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Hepatic dysfunction in dengue: A teritary care hospital experience

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Abstract

Background- The objective of study to evaluate liver dysfunction in patients with dengue infections and co-relation between liver function test & platelet count. **Methods**- Hospital based case-control study conducted on 141 hospitalized with Dengue infection (NS 1 and IgM positive). Dengue Seropositive patients are selected and subjected to complete blood count and Liver function tests were analysed. **Results**-The participants were found to have elevated levels of SGOT, SGPT levels and lower levels of serum albumin and platelet count as compare to control on evaluation. The significant negative correlation was noted between SGOT/ SGPT levels and baseline platelet counts levels. The Pearson correlation between platelet count and SGOT showed $r = -0.185$ and p-value <0.01 which proves that when platelet count decreases, the SGOT levels increases. Similarly, for the correlation between platelet count and SGPT showed $r=-0.166$ and <0.01 which proves that when platelet count decreases, the SGPT levels increases. **Conclusion**- Statistically significant co-relation was observed between liver enzymes with platelet count. Furthermore, the severity of dengue infection predicted the severity of liver derangements. It is recommended that Patients with dengue infections be screened for hepatic dysfunction. As hepatic dysfunction in dengue is transient and reversible, early identification of the same would help to reduce life threatening complications.

Keywords- SGOT, SGPT, Liver enzyme.

Introduction

Dengue fever is generally self-limiting, but its symptoms can be debilitating and cause considerable incapacitating morbidity, which have a significant health and economic toll in the society. There is currently no specific antiviral therapy or vaccine available for DF or DHF/DSS[1].

Hepatic dysfunction is a crucial feature seen in DENV infection. Hepatocytes and Kupffer cells are prime targets for DENV infection, as confirmed in biopsies and autopsies of fatal cases[2]. An eventual outcome of hepatocyte infection by DENV is cellular apoptosis, a phenomenon demonstrated both *in vivo* and *in vitro*. After apoptosis, what stays of the cells are the Councilman Bodies. The various pathways involved in this apoptotic process include viral cytopathy, hypoxic mitochondrial dysfunction, the immune response and accelerated endoplasmic reticular stress. Expression of DENV-induced TRAIL and TNF-α and Fas signaling have also been implicated in this process. Activation of the mitochondrial cell death pathway stems from the functional and morphological defects of these mitochondria[3]. The present study was carried out with an aim to evaluate liver dysfunction in patients with dengue infections and co-relation between liver function test & platelet count.

Material and method

Study Design

Hospital based case-control study.

Study Place

Department of Biochemistry with close collaboration of Department of General medicine& Pediatrics, Sardar Patel Medical College and

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Sample size

A sample size calculation on Power of study=80.00% & Allowable error=5.00%. Sample Size Calculation by MEDCALC 16.4 version software for each group (i.e. a total sample size of 142, assuming equal group sizes), to achieve a power of 80% and a level of significance of 5% (two sided), for detecting a true difference in means between the test and the reference group of 254.74 (i.e. 42.15 - 296.9) units according to study conducted by Kunal Gandhiet al[96].

Study population

Case- Dengue fever patients

Control- Age and sex matched healthy control.

Inclusion Criteria

All patients of any age & sex, coming with symptoms of dengue fever and had positive serology (Dengue NS 1positive cases / IgM Ab positive cases)

Exclusion criteria

1. All patients with fever who was Dengue IgM/NS1 Ag negative.
2. Dengue with any chronic disease like CLD, CKD, CAD.
3. Patient with history of intake of any hepatotoxic or similar drugs causing derangements of liver functions.
4. Dengue patients having other known infections causing hepatitis such as acute or chronic viral hepatitis,leptospirosis, malaria, enteric fever.

Data analysis

Standard statistical methods were applied for analysis of data. All collected data were entered into MS Excel sheet and were analyzed with the help of appropriate statistical software.
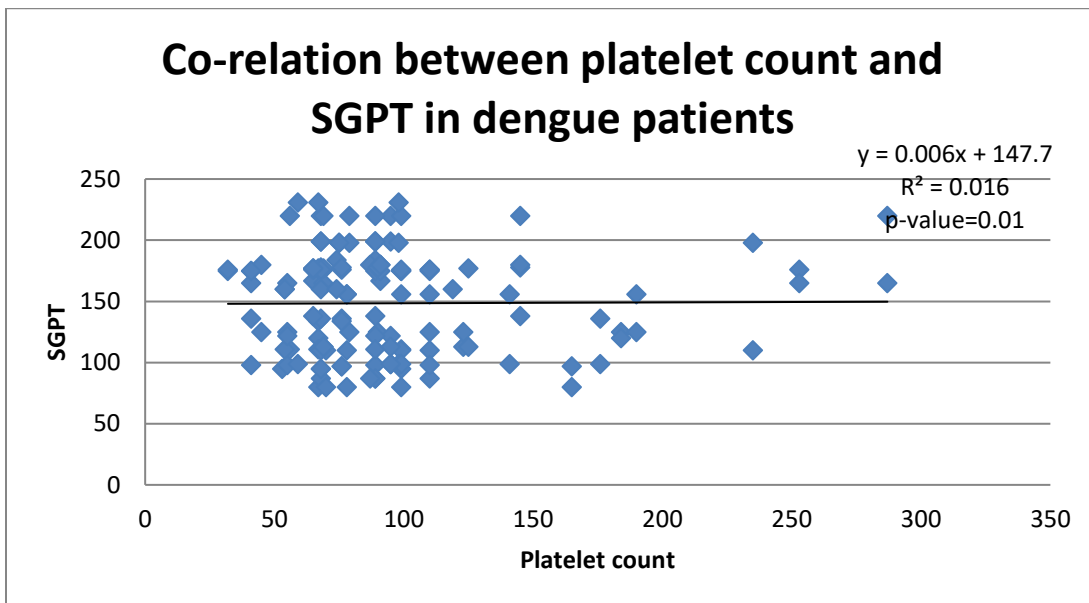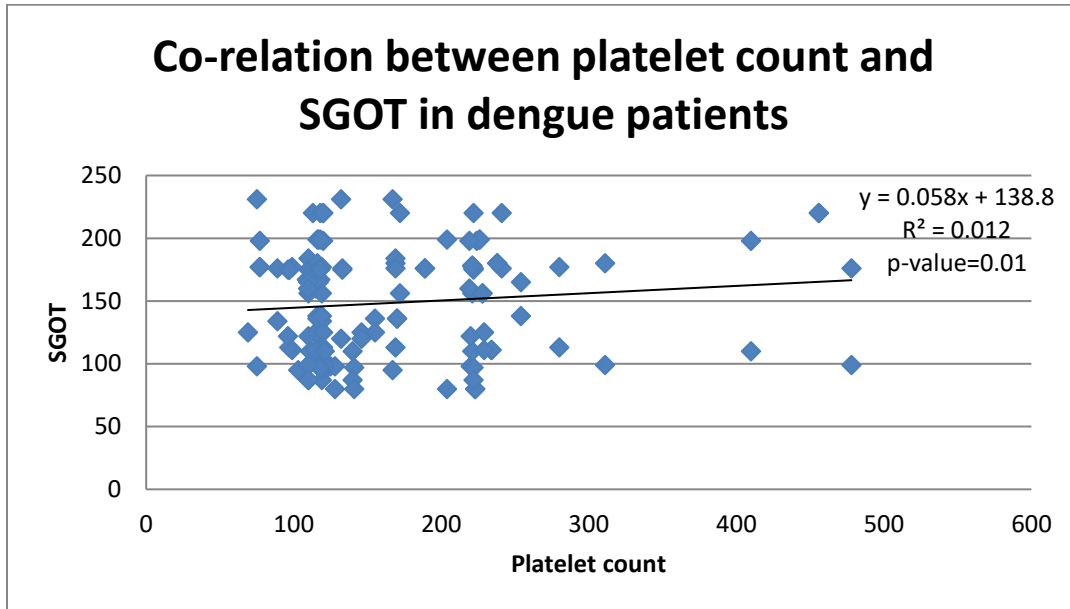
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Results

Table 1: General characteristics

Variable	Cases	Control	p-value
Age in Yrs	26.10±14.87	26.52±13.93	0.808
Male : Female	97 : 45	91 : 51	0.530

Table 2: Investigation

Variable	Cases	Control	p-value
serum total bilirubin (mg/dl)	0.78 ± 0.10	0.77 ±0.08	0.424
SGOT(IU/L)	165.30± 81.25	43.11± 6.05	0.001
SGPT(IU/L)	95.06±47.33	44.27±4.37	0.001
Total protein (gm/dl)	6.43± 0.67	6.50± 0.52	0.375
Albumin (gm/dl)	3.73± 0.29	3.93± 0.03	0.01
Platelet count per lakh mm^3	1.41±0.42	2.05±0.98	0.001

Co-relation between platelet count and SGOT in dengue patients

$y = 0.058x + 138.8$
$R^2 = 0.012$
p-value=0.01

Co-relation between platelet count and SGPT in dengue patients

$y = 0.006x + 147.7$
$R^2 = 0.016$
p-value=0.01

The participants were found to have elevated levels of SGOT, SGPT levels and lower levels of serum albumin and platelet count as compare to control on evaluation. The significant negative correlation was noted between SGOT/ SGPT levels and baseline platelet counts levels. The Pearson correlation between platelet count and SGOT showed r = -0.185 and p-value <0.01 which proves that when platelet

count decreases, the SGOT levels increases. Similarly, for the correlation between platelet count and SGPT showed r=-0.166 and <0.01 which proves that when platelet count decreases, the SGPT levels increases.

Discussion

Dengue infection is one of the most common mosquito borne disease of the world. The age group affected by dengue fever in this study compared to previous Indian studies[4,5]. This supports the view that endemicity of dengue fever is increasing in India.

In our study the liver enzyme was rise as compare to control and platelet count was lower as compare to control. When compared between the groups, rise in SGPT occurred in almost patients with a study by SrivenuItha et al[6], and Brij Mohan et al[7], also observed elevation in SGPT. Kuo et al[8], observed rise in ALT in 82% of cases. MMA Faridi et al[8], reported 64.6% rise in ALT levels.

Chandrasekar KT et al was also found a significant negative correlation was noted between SGOT/ SGPT levels and baseline platelet counts levels. The Pearson correlation between platelet count and SGOT showed r = -0.278 and p-value <0.01 which proves that when platelet count decreases, the SGOT levels increases. Similarly, for the correlation between platelet count and SGPT showed r=-0.192 and <0.05 which proves that when platelet count decreases, the SGPT levels increases.

Statistically significant association was observed between elevated liver enzymes and presence of thrmbocytopenia. The study involved a significantly larger number of samples as compared to that of other studies carried out in the region. This has significantly improved the power of the study findings. One of the limitations is its cross-sectional study. Considerably high proportion of patients with dengue infection were found to have hepatic dysfunction in the form of deranged liver enzymes. Furthermore, the severity of dengue infection predicted the severity of livery derangements.

Ethical approval

The study was approved by the Institutional Ethics Committee

Conclusion

Statistically significant association was observed between liver enzymes with platelet count. Furthermore, the severity of dengue infection predicted the severity of liver derangements. It is recommended that Patients with dengue infections be screened for hepatic dysfunction, and also patients with suspicion of dengue fever in the form of other clinical parameters should be complimented by deranged liver function tests.

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