

Haematological and Biochemical Changes in Dengue Fever.

¹Kaur Ramandeep, ²Babita, ³Dr.Promila Sama

¹MSc Biochemistry, Department of Medical Lab Technology, B.I.S Institute of Sciences and Technology, Gagra, Moga

²MSc Microbiology, Lecturer, Sant Baba Bhag Singh Institute of Nursing, Vill Khiala, Jalandhar

³H.O.D, Department of Medical Lab Technology, B.I.S Institute of Sciences and Technology, Gagra, Moga

ABSTRACT

INTRODUCTION: Vector borne viral infections endanger billions of people and World Health Organization (WHO) has estimated about 50 million cases of dengue infection every year worldwide. This disease caused by dengue ranges from a relatively minor febrile illness to a life threatening condition characterized by extensive capillary leak.

AIM: The present study aimed to prevent the complications associated with dengue fever.

METHODOLOGY: The present study has been carried out in Gamma Diagnostic Laboratory, Moga. Through convenient sampling twenty individuals each were taken up for the study as Healthy controls (Group A) and Dengue subjects (Group B). Hb, TLC, Platelet count, Prothrombin time, SGOT and SGPT estimations were done of Healthy control (Group A) and Dengue patients (Group B).

RESULTS: It was found that in dengue patients the Hb values are low as compared to Healthy controls i.e Hb ranging from 5.4- 12.7 gm/dl in dengue patients and 10.6-15.0 gm/dl in Healthy controls. TLC range in Healthy controls is 5100-10800 / cumm and in dengue patients it is recorded as 1200-18500/cumm. The study also depicted that platelet count is comparatively low among dengue patients i.e 20,000-80,000 cells/cumm as compared to Healthy control groups in which platelet count ranges from 1,71,000- 3,12,000 cells/cumm. Prothrombin time shows significant elevation in dengue patients in comparison to healthy controls with PT range of 12-16 sec in Healthy controls and 14-42 sec in dengue patients. SGOT and SGPT values are raised in dengue patients as compared to healthy controls with SGOT ranging between 74-420 IU/L among dengue patients and 8-40 IU/L among healthy control groups. The values of SGPT range from 12-30 IU/L in healthy controls and 53-390 IU/L in dengue patients.

CONCLUSION: Considering the results, it was concluded that in dengue patients Hb and platelet levels are low as compared to Healthy control group whereas TLC levels show a decrease in Dengue patients but sometimes it may also be increased due to other bacterial infections. Prothrombin time shows significant elevation in dengue patients and biochemical markers i.e SGOT and SGPT were higher with dengue patients than those with non dengue febrile conditions.

KEY WORDS : Dengue, Vector borne, Haemorrhagic, Platelet count, TLC, Prothrombin time, SGOT and SGPT.

I. INTRODUCTION AND BACKGROUND OF THE STUDY

Dengue is a vector borne viral infection that belongs to family Flaviviridae. It is a single stranded RNA virus and endangers 2.5 billion people worldwide. WHO has estimated about 50 million cases of dengue infection every year worldwide. After the incubation period of 4 – 7 days (range 3- 14 days) symptoms appear with sudden onset of fever that lasts for 3- 5 days with headache, myalgia, anorexia, Gastrointestinal tract infection and rash. The viruses are transmitted to man by the bite of infected mosquito, mainly *Aedes aegypti*. The incubation period of 4-7 days (range 3-14 days), includes four serotypes DENV-1, DENV-2, DENV-3 and DENV-4. This disease mainly occurs in the rainy season and immediately from July onwards till October in India. Dengue virus is present in the blood of infected patient suffering from dengue fever. When the mosquito bites the infected patient, it sucks blood and also the dengue virus. The virus undergoes further multiplication in the body of the mosquito and when the virus containing mosquito bites the normal human being, the virus is injected into the person's body and the person becomes infected and symptoms of dengue fever appear. In this way the cycle is repeated. Many dengue fever cases are self limiting but its complications like 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 is less than 1% (WHO,2001).Dengue fever is most common in urban areas in which outbreaks occur frequently during rainy season when mosquito breed heavily in standing water.Most healthy people who get dengue fever can recover by taking necessary precautions and medications.This will reduce the mortality rate.No specific antiviral therapies are currently available for the disease caused by insect vectored falvi virus.Thus efforts have been focused on the prevention of disease through either vaccination or vrctor control.(Coller et al, 2010)

II. MATERIALS AND METHODS

Research approach: Descriptive comparative approach

Research Design: Non-experimental cross sectional sectional study design

Settings of the study: Gamma Diagnostic Laboratory,Moga.

Population: Inviduals visiting Gamma Diagnostic Laboratory.

Sample and Sampling Technique: Through convenient sampling twenty individuals each were taken up for the study as Healthy controls (Group A) and Dengue subjects (Group B).

Blood is collected by venipuncture method and dengue virus is determined by Card Test.Serum, Plasma or Whole blood samples may be used for this test.

Hemoglobin is determined by Sahli's Acid Hematin method using capillary blood or anticoagulated blood (EDTA or double Oxalated) venous blood.

Total Leukocyte count is determined by Heamocytometry and number of white blood cells are counted and reported. Determination of Platelets and Prothrombin time is done using Heamocytometry and Quick's method respectively and the values are reported. EDTA anticoagulated blood is used for platelet estimation and Citrated Plasma is used for Prothrombin time determination.

Serum Glutamate Oxaloacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase (SGPT) are determined by Kinetic method

Analysis of the data: The analysis of the data was done in accordance with objectives of the study using Descriptive statistics.

III. RESULTS AND DISCUSSION

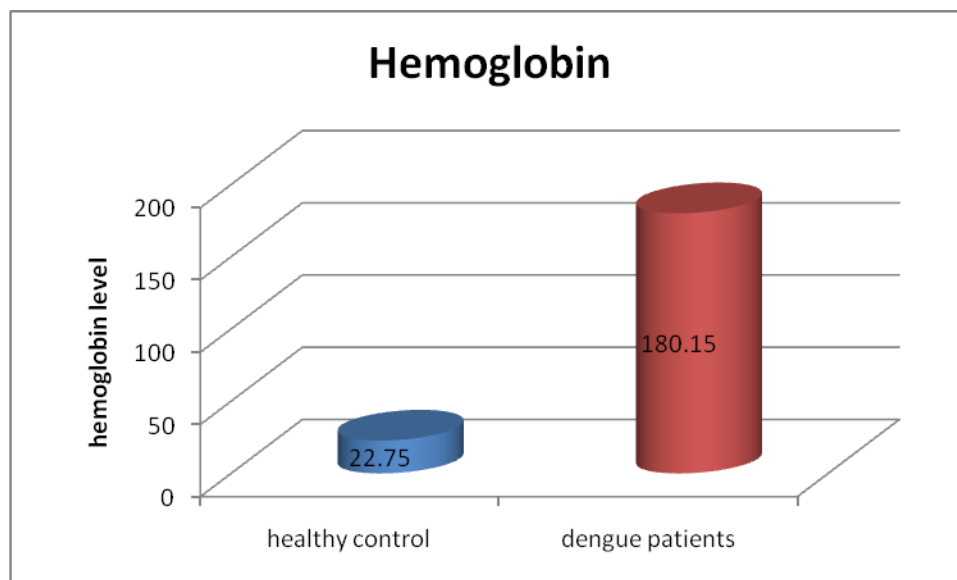
It is estimated that every year , 2 crore cases of Dengue fever occur in the world.The risk of opportunistic infections in Dengue fever infected persons continues to increase as dengue disease progresses and platelet count decreases.In every group 20 patients were examined. In the first group patients examined with negative dengue test within past 6 months is mentioned as healthy control group. Second group is reffered as Dengue subjects ,all the dengue positive subjects have history of transfusion of platelets.

Heamtological and Biochemical Parameters among subjects in the study.

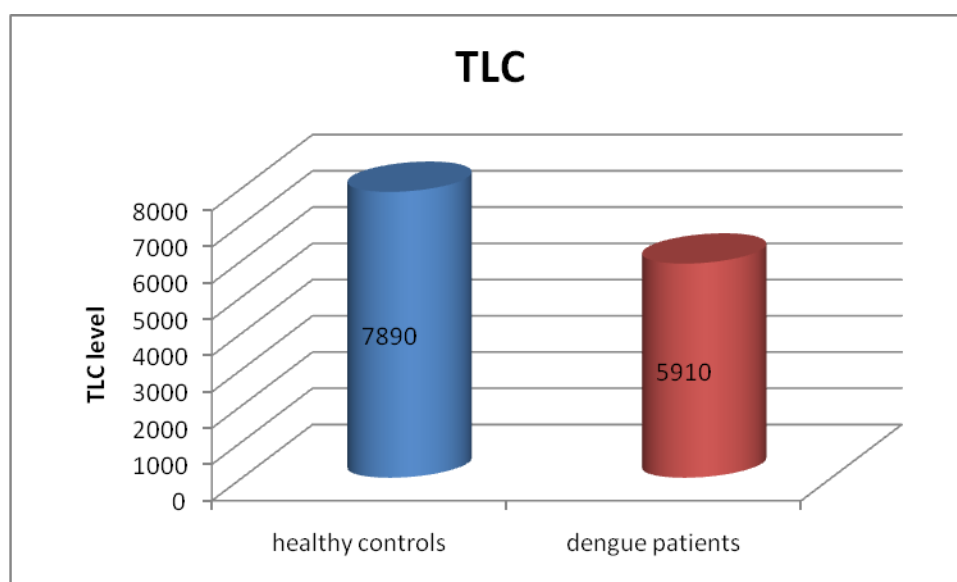
TEST	HEALTHY CONTROL	DENGUE PATIENTS
Hb	12.49 ± 1.13	8.79 ± 2.04
TLC	7890 ± 1393.87	5910 ± 4420.96
PLATELETS	220.55 ± 45.64	34.05 ± 24.56
PROTHROMBIN TIME	13.65 ± 1.68	26.4 ± 9.57
SGOT	22.75 ± 6.00	180.15 ± 94.90
SGPT	19.4 ± 5.59	153.7 ± 86.87

Values are presented as mean ± standard deviation.

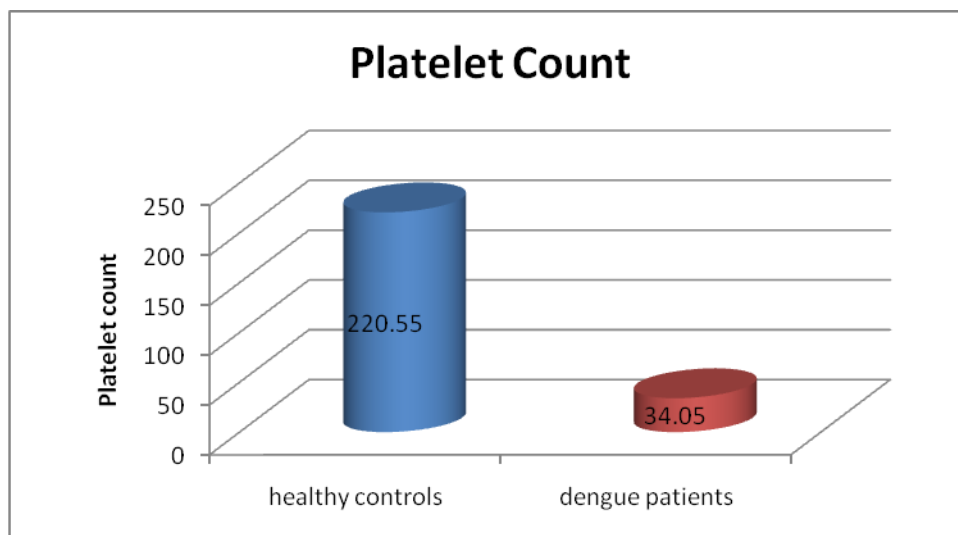
The results of dengue screening shows increased values of Prothrombin time, SGOT, SGPT and decreased values of Hb, TLC and Platelets than normal healthy control group.The Hb level in the Healthy Controls is 10.6 – 15.0 gm/dl and the mean value is 12.49 and S.D value is ± 1.13. In dengue patients chronic range 5.4 – 12.7 g/dl and mean value is 8.79 and S.D value is ± 2.04.The Hb levels are low due to disseminated intravascular coagulation (DIC) , where chemicals responsible for clotting are used up and lead to risk of severe bleeding.



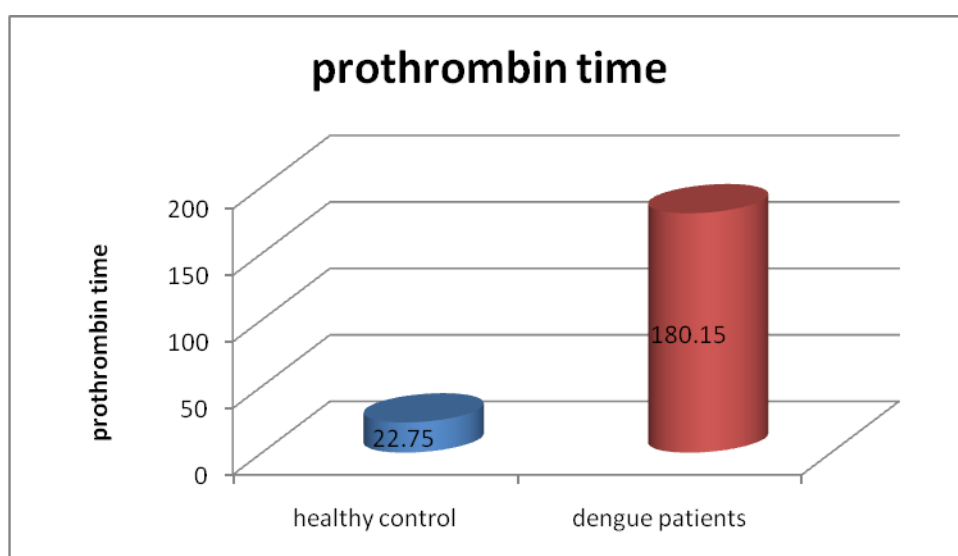
TLC levels decrease in dengue patients but sometimes it may also be increased due to other bacterial infections. Healthy controls range is 5100 – 10800 / cumm. The mean value is 7890 and S.D is ± 1393.87 . In dengue patients, the chronic range of TLC are 1200 – 18500/cumm and mean value is 5910 and S.D value is ± 4420 . This shows the new onset leucopenia with lymphocytosis and an increase in atypical lymphocytes indicate that the fever may dissipate within next 24 hours and the patient may enter into the critical phase.



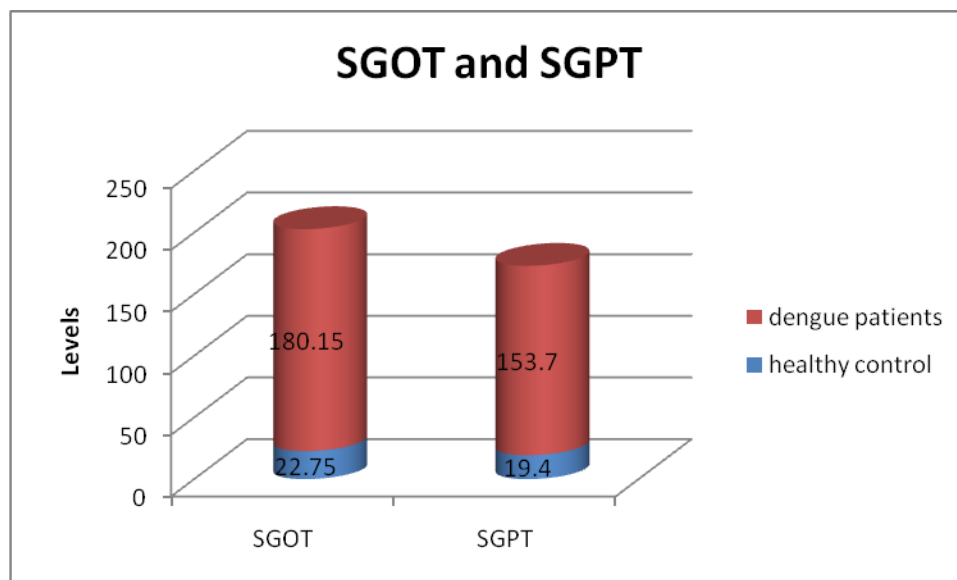
Platelet count in Healthy control ranges from 1,71,000- 3,12,000ells/ cu mm and the mean value is 220.55 and S.D value is 45.64. In dengue patients the chronic range is 20,000 -80,000 cell/cu mm and mean value is 34.05 and S.D value is 24.56. Dengue virus has been demonstrated to have toxic effects on platelets in the presence and absence of acute and convalescent patient serum. Bleeding was significantly related to severe thrombocytopenia. Most of the patients who had bleeding had a decrease haematocrit.



Prothrombin time values show significant elevation in the dengue patients in comparison with healthy control group individuals. The control range of Prothrombin time is 12 -16 sec and mean value is 13.65, its S.D value is ± 1.68 . The chronic value is 14 -42 sec, mean value is 26.4 and S.D value is ± 9.57 . PT values are increased in dengue patients because the blood clotting mechanism is affected severely.



The results of biochemical studies shows that mean value of SGOT in healthy control is 22.75 and S.D value is ± 6.00 while SGPT is between 12 -30 IU/L , mean value is 19.4 and its S.D value is ± 5.59 . In dengue infected subjects mean value of SGOT is 180.15 and S.D value is ± 94.90 and SGPT is 53-390 IU/L ,mean value is 153.7 and S.D value is ± 86.67 .



IV. SUMMARY AND CONCLUSION

Most healthy people who get dengue infection can recover by taking necessary precautions and medication. In dengue patients Hb levels are low as compared to Healthy control group whereas TLC levels show a decrease in Dengue patients but sometimes it may also be increased due to other bacterial infections. Platelet count is significantly decreased and the decrease is according to the clinical course of the disease and its severity. Prothrombin time values show significant elevation in dengue patients and biochemical markers i.e SGOT and SGPT were higher with dengue patients than those with non dengue febrile conditions. The degree of liver dysfunction in dengue infection varies from mild injury with elevation of aminotransferases alone to severe injury with jaundice and even fulminant hepatic failure.

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