Research Article

COMPARISON OF TOTAL COUNT OF WHITE BLOOD CELLS BY PERIPHERAL SMEAR AND AUTOMATED MACHINE

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A R T I C L E   I N F O

A B S T R A C T

Topic: Comparison of total count of white blood cells by peripheral smear and automated machine.

Aim and objectives: To compare total count of white blood cells by peripheral smear and automated machine.

Background: White blood cells (WBCs), also called leukocytes, are an important part of the immune system. These cells help fight infections by attacking bacteria, viruses, and germs that invade the body. White blood cells originate in the bone marrow, but circulate throughout the bloodstream. A Coulter counter is an apparatus for counting and sizing particles suspended in electrolytes. It is used for cells, bacteria, prokaryotic cells and virus particles.

Reason: To check whether the total count of white blood cells obtained by both methods are equal.

INTRODUCTION

White blood cells, also called as leucocytes or leukocytes are the cells of immune system that are involved in protecting the body against infectious disease and foreign microorganisms. All the white blood cells are produced and derived from multi potent stem cells in the bone marrow. It divided into five main types: neutrophils, eosinophils, basophils, lymphocytes and monocytes. These types are distinguished by physical and functional characteristics. [1] Neutrophils also known as neutrocytesare most abundant type of granulocytes and found mostly in mammals. They form an essential part of innate immune system.They are short lived and highly motile. It plays an major role in first line defence mechanism against invading pathogens. Neutrophils are phagocytes which is capable of ingesting the microorganisms and foreign particles.[2] Eosinophils are variety of white blood cells and one of the components of innate immune system. They are responsible for combating the multicellular parasites and certain infection in vertebrates and also control the mechanism of asthma and allergy. They are also granulocytes that develop during haematopoiesis in the bone marrow before migrating into blood. They appear brick red colour after staining with eosin. They play vital role in fighting the viral infection. Increase in eosinophilia count is eosinophilia

and decrease in count is eosinopenia.[3] A basophil is a type of white blood cells and least count of granulocytes, representing about 0.5 %to 1% of circulating white blood cells. They are responsible for inflammatory reaction during immune response as well as in the formation of acute and chronic allergic disease including anaphylaxis, asthma and hay fever. They produce histamine and serotonin that induce inflammation, heparin that prevents blood clotting.[4]

A lymphocytes is one of the white blood cells in a vertebrates immune system.Lymphocytes includes natural killer cells, T cells and B cells.[5] Monocytes are type of white blood cells or leukocytes. They can differentiate into macrophages and myeloid lineage dendritic cells.[6]

MATERIALS AND METHODS

The study was done under 50 patients of 60 years and below of Saveetha dental college, Chennai.

Blood Samples

All venous blood specimens were collected into tubes containing ethylenediaminetetraacetic acid (or K3EDTA) 2 ml and then were analysed

Automated Method

After thorough mixing of each blood sample on an automated mixer for 3-5 min, a complete automated blood count was performed using an haematology analyser

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Manual Method

Thin air-dried blood smears made after thorough mixing of each sample were stained manually with leishman's stain and examined under light microscopy with a X100 oil-immersion lens.
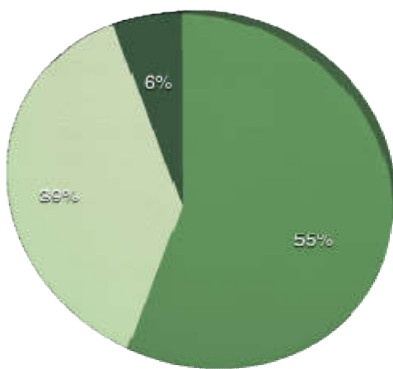
RESULTS

Unpaired sample test

Group	Manual method	Automated method
Mean	5296.00	9558.00
Sd	1074.56	2994.22
Sem	151.97	423.45
N	50	50
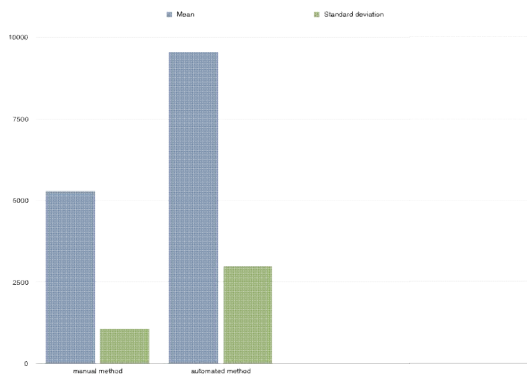
Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Manual method - Automated method	-4256.000	3011.689	425.917	-5111.912	-3400.088	-9.993	49	.000

CONCLUSION

The mean value of automated total count of white blood cells is 9226cells/cubic mm whereas total count of white blood cells by manual method is 5296 cells/cubic mm. The standard deviation value of automated method is 2994 cells/cubic mm whereas by manual method is 1074 cells/cubic mm. The P value is <0.05. The mean value of the paired differences between manual method and automated method is -4256.00 cells/cubic mm whereas standard deviation value is 3011.689 cells/cubic mm. Hence, the study concludes that the total count of white blood cells by automated method is comparatively higher than manual method.

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