Original Research Article

Dengue Fever: An Observational Study in Area of Solapur, Maharashtra

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ABSTRACT

Objective: To determine biochemical parameters of dengue fever in area of Solapur, Maharashtra.
Place and Duration of Study: At Ashwini Rural Medical College, Hospital and Research Centre, Solapur over the period of 6 month from June to November 2014.
Materials and Methods: Through convenient sampling 70 individuals each were taken up for the study as Healthy controls and Dengue subjects. Hb, SGOT and SGPT, creatinine and calcium estimations were done of Healthy control and Dengue patients.
Results: It was found that in dengue patients the Hb values are low as compared to Healthy controls it's ranging from 6.0 - 11gm/dl in dengue patients and 10.0-15.0gm/dl in Healthy controls. SGOT and SGPT values are raised in dengue as compared to healthy controls it's ranging between 56 - 532 IU/L among dengue patients and 19-60 IU/L among healthy control groups. The creatinine values are almost same in control and patients ranging between 0.5- 2.8 mg/dl. Calcium level decreased in DF range from 5.5-10 mg/dl and 8-11 mg/dl among the controls.
Conclusion: The results of this study have highlighted that estimating the levels of serum transaminases in dengue fever may help in early detection of liver cell damage. The level of the calcium and creatinine should also be assessed in severe cases of Dengue infection. Timely diagnosis and supportive therapy reduces the morbidity and mortality from DHF.

Key words: Dengue fever, vector born, hemoglobin, SGOT, SGPT, creatinine, calcium.

INTRODUCTION

Dengue is vector born viral infection that belongs to family Flaviviridae. It is single stranded RNA virus and endangers 2.5 billion people world wild. Nearly 100 million cases of dengue fever and between 250,000 and 500,000 cases of dengue fever are annually reported to world health organization (WHO). After incubation period of 4-7 days symptoms appear with sudden onset of fever that lasts for 3-5 days with headache, myalgia, anorexia, gastrointestinal tract infection and rash. Dengue is caused by Flavivirus, with four serotypes (DENV1, 2, 3, 4) inoculated into human by females Aedes aegypti or rarely by Aedes albopictus mosquito. This disease mainly occurs in the rainy season and immediately from June onwards till December in India. Dengue hemorrhagic fever and shock are life threatening. If untreated mortality rate is as high as 20%.

Whereas if recognized on right time and managed properly mortality less than 1% (WHO 2001). [1,2,3]

The present study has aimed to prevent the complications associated with dengue fever, in Solapur area from period of June to November 2014. For this certain biochemical parameters were done. These included hemoglobin, SGOT, SGPT, creatinine, and calcium.

MATERIALS AND METHODS

Study area/setting

The present study is an observational study of Dengue fever in area of Solapur. The study was conducted in Ashwini Rural Medical College, Hospital and Research Centre, Solapur over the period of 6 months after taking consent from the subjects. Ethical clearance was obtained from the institution. The total 70 dengue patients were taken from area of Solapur. To compared disease 70 healthy controls were taken.

Study design

This is a descriptive, hospital-based study.

Study subjects

This included all confirmed cases during the outbreak of Dengue infection in the period from June to November 2014, who were seen in area of Solapur. This study constituted all age groups from infants to old patients.

Exclusion criteria

All of the patients were tested first for malaria. Any patients with malaria infection were excluded from the research. Patients with positive test of hepatitis A, B, C, E or even had recent history of infection with these hepato-tropic viruses was also excluded from this research.

Blood were collected by venipuncture method and dengue virus was determined by card test. Serum used for this test.

Hemoglobin was determined by Sahlis Acid Hematin method using capillary blood or anticoagulated venous blood.

Total leukocyte count was determined by Heamocytometery and number of white blood cells are counted and reported. Determination of platelet was done by using Heamocytometry. [4,5]

Serum creatinine was determined by Jaffes kinetic method. [4,5]

Serum SGOP and SGPT was determined by UV Kinetic method. [4,5]

Serum calcium was determined by Aresenazo Kit method. [4,5]

Statistical analysis: The analysis of data was done by using student t test and SPSS-17 software. The difference in mean values of various parameters was calculated and expressed in terms of p value.

RESULT

According to our estimation, hemoglobin level in control were 12.48 ± 1.05 gm% while same in patients of dengue fever were found to be 9.08 ± 1.09 gm %. Thus, there was decreased in hemoglobin level in dengue fever compared to control $(p < 0.01)$. (Table-I)

The activity of serum glutamate oxaloacetate transaminase (SGOT) in controls were 33.62 ± 10.07 IU/L while same in patients of dengue fever were found to be 243.01 ± 94.51 IU/L. Thus, there was increase in SGOT activity in dengue fever as compared to controls $(p < 0.01)$. (Table-I)

The activity of serum glutamate pyruvate transaminase (SGPT) in controls were 34.55 ± 10.12 IU/L while in patients of dengue fever were 308.6 ± 106.34 IU/L. It shows that SGPT activity in dengue fever were increased as compared to controls $(p < 0.01)$. (Table-I)

The activity of creatinine in controls was 0.97 ± 0.47 mg/dl while in patients of dengue fever were 1.44 ± 0.51 mg/dl. Thus,

there was nearly 2.1 times increase in creatinine activity in dengue fever as compared to controls (p < 0.01). (Table-I)

The activities of calcium in controls were 9.74±0.89 mg/dl while in patients of dengue fever was 7.69 ± 1.08 mg/dl. Thus, there was decreased in calcium activity in dengue fever as compared to controls (p < 0.01). (Table-I)

Table-1: Evaluated values of biochemical parameters in controls and Dengue fever patients.

Biochemical parameters	Dengue fever (mean ± sd)	Control (mean ± sd)	P value
HEMOGLOBIN (gm%)	9.08 ± 1.09	12.48 ± 1.05	p < 0.001[*]
CREATININE (mg/dl)	1.44 ± 0.51	0.97 ± 0.47	p < 0.001[*]
SGOT (IU/L)	243.01 ± 94.51	33.62 ± 10.07	p < 0.001[*]
SGPT (IU/L)	308.6 ± 106.34	34.55 ± 10.12	p < 0.001[*]
CALCIUM (mg/dl)	7.69 ± 1.08	9.74 ± 0.89	p < 0.001[*]

p < 0.001* - Highly significant

DISCUSSION

Dengue is a dreadful viral infection common in countries like India. The importance of this study lies in the fact that it is the first documented research in this region of Solapur, which studied the severity of liver damage in Dengue infection. In this research, we included Dengue patients with mild symptoms seen in the outpatient department and severe cases who were admitted in the impatient units; so this study covers the mild as well as the severe cases of Dengue virus infections. [6,7]

In our study it was found that hemoglobin and calcium level were decreased significantly as compared to control. The observed significant values of calcium in dengue patients correlate with findings of Castilla-Guerra et al. also stated that acute hypocalcemia is primary cause of increased neuromuscular excitability and tetany is frequently associated with dengue virus infection. [8] Here, none of the patients in our study had previous liver illness or abnormal SGOT and SGPT levels. This study supports the association between developments of dengue fever and early alteration of the serum transaminases. About 80% of the patients in our study had abnormal SGOT levels. The SGPT level has been found to be elevated in 90% of the Dengue cases. These biomarkers have been proposed as indicators of severity in dengue patients. Alteration in the serum levels of transaminases may be caused by damage of the liver parenchyma. [9-11]

Previous studies suggest that biomarkers can predict a more severe form of dengue and could also be indicators of early tissue damage in the acute phase of dengue fever. Such studies could facilitate in establishment of predictor biomarkers of Dengue severity that will help to decrease morbidity and mortality caused by this disease. [12,13]

Since Solapur is one of the endemic areas with Dengue infection, Dengue virus should be added to the differential diagnosis of hepatitis in the local hospitals protocol. AST and ALT can be a useful surrogate marker to predict disease severity and bleeding outcome in Dengue infection, [14] therefore it should be measured in all Dengue patients. The level of the calcium and creatinine should also be assessed in severe cases of Dengue infection. We suggest the grading system presented in this study to be applied in Dengue virus management protocol.

CONCLUSION

The results of this study have highlighted the importance of history, clinical examination and the triad of

thrombocytopenia, raised hematocrit and elevated liver enzymes. Estimating the levels of serum transaminases in dengue fever may help in early detection of liver cell damage. Avoidance of hepatotoxic drugs in Dengue patients may prevent further liver damage. Application of these findings may help optimize resource allocation, leading to a more opportune and effective care of those patients. Timely diagnosis and supportive therapy reduces the morbidity and mortality from DF.

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