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Studies on erythrocytes & leukocytes count in normal & different types of leukemia cells

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Abstract: Red blood cells or the erythrocytes & WBC or the leucocytes are the cells that circulate in the blood & carries oxygen throughout the body. The counting of RBC indicates total number of red blood cells present in the given blood sample while the WBC represents the capacity to fight with diseases. It is regarded as one of the test which involves complete counting of blood & is very useful for the evaluation of the health & to have knowledge about certain disease.

Key words: erythrocytes, leucocytes, leukemia, hemocytometer

INTRODUCTION

RBC is the total number of red blood cells present in given volume of the blood. This test is performed to counts the number of red blood cells in a single drop (a microlitre) of blood & counted through either impedance or optical technology. By using microscopic evaluation of well-prepared blood smears qualitative estimation of RBC & WBC can be done efficiently. Decrease in RBC level also leads to anemia.[1] It is estimated that the normal range of RBC in blood varies according to the gender & age. Normal range of RBC in men varies from 4.5 to 6.2 million while in women it ranges from 4.0 to 5.2 million.

White blood cells also known as leucocytes play a major role in causing leukemia. The total number of WBC count also varies depending upon the age, gender & types of leukemia. A normal range of WBC is usually 5,000-10,000/ml in adults. White blood cells generally functions as an effectors cells of immune system or it is one of the important components of the body's defenses against any diseases. Decrease WBC count is often termed as leucopenia while decrease in WBC (blasts) causes medical emergency called leukostasis.[2-3] It circulates throughout the blood stream and the lymphatic system. However most of the studies show that high WBC count is generally related to coronary heart disease.[4-6] This paper concerns about the different RBC & WBC count in the patients having different types of leukemia.

Since in this paper, four different types of leukemia (blood cancer) patients have been studied about. Therefore attempt was made to find out different concentrations of RBC & WBC found in their blood cells. The major factor for the occurrence of blood cancer is abnormal increase in the concentration WBC that destroys the normal cells from its growth. There are various methods for finding out different concentrations of WBC & RBC count such as through hemocytometer using standard microscope system.

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MATERIALS & METHODS

Experimental trip

Before the analysis of erythrocytes & leucocytes in different leukemia cells, one of the cancer hospitals was selected for the research work in Bihar. The patients were selected suffering from different types leukemia having average age group. After the selection of the patient each of the patients depending on type of cancer were divided into five groups. In group 'a' normal patient were kept who did not suffered from any type of cancer so that study on comparison on erythrocytes & leucocyte count between the normal & diseased patient can be effective at great extend. In group 'b' patients suffering from acute Myeloid Leukemia (AML), in group 'c' patient having Chronic myelogenous leukemia (CML) were kept, in group 'd' patient suffering from Acute lymphocytic leukemia (ALL) were included and finally in group 'e' patient with Chronic lymphocytic leukemia (CLL) were kept. Number of patients per group with different types of leukemia has been given in table no 1.

Table 1-Different types of leukemia patients in five groups

Group name	Sample	No. of cases
Group a	Control	25
Group b	AML	14
Group c	CML	23
Group d	ALL	11
Group e	CLL	23

Procedure

Each of the patient were kept with great care provided by all the medical facilities so that none of the paitent get infected with other types of disease and were kept under the doctors supervision. Blood was drawn from each of the patient according to their division of groups to stop it from mixing with other patient's blood. Puncture of the vein was done to draw the blood evacuated tubes that contained anticoagulant ethylene diamine tetra acetic acid (EDTA)[7] to stop its natural clotting. The RBC & WBC concentration was further observed by using haemocytometer. The observation made has been explained using the table no 2 & 3 given below.

OBSERVATION

The finding on RBC count (in millions/mm^3) & WBC count (in thousand/ mm^3) in normal and different types of leukemia are shown in table no. 2 & 3.

Table no. 2:- RBC count (in millions/mm^3) in normal and different types of leukemia Control & normal mean value = 4.9 & SD = 0.356

Types of leukemia	Mean value	Combined SD(σ)
AML	1.8	0.395
CML	2.5	0.467
ALL	1.7	0.332
CLL	2.6	0.352

Table no. 3:- WBC counts (in thousand/mm^3) in normal and different types of leukemia Control & normal mean value = 7.0 & SD = 0.935

Types of leukemia	Mean value	Combined SD(σ)
AML	18.7	5.920
CML	241.5	25.958
ALL	49.3	6.583
CLL	154.0	19.387

RESULTS & DISCUSSION

According to the above observation it is found that the patient suffering from acute lymphocytic leukemia (ALL) had the most lower RBC count and the patient having Chronic lymphocytic leukemia (CLL) had higher mean value of RBC count. From the above explanation it is clear that the patient suffering from the different types of leukemia had lower RBC count. On the other hand since RBC is the most important component of the blood required for the proper functioning of the cells for growth & division.

When talking about WBC it is seen that the patient suffering from different types leukemia also had great differences in their WBC count. There was great inflammation of WBC count than the normal mean value. Patient suffering from Chronic Myelogenous Leukemia (CML) & Chronic Lymphocytic Leukemia (CLL) had higher value of WBC count with respect to normal WBC count. Since leukemia is a type of cancer mostly found in blood and bone marrow and its major cause is rapid production of abnormal white blood cells. As a result abnormal production of white blood cells is not able to fight infection and impair the ability of the bone marrow to produce red blood cells and platelets thus leading to leukemia.

Thus the overall result done on RBC and WBC count in different patient shows that change in the haemogram pattern is one of the major causes of leukemia also leading to anemia.

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REFERENCE

1. **Green, R; Wachsmann-Hogiu, S. 2015.** "Development, History, and Future of Automated Cell Counters". *Clinics in Laboratory Medicine*. **35(1):** 1–10.
2. **Barron HV, Cannon CP, Murphy SA, Braunwald E, Gibson CM. 2000**. Association Between White Blood Cell Count, Epicardial Blood Flow, Myocardial Perfusion, and Clinical Outcomes in the Setting of Acute Myocardial Infarction: A Thrombolysis In Myocardial Infarction 10 Substudy. Circulation. **102(19):**2329–34.
3. **Schiffer, C.A. 2019.** *"Hyperleukocytosis and leukostasis in hematologic malignancies"*.
4. **Yarnell JW, Baker IA, Sweetnam PM, Bainton D, O'Brien JR, Whitehead PJ, et al.** Fibrinogen, viscosity, and white blood cell count are major risk factors for ischemic heart disease. The Caerphilly and Speedwell collaborative heart disease studies. Circulation. 1991;83(3):836–44.
5. **Kannel WB, Anderson K, Wilson PF.** White blood cell count and cardiovascular disease: Insights from the framingham study. JAMA. 1992;267(9):1253–6.
6. **Grimm RH Jr, Neaton JD, Ludwig W (1985**). Prognostic importance of the white blood cell count for coronary, cancer, and all-cause mortality. JAMA. **254(14):**1932–7.
7. **Brown DW, Giles WH, Croft JB. 2001.** An independent predictor of coronary heart disease mortality among a national cohort. *Journal of Clinical Epidemiology*. **54(3):**316–22.

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