

ORIGINALRESEARCH**A comparative Study of Liver enzymes and hematological parameters indenguefever casesandhealthycontrols****¹Dr Mahantesh BB,²Dr KavithaMM ,³Dr Subhash N, ⁴Dr SangappaVK**¹Assistant Professor, ²Associate Professor, ⁴Professor, Department of Biochemistry S N Medical College, Bagalkot, Karnataka. India³Associate Professor Department of General Medicine BLDE Medical College, Bijapur, Karnataka, India**Correspondence:**

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ABSTRACT

Dengue is the most serious viral infection in recent years, resulting in major morbidity and mortality. This was a hospital based comparative study done from July – August 2019. The purpose of this study was to estimate the hematological parameters and liver enzymes in dengue patients which could help to detect the severity of the disease and intervene early. Participants included 75 cases and 75 healthy controls. Hemoglobin, WBC count, Platelet count along with SGOT and SGPT levels were analysed. Our study showed elevated SGOT AND SGPT levels of which SGOT is more elevated. WBC and platelet count were reduced and showed negative correlation with SGOT and SGPT values. Hence this study showed liver enzymes get affected by dengue and also its severity can be assessed by knowing hematological parameters which aids in early intervention and initiate the treatment sooner.

Key Words: Dengue, SGOT, SGPT, severity, intervention.

INTRODUCTION

Dengue is the arthropod borne viral disease, widely distributed in tropical and subtropical regions of the world. Female *Aedes Aegypti* is the most common vector for this disease. It is an arthropod borne viral disease with high morbidity and mortality in human beings.

Dengue virus belongs to family of Flaviviridae, single stranded RNA virus. There are four serotypes of dengue virus-1, 2, 3 and 4 which result in acute infection. Dengue presents as mild asymptomatic, flu-like symptoms and self-limiting dengue fever (DF). In severe cases it may complicate to dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS)^{1,2}.

Dengue affects different systems like vascular, hepatic, renal, muscular and central nervous system. As per the world health organization (WHO) guidelines thrombocytopenia is the vital indicator of the severity of dengue infection. Along with the hematological features, hepatic dysfunction features are also associated with it. Hence the present study was undertaken to assess the hematological parameters and liver enzymes in dengue infection^{3,4}.

MATERIALS AND METHODS

This was hospital based study, conducted in the department of Biochemistry, S Nijalingappa Medical College and Hanagal Shri Kumareshwar Hospital Research centre, Bagalkot, a tertiary care teaching hospital in Karnataka. Study was conducted from July to October 2019.

Study consisted of 150 participants of age group above fourteen years attending medicine OPD. 75 were dengue patients and 75 were age and sex matched healthy controls. Individual with positive for only NS1 antigen and positive for IgM and IgG antibodies for dengue infection were considered dengue positive cases and were included in the study. Individuals with dengue negative, malaria, chronic liver diseases, bleeding disorders were excluded from the present study. These dengue patients were further subdivided into two groups as NS1 antigen positive cases and another group IgM /IgG antibody positive cases.

The study protocol was approved by institutional ethics committee (IEC). Informed written consent was taken from all the patients at the beginning. The patients attending to medical OPD and admitted in wards were enrolled in the study. A 3-5 mL venous blood was drawn from the median cubital vein under aseptic precautions. In this, 2mL was EDTA sample used for complete blood count (CBC) analysis. CBC was assessed in 5 part Horriba cell counter. Remaining 3mL of blood made to clot and serum was collected. Serum was used for estimation of biochemical parameters such as serum glutamate oxaloacetate transaminase (SGOT)⁵ and serum glutamate pyruvate transferase (SGPT)⁶. These were analysed in fully automated analyser Biosystem A-25 instrument. Dengue was confirmed by serological test NS1, IgM and IgG using standard kit SDBIOLINE dengue duo rapid test by immunochromatographic assay method⁷.

STATISTICAL ANALYSIS

Statistical analysis was done using software Statistical Package Social Sciences (SPSS) version 13. Quantitative data expressed in terms of mean \pm SD. Student 't' test was applied for comparison of groups and Pearson's correlation test was applied for correlation of platelet count with other parameters. $p < 0.005$ was considered as statistically significant.

RESULTS

Table-1: Clinical symptoms in dengue cases

Presentations	Cases (n=75)
M:F	45: 30
Mean age in year	42
Fever	75(100%)
Headache	32(42.6%)
Myalgia	54(72%)
Vomiting	18(24%)
Rashes	9(12%)
Pain abdomen	8(10.6%)
Bleeding	0

Table-2: Mean values of hematological and biochemical parameters in cases and controls

	Cases n=7 5	Controls n=75	p-value
Haemoglobin/dL	11.85 \pm 2.1	11.6 \pm 1.83	NS
Total leucocyte/cmm	5076.62 \pm 2567.52	7859.36 \pm 4410.72	0.0001
Platelet count/cmm	1.13 \pm 0.72	2.41 \pm 7.46	0.0001
Total Bilirubin mg/dL	0.79 \pm 0.42	0.63 \pm 0.37	NS
SGOT (AST) IU/L	132.98 \pm 61.04	21.82 \pm 9.3	0.0001
SGPT (ALT) IU/L	92.35 \pm 53.82	9.5 \pm 7.26	0.0001

NS-not significant, 0.001*highly significant

Table-3: Mean values of the hematological and biochemical parameters in different sub-groups

	NS1(n=33)	IgG/IgM (n=42)	p-value
Haemoglobin/dL	11.63 ± 1.45	11.6 ± 1.8	NS
Totalleucocyte/cmm	4684.36 ± 2465.7	5092.736 ± 2576.98	0.001
Plateletcount/cmm	0.89 ± 0.42	1.16 ± 0.85	0.001
TotalBilirubin mg/dL	0.54 ± 0.3	0.82 ± 0.63	0.01
SGOT(AST)IU/L	126.69 ± 56.63	104.23 ± 63.1	0.001
SGPT(ALT)IU/L	97.82 ± 50.16	75.64 ± 33.67	0.001

NS-notsignificant,0.001*highlysignificant

Figure-

1: Pearson negative correlation of platelet count with serum glutamate oxaloacetate transaminase (SGOT) in NS1 positive dengue cases

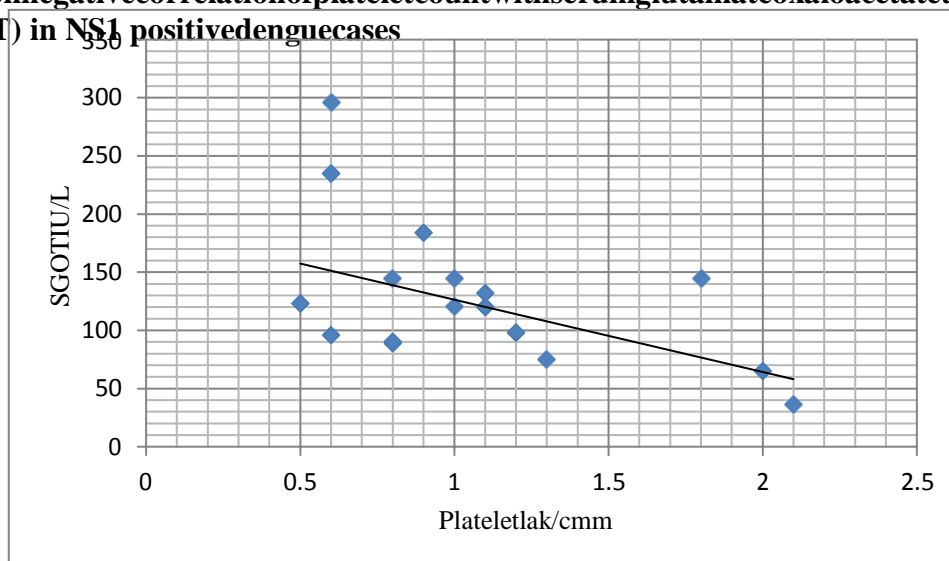
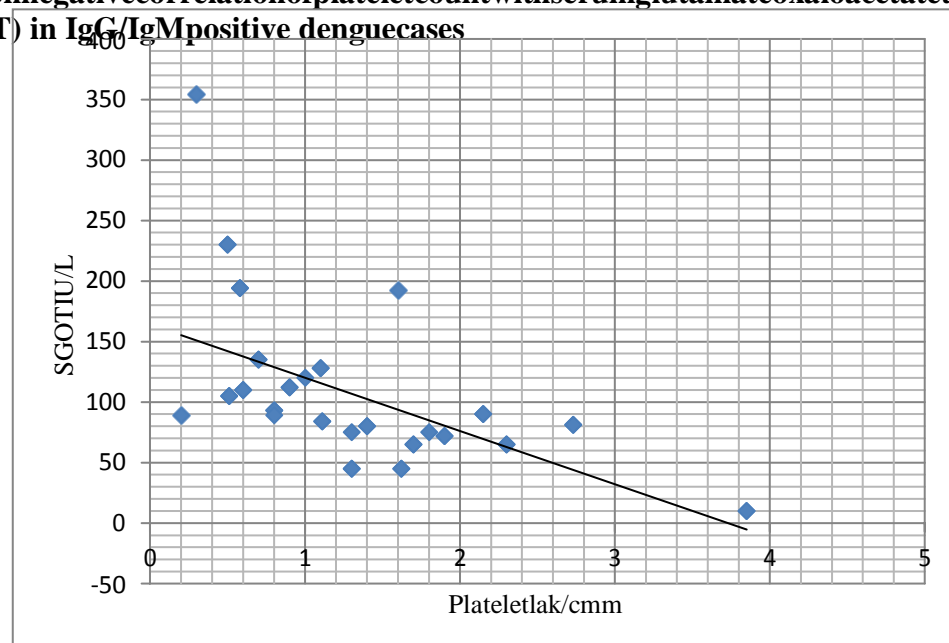


Figure-

2: Pearson negative correlation of platelet count with serum glutamate oxaloacetate transaminase (SGOT) in IgG/IgM positive dengue cases



DISCUSSION

Our study showed statistically significant increase in SGOT and SGPT levels in case of NS1 and IgG, IgM positive cases. Of these NS1 cases had higher serum levels of these parameters in comparison to IgM, IgG positive cases. Even the platelet count was significantly reduced in NS1 positive cases compared to IgM, IgG cases. But there were no significant changes in hemoglobin levels. WBC showed significantly reduced count levels in dengue positive cases. These findings are in accordance with study done by Kularatne et al, which showed 88% patients had two fold increase in SGPT and SGOT levels⁸. Mandal et al, in his study revealed elevated both transaminases in 83.7% of cases⁹.

A Brazilian study by Silva et al, in which C1q has found an interaction between NS1 protein and liver proteins leading to the liver dysfunction of liver in dengue cases¹⁰. Clinical jaundice presents with rare pain abdomen due to serositis. Hepatic enzymes are significantly elevated in dengue cases compared to controls and these transiently elevated transaminases levels returned to normal level after 4 weeks of treatment and improvement¹¹.

Wilder Smith et al concluded that three lab parameters such as platelet count <1,40,000, WBC count <5000 and Aspartate aminotransferase level of >34 IU/L. A combination of these tests showed 75% sensitivity and 100% specificity¹².

Elevated AST levels correlates with that of hemorrhage. In dengue AST is higher than ALT with ratio of 1-1.5, while other types of viral hepatitis have higher ALT levels. Dutta et al suggested liver injury due to direct infection of hepatocytes and Kupffer cells. Lei et al found increased RANTES level in comparison to other viral infections. This chemokine recruits lymphocytes and NK cells to inflammatory sites resulting in indirect liver damage^{13,14}.

CONCLUSION

The above study concluded that thrombocytopenia and low WBC counts could be useful as diagnostic markers for the dengue fever and to assess the severity of the disease. Elevated hepatic enzymes adds information about the ongoing liver damage secondary to dengue. Hence these parameters are helpful for early diagnosis and to initiate treatment sooner to prevent the late stage complications and mortality.

CONFLICT OF INTEREST

Nil

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