Hematological values in young adults

ASSIGN BUSTER

A study on complete Blood cell count in young healthy Medical individuals

Abstract

Background: complete blood cell count is a frequently used laboratory test for the diagnosis of several diseases, in health examination and preoperative evaluation. The values of hematological parameters are affected by a number of factors even in apparently healthy population. Recently it was reported that white blood cell count and platelet counts are associated with cardiovascular diseases. It is of interest to note that the premenopausal women have a lower incidence of cardiovascular disease than men possibly due to female sex hormonal effect on platelet functions. so this study has been conducted in order to determine any sex variation effect on hematological parameters in apparently healthy male and female young adult subjects.

Aims and objectives: The aim of this study is to measure the various hematological values in the young adult male and female subjects and then to compare their results.

Methods: 80 young adult students between 17 to 20 years of age group have participated in this study voluntarily. After being informed blood samples of subjects had been taken in morning. Haematological parameters were analysed by Sysmex KX -21 automated hematology analyzer. The haematological changes in between male and female subjects were analyzed by Student’s paired “ t” test respectively.

Result: It shows that difference between the levels of Differential leukocyte cell count, Hemoglobin and Platelet count of the two studied group is

statistically significant ($p < 0.05$). although some blood cell of male and female subjects in the same age group were in the reference range it is thought that their being high or low in number is related to variant condition followed for long duration of time.

Key words: Male, Female, Blood cell, Hemoglobin, Leucocyte, Platelet

Introduction

Study of hematological parameters like complete blood cell count is a frequently used laboratory test performed to support the diagnosis of several diseases. It is also used in periodic health examination and preoperative evaluation. The values of hematological parameters are affected by a number of factors even in apparently healthy population. These include age, sex, body builds, and nutritional, environmental and social factors with ethnic backgrounds. [1] It has been shown in several studies that some of the hematological parameters exhibit considerable variation in different period of life. At birth the total Hb level, RBC count, PCV are shown to be higher than at any other period of life. [2, 3] The levels of these parameters then decrease during the next few months after birth, some more steeply than others, with cells becoming hypo chromic with the development of physiological iron deficiency anemia. [4] The Hb content and RBC count then gradually rise and approaches near to the adult levels by the age of puberty. [5] In general the male hematological levels are higher than the adult female levels. [6] However, Tell et al (1985) [7] reported that total WBC & Platelet counts are significantly higher in adolescent female than adolescent male subjects of 14-16 years of age. Recently it was also reported that white blood

cell count and platelet counts are associated with cardiovascular diseases. Total WBC and certain subtype counts in young adulthood are significantly associated with the presence of coronary artery calcification (CAC) 15 or 20 years later in early middle age. This suggests possible involvement of WBC in initiation or early development of atherosclerosis at later age of life. [8] Therefore, study on WBC at an early adulthood is important.

Test	Male	Female	P-value
RBC	4. 76±0. 38	4. 59±0. 29	0. 075
Hb (g/dl)	13. 58±1. 05	12. 67±1. 10	0. 005*
HCT(%)	41. 96±4. 51	39. 92±2. 70	0. 064
MCH(pg)	28. 67±1. 90	27. 60±1. 61	0. 041*
MCHC(g/dl)	32. 79±2. 24	31. 70±0. 93	0. 033
RDW (fl)	46. 31±4. 55	44. 04±2. 67	0. 036*

Materials and methods

40 healthy females average 20. 75 ± 2. 23 years old and 40 healthy males , on average 20. 83 ± 0. 96 years old; a total of 80 people apparently healthy have participated in this study on a voluntary basis. The subjects was excluded from the study, if they Suffer from any hematological, endocrinological, gynecological, cardiovascular, respiratory and nervous disorders and evidence of infection at the time of sampling or Subject had history of Blood transfusion or donation in last 3 months. The protocol has been explained to the subjects. 2 ml of venous blood sample was drawn between 9 a. m to 12 noon from anticubital vein under aseptic precautions in to a vial containing of 10% potassium EDTA to avoid diurnal variations. The sample was analysed immediately within 1-2 hrs, to avoid any variations due to storage. Hematological parameters such as red blood cell count (CBC), hemoglobin (HBG), hematocrit value (HCT), mean corpuscular volume (MCV), mean cell hemoglobin (MCH), mean cell hemoglobin concentration (MCHC), erythrocyte distribution width (RDW), leukocyte count (TLC), Differencial cell count, platelet count (PLT) were analyzed with “ Sysmex-kx-21” brand blood cell counter device in central laboratory of Dhiraj hospital Piparia from July 2012 to Oct 2012. SPSS program has been used in assessment of data. Results have been decided on basis of Mean and Standard Deviation. t test was applied in independent groups to compare them. 0. 05 values were accepted as significant.

Results

Table 1: Erythrocyte Parameters of Male (n= 40) and Females (n= 40)

Table 2: Leukocyte & Platelet count of Male (n= 40) and Females (n= 40)

Test	Male	Female	P-value
Total WBC count	7. 48± 1. 85	7. 02 ± 2. 00	0. 418
Differential Neutrophil count	65. 33 ± 7. 83	56. 70 ± 13. 59	0. 010*
Differential Lymphocyte count	29. 90 ±9. 72	35. 80 ± 9. 74	0. 041*
Differential Monocyte count	5. 85 ± 2. 16	7. 49 ± 1. 10	0. 002*
Total Platelet count	218. 79 ± 29. 96	252. 54 ± 37. 84	0. 001*

Discussion

In our study Erythrocyte parameters like Hemoglobin, MCH and MCHC have been found to be higher in males, total WBC count with neutrophil count also higher in male subjects. Whenever lymphocyte count, monocyte count and Platelet were higher in female subject. EL- Hazmi and Warsy (2001) studied Saudi Children with ages ranging from 1-15 years. The RBC Count did not Show a Significant Changes in the 1 to 13 year Old but rope slightly beyond this age. No Significant differences were observed in red cell count in the male and female children. White blood cell gradually decreased 2 years onwards, While Hemoglobin and hematocrit levels increased significantly from 2 to 15 years. The same author reported WBC Count 10. 9 ± 3. 8 x 10

^{12} /L , 6. 9 ± 3. 1 x 10 ^{9} /L in one year olds , 9-11 years & 12-15 years age group respectively. ^{9} Ghafouri et al (1987) reported that total Level of hemoglobin was 13. 7 ± 1. 0 g/dl And 13. 5 ± 1. 0 g/dl, respectively in male & female children, with ages ranging from 12-15 years. Hemoglobin Level was Lowest in the two-year olds, and then gradually increased up to 15 years of age in both boys & girls. The differences of Boys & Girls Level was significant after 14 years of age, The male values were Higher than the female values. ^{10} Usman k et al (2007) studied 302 healthy volunteers, both male and female, ages Range between 20-45 years. They found, in males, the mean Hb concentration of 13. 04 g/dl. Was significantly higher than females value of 11. 63 g/dl. The RBC Count of 5. 3 x10 ^{12} /L in males was significantly higher than the corresponding Values of 4 x10 ^{12} /L in females. On the other hand The mean WBC Count of 8. 25 x 10 ^{9} /L in males was lower than the mean values of 8. 42 x10 ^{9} /L in females. Similarly the Values for platelet count of 255 x10 ^{9} /L in males were also Significantly lower than corresponding values of 279 x 10 ^{9} /L in females . ^{11} Khanduri et al (2005) reported platelet counts in 25 males & 25 females normal adult Indians the range being 111-338 (x 10 ^{9} /L) and 137-337 (x 10 ^{9} /L) respectively. ^{12} Earlier Bain (1985) reported the mean platelet counts which were 288 and 262 x 10 ^{9} /L in Caucasian females and males respectively. ^{13} Casimir et al (2010) reported that Gender influences clinical presentation and markers in inflammatory diseases, in many chronic condititions frequency of complications is greater in females with the increase production of inflammatory markers like CRP (C – reactive protein). Neutrophil count and

ESR . [1 4] Although numerous studies have been undertaken to examine the effects of Gender and various factor on differential blood counts but results have often been inconclusive and contradictory (Makinoda et al, 1996) [1 5]

Conclusion

Although blood cells of both groups are within the reference range, their being low or high in numbers is based on various factor like age, sex, body build, and nutritional, environmental and social factors with ethnic backgrounds. For clearance similar type of studies with multi subject and multi repetition are needed.

References

1. Mohson AF, Hazmi EL, Warsy As. Normal reference values for hematological parameters, red cell indices, HbA2 and HbF from early childhood through adolescence in Saudis. AS M 2001; 21: 165-169.
2. Matoth Y, Zaizon R, Varsano I. Postnatal changes in some red cell parameters. Acta Paediatr Scand 1971; 60: 371.
3. Marwaha N, Marwaha RK, Narang A, Thusu K, Garewal G, Bhakod ON, Routine hematological values in term newborns. Indian Pediatrics 1992; 29: 1095-1099.
4. Dacie JV, Lewis SM. Practical Haematology. 7th edition. Londan: Churchill Livingstone, 1991.
5. Taylor MR, Holland CV, Spencer R, Jackson JF, conner GI, Donnell JR. Haematological reference range for school children. Clin Lab Haematol 1997; 19: 1-15.

6. Kelly A, Munan L. Haematological profile of normal populations: red cell parameters. Br J Haemtol 1977; 35: 153.
7. Tell GS, Grimm RH, Vellar OD. The relationship of white cell count, platelet count, and hematocrit to cigarette smoking in adolescents: the Oslo Youth Study. Circulation 1985; 72: 971-974.
8. Hou L, Jones DL, Ning H, Huffman MD, Fornage M, He K et al. White blood cell count in young adulthood and coronary artery calcification in early middle age: coronary artery risk development in young adults (CARDIA) study. Circulation 2012; 125: 11.
9. Gilles HM, Haematology in tropical Africa. Clin Hematol 1981; 10 : 695-705.
10. Ghafouri HM, Alfares AM, Islam SI, Ahmed AO, Jan MY. Haematological reference values assessed from birth to adolescent in Saudi subjects in the area of Jeddah. Saudi Med J 1987; 8: 575-82.
11. Usman K, Syed ZA, Rao AA. References range values of hematological parameters in healthy Pakistani adults. Pak J Physiol 2007; 19-22.
12. Khanduri U, Sharma A and Joshi A. occult cobalamin and folate deficiency in Indians. The national medical journal of india, 2005; 18(4): 182-183.
13. Bain BJ Platelet count and platelet size in males and females. Scand J Haematol 1985; 35: 77-9.
14. Casimir G, Muller S, Hanssens L, Zilberg K, Duchateau J. Gender differences in inflammatory markers in infancy. Shock, 2010, 33(3): 258-262.

15. Makinoda S, Mikuni M, Sogame M, Kobamastsu Y, Yamada H, Yamamoto R, Fujimoto S, FUruta I. Erythropoietin, granulocyte –colony stimulating factor, interlukin-1 beta and interleukin-6 during the menstrual cycle. Int J Gynecol Obstet 1996; 55: 265-71.