IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 10 Ser.1 (October. 2019), PP 09-11
www.iosrjournals.org

Dengue Fever- Liver Function Tests Analysis

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Date of Submission: 17-09-2019 Date of Acceptance: 02-10-2019

I. Introduction:

Dengue or " break bone fever" has gradually evolved as one of the important causes of febrile illness in the tropical and subtropical region. There are about 50 million new dengue infections occuring each year worldwide.[1] There are about 2.5 billion people living in areas where dengue is endemic and hence potentially at risk for infection. A sharp increase in dengue cases is being observed in 2019 when compared to past decades. Dengue fever has been found to have profund effect on multiple organ systems, the commenest being the liver.

The aim of present study is to analyze the Liver Function Test and dengue serology in individuals having acute febrile illness to study the changes in LFT in Dengue cases.

II. Materials & Methods :

A cross sectional case control study of 100 subjects with acute febrile illness presenting to the Care Hospitals, Hyderabad. The study was conducted in the Department of Biochemistry in collaboration with Department of Microbiology from June 2019 to August 2019.

Inclusion criteria included patients more than 11 years of age & dengue serology positive cases. Exclusion criteria consisted of subjects with known chronic liver diseases, chronic renal diseases and Pregnancy.

Liver function tests were analysed on fully automated Beckman Coulter DXC 860i. Bilirubin testing was done by diazo method, alanine aminotransferase (ALT) & aspartate aminotransferase (AST) were tested by IFCC method. Alkaline phosphatase was tested by Biuret method, serum albumin was tested by BCG, dyebind method and serum globulins were calculated. Dengue serology was done by using PANBIO Dengue NS1 antigen, Dengue IgG and IgM antibodies by capture ELISA. When results of either of these tests were positive, patients were considered to be currently infected with dengue virus while subjects in which the results were negative were considered as controls.

III. Results:

Statistical analysis:

Descriptive statistics of normally distributed variables is reported as mean and Standard Deviation and that of normally distributed variables is reported as percentile. To test the differences between two groups, i.e. cases and controls we used unpaired Student's t-test for normally distributed variables; p value <0.05 was considered as statistically significant. The statistical analysis was done using Microsoft excel 2007 version.

Study included a total of 100 subjects that included 54 dengue infected cases and 46 dengue non infected controls. The mean age was 32.1±10.4 years in case group, 32.6±11.7 years in control group.

Table-1 *Age distribution in study population*

Study Group(N=100)	Number	Mean±SD (age in years)
Cases	54	32.1±10.4
Control	46	32.6±11.7

Table-2 *Sex wise distribution of Cases*

Study population	Males	Females
Cases	30(55.5%)	24(44.4%)
controls	25(54.3%)	21(45.6%)

Table-3

Analyte	Cases (N=54)	Controls(N=46)	p-Value
AST	152.34±121.23	29.6±6.9	<0.0001
ALT	118.9±121.2	24.5±10.2	<0.0001
Total Bilirubin	0.69±0.33	0.82±0.56	0.153
Direct Bilirubin	0.199±0.14	0.17±0.17	0.3518
ALP	262±134	255±153	0.807
Total Proteins	6.8±0.6	7.1±0.6	0.01
Albumin	4.2±0.3	4.3±0.4	0.157

Out of 54 dengue infected cases 92% of patients have increased AST and 89% have increased ALT levels. The mean±SD values of all liver function test parameters in dengue infected cases when compared to dengue negative controls liver transaminases were increased ($p<0.0001$) and total proteins (p value 0.01) was decreased and statistically significant.

IV. Discussion

Dengue infection is known to affect the liver. The Liver injury is not fully manifest in the early stages of Dengue fever. The cause for the liver dysfunction is thought to be multifactorial. Various mechanisms are postulated to explain the hepatic dysfunction seen in dengue illness including direct viral damage, immunological injury and hypoxic injury.2 Dengue virus targets the hepatocytes and Kupffer cells in the liver.3 Virus enters the cells by binding to receptors and is taken inside the cells by endocytosis. Liver involvement in dengue can be quite varied with mild to moderate elevation of serum transaminases to acute liver failure.

Histopathological studies done in patients who had a fatal outcome have revealed patterns such as microvascular steatosis, liver cell necrosis, Councilman bodies & portal tract inflammation. 4,5,6

Liver involvement in Dengue infection could be suspected in patients with Dengue fever complaining of abdominal pain, nausea, vomiting and anorexia.7

The commonest abnormality detected has been raised transaminase levels. In our study raised AST levels have been seen in 92% of cases while raised ALT levels in 89 % of cases. Souza et al 8 described elevated transaminases in 74.2% of patients with serologically confirmed dengue illness. Kuo et al 9 and Nguyen et al 10 observed that the level of AST was higher than that of ALT. The AST released from damaged myocytes could explain the higher levels of AST than those of ALT in patients with dengue fever at an earlier stage.11

In Dengue associated hepatic dysfunction, AST levels are more elevated than ALT levels-a pattern that is easily distinguishable from viral hepatitis, where ALT levels are typically higher than or equal to those of AST.

In a study by Narasimhan D et al 12 5% of patients had hyperbilirubinemia which was comparable to our study which had 7%. Larreal Y et al 13 in their study had reported hyperbilirubinemia in 2 out of 63 cases.

Hypoproteinemia or hypoalbuminemia have been seen in 12.9% in one of the large studies from Kolkata, India 14, while it ranges from 16.5%-76% in various other studies 15,16,17 and our study shows 18% which falls within the range. The heterogeneity in the population and severity of the disease may be responsible for such a wide range observed in the various studies.

V. Conclusion

Dengue has a wide spectrum of manifestations. From asymptomatic elevated transaminase levels to fulminant hepatic failure, the variable manifestations are a big challange to the clinician treating the condition. Management is primarily supportive & outcome is usually good. Care must be taken regarding the diagnosis and severity of disease which are important in reducing mortality due to ALF though it is rare.

LIMITATIONS:

However the study has its limitations. Our study did not differentiate between classical dengue and dengue hemorrhagic fever. Other Liver functional parameters like coagulation studies which are effected in severe dengue cases were not evaluated.

References:

[1]. Dengue guidelines for diagnosis, treatment, prevention and control: new edition. Geneva, World Health Organization. 2009:3 Available at http://www.who.int/rpc/guidelines/978924154871/en/.
[2]. Fernando S, Wijewickrama A, Gomes L, Punichihewa CT, Madusanka SD, Dissanayake H, et al. Patterns and causes of liver involvement in acute dengue infection. BMC Infec Dis.2016;16(1):319.
[3]. Samanta J, Sharma V. Dengue and its effects on liver. W J Clinic Cases: WJCC.2015;3(2):125.
[4]. Bhamarapravati N. Hemostatic defects in dengue hemorrhagic fever. Rev Infect Dis. 1989;11 Suppl 4:S826–S829. [PubMed] [Google Scholar]
[5]. Burke T. Dengue haemorrhagic fever: a pathological study. Trans R Soc Trop Med Hyg. 1968;62:682–692. [PubMed] [Google Scholar]

[6]. Aye KS, Charngkaew K, Win N, Wai KZ, Moe K, Punyadee N, Thiemmeca S, Suttitheptumrong A, Sukpanichnant S, Prida M, et al. Pathologic highlights of dengue hemorrhagic fever in 13 autopsy cases from Myanmar. Hum Pathol. 2014;45:1221–1233. [PubMed] [Google Scholar]
[7]. Karoli R, Fatima J, Siddiqi Z, Kazmi KI, Sultania AR. Clinical profile of dengue infection at a teaching hospital in North India. J Infect Dev Ctries. 2012;6:551–4. doi: 10.3855/jidc.2010. [PubMed] [CrossRef] [Google Scholar]
[8]. Souza LJ, Alves JG, Nogueira RM, Gicovate Neto C, Bastos DA, Siqueira EW, Souto Filho JT, Cezario Tde A, Soares CE, Carneiro RC. Aminotransferase changes and acute hepatitis in patients with dengue fever: analysis of 1,585 cases. Braz J Infect Dis. 2004;8:156–63. doi: 10.1590/S1413-86702004000200006. [PubMed] [CrossRef] [Google Scholar]
[9]. Kuo CH, Tai DI, Chang-Chien CS, Lan CK, Chiou SS, Liaw YF. Liver biochemical tests and dengue fever. Am J Trop Med Hyg. 1992;47:265–70. doi: 10.4269/ajtmh.1992.47.265. [PubMed] [CrossRef] [Google Scholar]
[10]. Nguyen TL, Nguyen TH, Tieu NT. The impact of dengue haemorrhagic fever on liver function. Res Virol. 1997;148:273–7. doi: 10.1016/S0923-2516(97)88364-1.
[11]. [PubMed] [CrossRef] [Google Scholar]
[12]. Nath P, Agrawal DK, Mehrotra RM. Ultrastructural changes in skeletal muscles in dengue virus-infected mice. J Pathol. 1982;136:301–305.
[13]. [PubMed] [CrossRef] [Google Scholar]
[14]. Denesh Narasimhan, Pasupathi Ponnusamy, M.Sathish. Analysis of liver function tests in dengue fever.Int J Adv Med. 2018 Feb;5(1):47-49. http://www.ijmedicine.com
[15]. Larreal Y, Valero N, Estevez J, Reyes I, Maldonado M, Espina LM, et al. Hepatic alterations in patients with dengue. Invest Clin. 2005; 46(2): 169-78.
[16]. Saha AK, Maitra S, Hazra SCh. Spectrum of hepatic dysfunction in 2012 dengue epidemic in Kolkata, West Bengal.
[17]. Indian J Gastroenterol. 2013;32:400–403.[PubMed] [Google Scholar]
[18]. Karoli R, Fatima J, Siddiqi Z, Kazmi KI, Sultania AR. Clinical profile of dengue infection at a teaching hospital in North India. J Infect Dev Ctries. 2012;6:551–554. [PubMed] [Google Scholar]
[19]. Wong M, Shen E. The utility of liver function tests in dengue. Ann Acad Med Singapore. 2008;37:82–83. [PubMed] [Google Scholar]
[20]. Itha S, Kashyap R, Krishnani N, Saraswat VA, Choudhuri G, Aggarwal R. Profile of liver involvement in dengue virus infection. Natl Med J India. 2005;18:127–130. [PubMed] [Google Scholar]

Dr.Jyothi Allamsette. "Dengue Fever- Liver Function Tests Analysis." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 10, 2019, pp 09-11.