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Original Research Article

To study relation of haemoglobin level and platelet count

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ABSTRACT

Background: The relationship between haemoglobin level and platelet count was carried among 116 volunteer with respect to differences between platelet count within haemoglobin (gm%) level within platelet count.
Methods: Blood samples were collected into EDTA anticoagulant bulbs for both platelet count and haemoglobin level from healthy subjects.
Results: Statistical analysis showed significant differences ($p<0.05$) between haemoglobin level that fell within platelet count 1.5 to 2.5 lacs/mm^3 as (11.7±1.62) and haemoglobin level that fell within platelet count 2.51-4 lacs/mm^3 as (9.1±2.40). statistical analysis also show a significant difference ($p<0.05$) between platelet count that fell within the haemoglobin level less than 11 gm% as (2.62±0.86) and platelet count that fell within haemoglobin level of 11-16 gm% as (2.11±0.42).
Conclusions: The above results indicate that there is a relationship between low and high level of haemoglobin on platelet count and vice versa.

Keywords: Haemoglobin level, Platelet count

INTRODUCTION

Blood consists of protein rich fluid known as plasma, in which are suspended cellular elements RBC, WBC, Platelets[1]. The normal total circulating blood volume is 8% of body weight. About 55% of this volume is plasma. In blood serum is plasma with fibrinogen removed. Blood contains 45% formed elements and 55% plasma. Plasma contains 90% water and also contains salts, plasma proteins and substances transported by blood. RBC, WBC and platelets are suspended in plasma.

RBC (erythrocytes) is biconcave and round in shape. Size is about 7.5 micron in diameter. RBC contains haemoglobin within it. Life span of RBC is 120 days. They are produced in bone marrow and destroyed mainly in spleen. RBC transports O_2 and CO_2. WBC (Leucocytes) is divided into 2 groups' granulocytes and agranulocytes. Granulocyte contains granules in their cytoplasm and lobed nuclei, granulocytes are neutrophils, basophils, eosinophils. Agranulocytes contain no visible granules in cytoplasm their nuclei are round, oval or bean shaped. Aganulocytes include monocytes and lymphocytes.[2] Main function of WBC is in body defence and immunity.

Platelets (thrombocytes) are small colourless, non-nucleated cells. They are spherical and irregular in shape. Their diameter is 2 to 4 microns. Function of platelet is to help in stopping bleeding. Their normal count is 1.5 to 4 lacs/mm^3. They are formed in bone marrow. They have role in platelet plug formation, clot retraction and repair of damaged blood vessels[3].

Haemoglobin is present inside RBC. It is made of 2 parts haem and globin. Haem contains iron and globins are polypeptide chains. Red colour of blood is due to haemoglobin. Its function is to transport oxygen from

lungs to tissues and carbon dioxide from tissues to lungs. Normal Hb in females is 11-16 gm% and in males 12-18 gm%. All blood cells arise from haemopoietic stem cells in bone marrow. It is assumed that what affects bone marrow would affect all blood cells .There is less information on relation between low or high level of Hb on platelet count. This research was carried out to determine this relationship which will be of good value to both physicians and academic medical students. Many anemia are associated with platelet disorders, Aim of this research was to study relation between platelet count and Hb level of same blood sample.

METHODS

The research was carried out using medical laboratory in private medical college. A total number of 116 blood samples were collected from male and female subjects between ages of 20-40 years. Ethical clearance was taken. Informed consent was taken from subjects and procedure was explained to subjects. 2 ml of blood was collected under all aseptic precaution from each subject with help of sterile syringe and needle. Venous blood sample was collected by venepuncture technique. The sample collected was transferred to EDTA anticoagulant bulb for haemoglobin and platelet count. Haemoglobin level and platelet count was done by using automated cell counter machine using standard protocol.

RESULTS

From Table 1 mean and standard deviation of haemoglobin that falls within 1.5 to 2.5 lacs/mm^3 platelet count was 11.7±1.62 gm%. Haemoglobin level that falls between 2.51 to 4 mm^3 platelet counts was 9.1±2.40 gm%. There was significant difference between the Hbgm % level that fell within 1.5 to 2.5lacs/mm^3 and the Hb level that fell within 2.51to 4lacs/mm^3. This was statistically significant ($p<0.05$).

From Table 2, the mean and standard deviation of platelet count that fell within Hb gm% level below 11 gm% was 2.62±0.86 lacs/mm^3, and platelet count that fell within Hb level of 11-16 gm% was 2.11±0.42 lacs/mm^3. There is significant increase between platelet count that fell below Hb gm% of 11 and that fell with 11-16 gm%.

Table 1: Mean and SD of Hb gm% level that falls within platelet count of 1.5-2.5 lacs/mm^3 and Hb gm% level that fall within 2.51- 4 lacs/mm^3.

Parameter	Platelet count between 1.5-2.5/Lacs/mm^3	Platelet count between 2.5-4/Lacs/mm^3	p value
Hb gm%	11.7±1.62	9.1±2.40	P<0.05

Table 2: Mean and SD of platelet count that falls within Hb gm% level less than 11 gm% and platelet count that fall within Hb gm% level 11-14 gm%.

Parameter	Hb below 11 gm%	Hb between 11-14 gm%	p value
Platelet count. Lacs/mm^3	2.62±0.86	2.11±0.42	P<0.05

DISCUSSION

This study was conducted to establish relationship between platelet count and haemoglobin level. Platelets are small granulated bodies that aggregate at site of vascular injury. They are non-nucleated. The megakaryocytes, gaint cells in bone marrow form platelet by pinching off bits of cytoplasm.[4] They help in platelet plug formation which stops bleeding from injured blood vessels. Haemoglobin is iron containing pigment in RBC[5.] The main function of Hb is to carry oxygen from lungs to tissues to burn nutrients to release energy and also carry away carbon dioxide back to lungs.[6] Haemoglobin formation continue in RBC throughout its early development from pro-erythroblast to reticulocyte in bone marrow.[7]

From above results, it is seen that when there is platelet count on lower side (1.5-2.5lacs/mm^3) then there is more Hb level (11.7±1.62 gm%) and when platelet count is on higher side (2.51-4 lacs/mm^3) Hb level is low (9.1±2.40). It was also observed that when there is low Hb level below 11gm% there is high platelet count (2.62±0.86) and high Hb level (11-16gm%) shows low platelet count (2.11±0.42)

The reason for the relationship between low and high platelet count on haemoglobin level and low and high haemoglobin level on platelet count, may be linked to fact the blood components originates from the same bone marrow as seen in normal adult haematopoiesis. It is assumed that what affects the bone marrow would affect all the cells including the haemoglobin level and the platelet.

CONCLUSION

It can be concluded that there is a significant relationship between low and high platelet count on haemoglobin level and low and high haemoglobin level on platelet

count. The evaluated relationship will enable scholars for diagnosing purposes.

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