General Health Status Study of Normal Young Male Adult Using Complete Blood Count Examination

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Abstract

" White Blood Cells as the 'Armed Forces' of the Body "

An attempt has been made to study the general health status of normal adult patient using complete blood count. The number of tests such as Red blood cell count, White blood cell count, Abs. Eosinophil count, Packed cell volume, Mean corpuscular volume, Mean corpuscular hemoglobin, Mean corpuscular Hb concentration, Red cell distribution width, Neutrophils, Lymphocytes, Eosinophil, Monocytes, Basophils, Platelets,Hemoglobin,

Hematocrit, etc were done on Semi Automatic Analyzer. The abnormal increases or decreases in cell counts as revealed in a CBC may show that the patient underlying medical condition that calls for further examination. The results of these tests observed were used to advice the patient health status and diagnose a medical condition to monitor medical treatment. The observations of tests were compared with known reference value range, which may show positive or negative divergence with child stage, young stage, old age stage and also with male-female difference in sex. The positive deviation of means corpuscular volume and negative deviation of mean corpuscular H_b concentration were well explained.

Key words:- Complete blood count, red blood cell, white blood cell, platelets, hemoglobin, diagnose, patient etc.

Objective

* To discuss blue print of blood tests.
* To study the physiological mechanism of cells.
* To know the health status of patient.
* To promote the awareness of CBC.

Introduction

A complete blood count (CBC) or full blood count (FBC) or full blood examination (CBE) is one of the most commonly ordered blood tests used to monitor patients overall health and find a wide range of disorders including anemia, infection and leukemia etc. It is the calculation of the cellular or formed elements of blood. The special type of machine is used to do this calculation of component of blood in less than minute. This assessment of medical laboratory group tests gives the blue print of cells in a patient blood which are mainly used by doctor to check or monitor health problem or to do diagnose the different diseases.

The cells in the CBC (WBC, RBC and Platelets) have special unique functions. In general way of condition the white blood cells or leukocytes are mainly the important part of the immune system and help to fight against the infections by attacking bacteria, viruses and germs that caused due to different unfavorable conditions invade the body. Each and every component of WBC plays vital role in increasing the power of immune system. The WBC originates in the bone marrow but circulate throughout the bloodstream. A WBC count can find hidden infections of patient body and give alarm to doctors to un diagnosed medical conditions, such as autoimmune diseases, immune deficiencies and blood disorders. The important application of WBC tests are found supportive study in cancer treatment also. Many medicinal study shows that the infants are often born with much higher number of WBC. There are five major types of white blood cells. According to the Leukmia and Lumphoma Society (LLS), the normal percentage of WBC count are usually found in following ranges.

Table 1: Types of WBC and their Normal Percentage of Overall Count in Normal Male Adult

Sr.No	Type of WBC	Normal percentage of overall WBC count
1	Neutrophils	55 - 73
2	Lymphocytes	20- 40
3	Eosinophils	1- 4
4	Monocytes	2- 4
5	Basophils	0.5- 1

Literature survey reveals that the lower or higher numbers of WBC than normal can be a sign of an underlying medical condition. The symptoms of a low WBC count includes body aches, fever, chills, headaches etc, while high counts don't often shows any symptoms. The leukopenia is the medical term used to describe a low WBC count, on other hand, the leukocytosis is the medical term used to describe a high WBC count. No specific diet or food increase WBC count in the patient body, but vitamin B-12 and folate are also required to produce the WBC. Generally the doctor's advice the good source of protein diet plan with multivitamins and mineral supplements. The doctor's mainly suggested 15 foods that boosts the immune system are citrus fruits, garlic, spinach, ginger, almonds, turmeric, yogurt, red bell peppers, sunflower seeds, poultry, kiwi, papaya, green tea, shellfish, broccoli etc.

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Red blood cells (RBC), also known as erythrocytes or haematids, or erythroid cells deliver fresh oxygen to the tissues in our body via blood flow through the circulatory system converted into energy and our tissues release carbon dioxide to lungs for exhale. They are made in bone marrow and with richest source of proteins. The RBC typically live for about 120 days and then die. The structure of RBC are round with a flattish, intented center like doughnuts without a hole. The food rich in iron help to maintain healthy RBC. Generally, vitamins B-12, B-3 found in eggs, whole grains and bananas are needed to build healthy RBC. Also the folate found in fortified cereals, dry beans, lentils, orange juice, and green leafy vegetables are the good sources for the supplement of RBC. They suffers due to illness or a lack of iron or vitamins in our diet, while some diseases of the RBC are inherited. The diseases of RBC include many types of anemia and symptoms of anemia are tiredness, pale skin, feeling cold, fast heart beats and in severe case heart failure etc. The experimental observation shows that the children with unhealthy RBC grow and develop more slowly than other children.

The platelets or thrombocytes are tiny, colorless cell fragments in our blood that forms clots and prevent or stop bleeding. If due to some accident our blood vessels get rupture or damaged, then it send signals or message to the platelets, which immediately rushes to the particular site of damage and forms plug or clot to fix or adhere the damage. If by some underlying medical condition patient don't have enough platelets in blood, then body can't forms so required clots. In medical term low platelet count may also called thrombocytopenia, i.e. infections with protozoa, bacteria, and viruses which may range from mild to severe depending upon illness caused to patient. In such condition, doctor suggests generally following balanced things to increase the blood platelets count as, eating leafy vegetables, fatty fish, citrus, iron rich foods, use of chlorophyll supplement, folate rich foods, food rich vitamin B-12, C, D, K and avoiding alcohols, vitamin E and fish oil supplements etc.

Material and Methods

For the measurement of CBC examination directly you can give the blood sample to medical care taker staff, it means you can eat and drink normally before the test or fast for a certain interval of time as per doctor's suggestion. The medical care taker staff collect a blood sample by inserting a needle into a vein in your arm or a finger stick or heel stick (new born), usually at the bend in your elbow. The blood sample is then sent to clinical pathology laboratory for the analysis purpose by taking precaution of patient code name or well labeling. Sometimes, in addition a drop of blood is spread thinly on a glass slide creating a blood smear. This is stained with special types of dyes and examined under medical microscope to observe the appearance of individual cells. After this there is no need to wait for the samples and patient can go for his routine activities.

The semi-auto biochemistry analyzer measures biochemical indexes by analyzing blood samples and other body fluid samples which combines with clinical information to help diagnose different diseases. This instrument is a compact, simple, reliable semi-automated biochemistry analyzer capable to perform different tests on whole blood, serum, plasma, cerebro spinal fluid and urine etc as samples. The applications of this instruments were found in both clinical analysis and in industrial analysis as a continuous flow analysis (CFA) method quickly and with minimal human resources. This photo metry is the most common method for analyzing the amount of a specific analyte in a sample. In this technique the sample undergoes a reaction to produce a color change, then measures optical density or absorbance concentration by using ion selective electrodes as sodium, calcium or potassium present in the samples.

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Generally routine methods are followed to analyze all types of samples taking precaution safety of medical care taker staff.

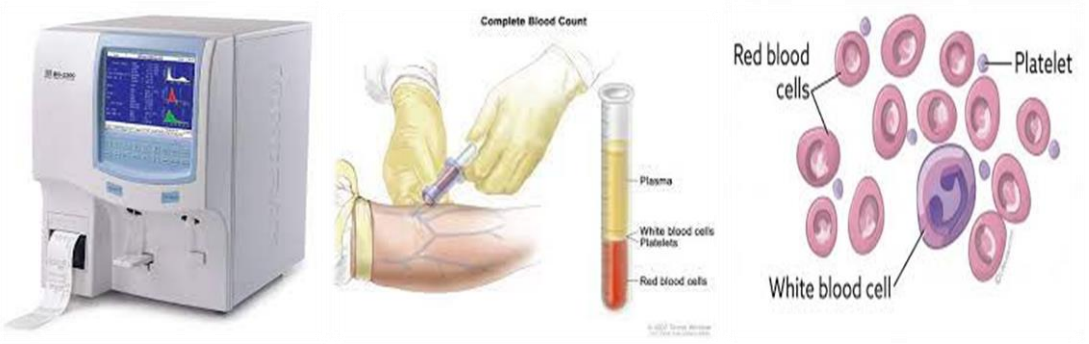

Figure showing a-semi auto biochemistry analyzer, b-blood tests sample, c-complete blood count

Results and Discussion

For the present study, we considered following 15 numbers of tests made by normal young adult of age 22-23 years. The weight and height of adult was 60 kg and 165 cm respectively. As per medical history, he has no any health problem but due to lockdown period some acidity and fever symptoms are under observation. He is a college going regular final year graduation student. So far, his daily routine is good with regular morning walk of about 45-60 minutes, with some physical exercise warm up, to play cricket for 60-90 minute on play ground. Good breakfast at 9.30-10.00 a.m.and routine online classes from 10.30 -2.30 p.m. followed by lunch. Reading, writing, assignment, record book completion etc with some rest up to 5.00 p.m. Evening walk, observing TV cricket match, discussion, debate or news, program, preparation of study notes and lunch at 8.00 p.m. The evening study up to 11.00 p.m. with sleep up to 6.00 a.m. and so on. As per doctor's advice, following clinical laboratory tests were carried out for the purpose to see the complete blood count.

Table 2: Complete Blood Count Examination of Normal Male Adult Patient

Sr. No.	Tests	Results	unit	Reference range
1	R.B.C.count	5.02	mil/cmm	4.5 - 6.5
2	W.B.C.count	5000	/cmm	4000-11000
3	Haemoglobin	14.30	gm/dl	14-16.50
4	Abs.Eosinophil count	150	/cmm	40-440
5	**Red cell absolute value** Packed cell volume HCT	 48.20	 %	 40-54
6	Mean corpuscular volume	**96.02**	cu micron	76-96
7	Mean corpuscular hemoglobin	28.49	picograms	27-32
8	Mean corpuscular H_b conc.	**29.67**	g/dl	32-36
9	Red cell distribution width	12.30	%	11.50-14
10	**Differential count** Neutrophils	 50	 %	 40-70
11	Lymphocytes	40	%	20-45
12	Eosinophil	3	%	0-6
13	Monocytes	7	%	0-8
14	Basophils	0	%	0-1
15	**Periphral smear Examination** Platelets	 151000	 /cmm	 150000-450000

*** All tests are carried out at Prasanna Pathology Laboratory, Jay Nagar, Parli-vaijnath District Beed 431 515 .**

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As all the above tests are compared with standard reference range, only two tests i.e. mean corpuscular volume (MCH) = 96.02 cu micron and mean corpuscular H_b concentration (MCH_b Conc.) = 29.67 g/dl shows positive deviation and negative deviation from the reference range value respectively. The probable reason behind this is that, the high level of MCH means, their red blood cells are larger than usual, so the patient have macrocytic anemia, but macrocytosis occurs in people with an MCH level higher than 100 femtoliters. This caused due to the deficiencies in vitamin B12 and folate vitamin B9. The low level of MCH_b Conc., means the patient red blood cells do not have enough hemoglobin, because is an iron rich proteins and lack of it may shows anemia. The hemoglobin is responsible for red color in blood and for circulating oxygen around body. In order to cover the medical health situation doctor advised ten days prescription dose of different medicine, injection and tablets. All other remaining tests indicates good reference range so, results are in favour of normal young man adult.

Conclusion

The complete blood counts refers for variety of reasons, i.e. to review patients normal health, to diagnose a medical conditions, to monitor a medical underlying, to check overall medical treatment such as an anemia, leukemia, weakness, fatigue, fever, inflammation, brushing bleeding, thalassemia, nutritional deficiencies, sickle cell disease, hemoglobin abnormalities, dehydration, bone marrow disorder etc.

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