespread throughout the tropics, that have variations in incidence of disease due to influence of risk factors like - rainfall, temperature, unplanned rapid urbanization etc.[1] Dengue fever is a wide spectrum of disease that includes from subclinical infection to severe flu-like symptoms. Some people can develop severe dengue, which can be associated with complications like severe bleeding, organ impairment and/or plasma leakage that have a higher risk of death when not managed appropriately[1]. Recently severe dengue affects most Asian and Latin American countries and has become a leading cause of hospitalization and death among children and adults in these regions[1].

It's estimated that 3.9 billion peoples in 128 countries, are at risk of infection with dengue viruses[2]. In India, number of cases reported has increased from 2.2 million in 2010 to 3.2 million in 2015 with worst outbreak in Delhi with over 15000 cases in 2015. It's estimated that in India around 500000 people requires hospitalization with severe dengue and with an estimated 2.5% case fatality, annually. Globally decline in case fatality have been recorded with significant improvement in health care facilities[1].

Liver involvement in Dengue infection is common and ranging from mild to moderate elevation of serum transaminases to fulminant hepatic failure. In some patient low serum albumin level has also been noted[3]. Dengue associated acute liver failure has a high mortality due to complications such as encephalopathy, severe bleeding, renal failure and metabolic acidosis. Although dengue associated acute liver failure is thought to occur due to liver injury as a result of prolonged shock. Management is primarily supportive and the outcome is usually good. Care must be taken regarding the diagnosis and use of drugs which may worsen the liver damage.

AIMS & OBJECTIVE:

This study aimed to find out incidence of hepatic dysfunction in dengue fever and to correlate hepatic dysfunction with it's severity of dengue fever.

Inclusion Criteria:

Both male and female patients aged more than 15 years presenting with features of dengue fever and confirmed by positive ELISA test i.e. IgM antibodies against dengue.

Exclusion Criteria:

Dengue fever with any other co-infection like malaria, enteric fever etc., known case of chronic liver disease of any etiology and diabetic or hypothyroid patients with non-alcoholic fatty liver and non-alcoholic steatohepatitis.

METHODS:

This cross sectional study, which based on hospital observation, was conducted in department of medicine, Mathura Das Mathur hospital attached to Dr. S.N. medical college, Jodhpur (Rajasthan). Data were collected from record of case notes of outdoor and indoor patients. Case selection was based on clinical features of dengue fever including chills, body ache, headache, rash, nausea, vomiting, bleeding manifestations and thrombocytopenia and all cases were confirmed by positive ELISA test for IgM antibody. Wherein 100 patients confirm diagnosed as suffering from dengue fever from September 2018 to August 2019 were analysed. To enter data, a structural proforma was designed which was pretested and validated by subject export.

Ethical considerations:-

Permission was taken from higher authority to take data record from case notes of outdoor and indoor patients for the study.

RESULTS:

A total of 100 patients data were analysed, those who were included in the study. Overall, 77 % of the patients were males and 23 % were females. Majority of patients were from the age group 15 -30 years**.** **M**inimum age of patients was 15 years and maximum was 83 years and mean age was 28.4 years. Majority (62%) of patients were from urban background and rest (38%) were from rural background.

Out of 100 patients, 75% patients had vomiting, 58% patients had abdominal pain, 16% patients had rashes over body and 9 % patients presented with bleeding manifestations. On examination, 5% patients

had jaundice, 13% patients had hepatomegaly by palpation and 18% were in shock while Tourniquet test was positive in 18% (figure 1). We have observed that mean SGOT and SGPT values (291 IU/L & 208.4 IU/L) were high among the patients having platelet counts <10,000 /mm^3; these values were 174.18 IU/L & 117.70 IU/L among patients having platelet counts in between 10,000 /mm^3 to 50,000 /mm^3 while these were low (146.25 IU/L & 106.58 IU/L) in patients having platelet counts more then 50,000 /mm^3. Normal level of SGOT was observed in only 12% of patients while 57% patients had SGOT level >120 (3× of UNL) at the time of admission (day 1), that was reduced to 35% patients on 5th day. Normal level of SGPT was observed in only 19% of patients while 35% patients had SGPT level >120 IU/L (3× of UNL) at the time of admission which was reduced to 19% on 5th day. Only 4% patients had total bilirubin >2 mg/dl at the time of admission and 38% patients were having total protein <6.2 gm/dl while 50% patients were having serum albumin ≤ 3.5 gm/dl. Out of all, 10% patients had both pleural effusion and ascites, 3% patients had only ascites and only 1% patient had pleural effusion.

Majority (75%) of patients were in dengue fever (DF) category without any complication, 7% were in dengue haemorrhagic fever (DHF) category and 18% were in dengue shock syndrome (DSS) category (figure 2). Minimum Haemoglobin was 5.6 g/dl and maximum was 17.9 g/dl while mean haemoglobin was 12.711 g/dl. Minimum haematocrit was 16.8 and maximum haematocrit was 56.1 while mean was 39.37. Mean haematocrit among DHF patients was 37.15 and among DSS patients it was 41.26. As shows in table- 1, mean SGOT level was 163.83 IU/L and mean SGPT level was 115.79 IU/L at the time of admission indicating that both SGOT and SGPT levels were significantly increased in patients with dengue fever but SGOT level was increased more than SGPT level. Mean SGOT & SGPT in patients having shock was 237.67 IU/L and 179.61 IU/L while these values were 147.62 IU/L and 101.78 IU/L in patients not having shock, showing that hepatic dysfunctions were very common in all forms of dengue infection, with SGOT rising significantly more than SGPT. There was a significant correlation in SGOT, SGPT and ALP level with bleeding manifestations and/DSS as SGOT, SGPT and ALP level were significantly higher in patients with bleeding manifestation and/DSS. Mean SGOT and SGPT level among DF patients was 141.19 IU/L and 97.10 IU/L, among DHF patients 241.5 IU/L and 178.75 IU/L while in DSS patients these were 237.66 IU/L and 179.61 IU/L. Overall mean platelet count was 66,220/mm^3, while mean platelet count among DF patient was 78,546/mm^3, among DHF patients 38,000/mm^3 and among DSS patients it was 23,000/mm^3 and in patients not having shock mean platelet count was 75,710/mm^3, showing that platelet count below 25,000/mm^3 was increasingly associated with shock and severity in dengue patients.

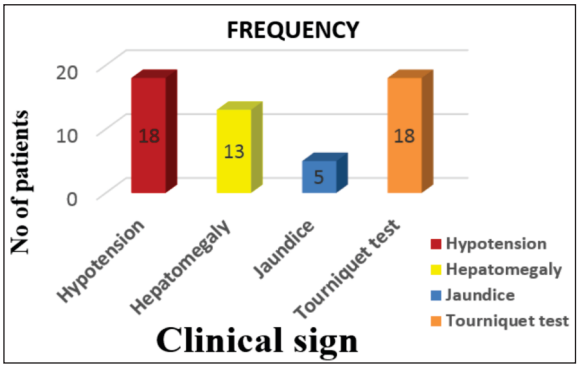

Figure 1 - Distribution of patients according to Symptomology

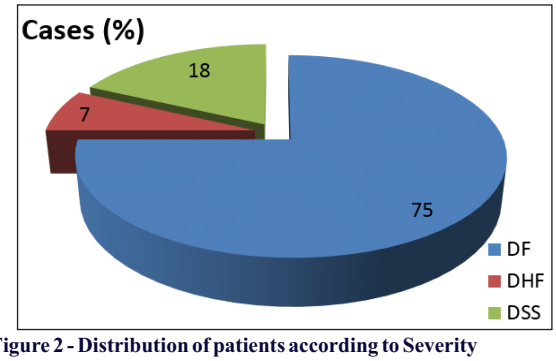

Figure 2 - Distribution of patients according to Severity

DF= Dengue Fever, DHF= Dengue Hemorrhagic Fever, DSS= Dengue Shock Syndrome

Table 1 - Distribution of laboratory parameters among severity group

Parameters	DF (n=75)		DHF (n=7)		DSS (n=18)		P-value	Interpretation
	Mean	Min-max	Mean	Min-max	Mean	Min-Max		
Platelets (×1000/mm^3)	78.546	0-206	38	16-57	**23**	7-51	**<0.0001**	Significant
Bilirubin (mg/dl)	0.7228	0.25-3	0.6675	0.38-1.13	0.895	0.6-4.84	0.556	Not Significant
SGOT (IU/L)	141.19	26-454	241.5	93-411	237.66	134-788	**0.005**	Significant
SGPT (IU/L)	97.102	17-342	178.75	74-332	179.61	78-676	**0.002**	Significant
ALP (IU/L)	122.84	58-370	203.25	50-372	177.33	88-409	**0.007**	Significant
T. Protein (g/dl)	6.650	3.1-8.2	6.425	4.8-7.3	5.57	4-7.1	**<0.0001**	Significant
Albumin (g/dl)	3.698	2.4-4.9	3.375	3.2-3.6	2.916	2.3-3.9	**<0.0001**	Significant
PT-INR	1.219	0.86-1.9	1.297	1.05-2.1	1.23	0.88-1.6	0.093	Not Significant

DISCUSSION

The socio-demographic characteristics of the patients diagnosed as suffering from dengue fever shows that mean age of the patients was 28.45 years and maximum number of patients were in the age group of 15-30 years (71%) followed by in the age group 31-45 years (19%) and minimum (4%) were in the age group of >60years. This study included 77% males and 23% females. Some other studies done by malavige et al[7], NP singh et al[8], Janak Kishore et al[9] and adriana O et al[10] were equally comparable to our study.

Majority (75%) of patients were of dengue fever without any complications, followed by dengue shock syndrome (18%) and dengue haemorrhagic fever (7%), while incidence of dengue haemorrhagic fever was more than 40% in studies done by malavige et al[7] and Janak Kishore et al[9] and incidence of dengue shock syndrome was 15.56% in study done by Itha S et al.[11] Hepatomegaly was observed in 13% patients, compared to 11–45% in other Indian studies done by Karoli R, Prakash O et al, Malavige et al, Itha S et al, Bedge Abhinandan, Saha AK and Trung DT [7-16]. Clinical jaundice was detected in 5% patients while it was 3.1-15% in studies done by Itha S et al[11], Prakash O et al[12]and Rachel Daniel et al[17]. Pleural effusion and Ascites were present in 11% and 13% patients respectively and similar observations were found in studies done by Rachel Daniel et al[17](14% & 11%) and Malavige et al[7] (16% & 17%). In dengue haemorrhagic fever cases, out of 7 only 1 patient had platelet count <20,000/mm^3 showing that bleeding manifestations did not very well correlate with the platelet count, which was also found in a study conducted by S. Sharma et al.[18] A highly involvement of liver was found as evidenced by elevated levels of SGOT and SGPT in most of the patients (88% & 81%), which was also supported by other studies as raised SGOT level was seen in 63-97% of patients and raised SGPT level in 45-96% of patients[11-16,19,19,20].

The value of mean SGOT and SGPT level was found higher in severe forms of dengue (DHF and DSS) than uncomplicated dengue[14,19,21] which was also found in study done by Saha A K et al[14], Shouza LJ et al[19], Seneviratne et al[25] and Wahid SF et al.[21] This indicates a possible association between increased transaminase levels with increasing disease severity, hence liver injury has been proposed to be a good positive predictive factor for the development of DSS and DHF. The SGOT levels in dengue infection tend to be greater than SGPT levels [22,23]. This differs from the pattern in viral hepatitis but is similar to that seen in alcoholic hepatitis. The exact cause of this is uncertain, but it has been suggested that it may be due to excess release of SGOT from damaged monocytes during dengue infection [24]. More than a 10-fold rise in SGOT & SGPT was found in 3.4% cases in a large study from Brazil [19], while they were 1.8% and 11.1% in studies done by Karoli R et al [13] and Wong M et al [20] respectively and in our study they were 6%. Increased level of hepatic transaminases can easily mimic acute viral hepatitis.

CONCLUSION

Dengue fever has a wide spectrum of manifestations and its effects on

liver are usually asymptomatic but have varied severity. The variable manifestations are a big challenge to the clinicians for treating the condition. Bleeding, shock, poly-serositis are the complications seen in severe form of dengue. This study concludes that there was no significant correlation of jaundice, bilirubin levels, and PT/ INR values with severity of illness. The levels of SGOT, SGPT and ALP were significantly higher in patients with dengue shock syndrome and high SGOT and SGPT may serve as an early indicator of dengue infection. High SGOT, high SGPT and low platelet counts may indicate progression of dengue fever to dengue haemorrhagic fever /dengue shock syndrome. So, early recognition and aggressive management of complications are essential to prevent morbidity and mortality in dengue fever patients.

Limitations

In this study, the sample size is small hence information cannot be generalized. The retrospective case records were deficient in providing the natural course and phenomenology of the illness.

Conflict of interest:

The author declares no potential conflict of interest.

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