Research Article

Some haematological parameters among geriatrics in Owerri Metropolis

Okoroiwu,I.L.[1],Obeagu,Emmanuel Ifeanyi[2*], Elemchukwu,Queen[3] and Daniel-Igwe,Gloria[4].

[1]Department of Medical Laboratory Science,Imo state University,Owerri,Nigeria.
[2]Diagnostic Laboratory Unit,Department of University Health Services,Michael Okpara University of Agriculture,Umudike,Abia State,Nigeria.
[3]College of Health Science and Technology,Port Harcourt,Rivers State,Nigeria.
[4]Department of Veterinary Pathology,Collge of Veterinary Medicine, Michael Okpara University of Agriculture,Umudike,Abia State,Nigeria.
*Corresponding author

Abstract

Some haematological parameters of geriatrics comprising the determination of their haemoglobin level,packed cell volume,total and differential WBC as well as blood film examination was carried out in Owerri metropolis.A total of 100 subjects comprising 50 geriatrics and 50 non geriatrics were recruited for the study.The parameters were determined using standard haematological procedures and analysis of result done using t-test.The result obtained from statistical analysis showed that there was no significant difference $(p>0.05)$ in the total and differential count when compared with non-geriatrics.However,the PCV and Hb showed significant difference with both parameters being significantly lower $(9.5\pm1.9$ and $28.7\pm5.7)(p<0.05)$.There was no significant difference $(p>0.05)$ in the gender.The blood film examination revealed a high incidence of hypochromic microcytic cells.This finding is relevant for screening of anaemia and diagnosis of many diseases in geriatrics.

Keywords: Geriatrics,Packed Cell Volume,Haemoglobin,Total white Cell count,Differential count,Blood Film Examination.

Introduction

A full blood count also known as complete blood test is a panel requested by a doctor or other medical professional that gives information about the cells in a patient blood.The cells that circulate in the blood streams are generaly divided into three types.Leuckocytes,erythrocytes and thrombocytes.Abnormally high or low counts may indicate the presence of many forms of disease,and hence blood counts are amongst the most commonly performed blood test in medicine,as they can provide an overview of patient's general health status.

The comlete blood count consists of 5 tests:white cell count,red cell count and stained red cell examination.White blood cell,protect the body against infection.If an infection develops white blood cells attack and destroy the bacteria,virus or other organisms causing it.White cells are bigger than red blood cells but fewer in number.When a person has a bacterial infection,the number of white cells rises very quickly.Total white cell count is used to find an infection or how the body is responding with cancer treatment.

Differential white cell includes neutrrophils, eosinophils, monocytes, lymphocytes and basophils. Each type of cells plays a different role in protecting the body.The numbers of each one of these types of white blood cells give important information about immune system. Too many or too few different type of

white blood cells can be helpful to find infection, allergic or toxic reaction to medicine or clinical and many conditions such as leukaemia(Brady,2007).

Red blood cells carry oxygen from the lung to the rest of the body.They also carry carbon dioxide back to the lungs so that it can be exhaled.If the red blood cell count is low,it points towards anaemia but if it is too high ,polycythaemia is indicated (Brady,2007).

Geriatrics are the elderly people in the society.The age group in association with progressive decline in the functional reserve of multiple organs system,increasing the probability of dysfunction and diseases.Haemopoiesis modulation becomes imbalances with aging.Stuides suggest a decline in the stem cell population reserve,imbalance in the haematopoietic cytokine production,decreased sensitivity of stem cells and precursor cells to the action of cytokine and alteration in the microenvironment .

Anaemia,generally mild is a common problem in the elderly,especially in men.The incidence of anaemia increases with age.

Untreated geriatrics anaemia has been associated with higher mortality, increasing the prevalence of comorbidity and functional impairment .

This age group has not been given adequate attention in developing countries.Most of them are sickly and not properly taken care of by immediate families due to economic situation in the country.Some of them from well to do homes live a very healthy life.

A growing concern about the interpretation of haematologica data in context with age is due partly to the tremendous heterogeneity of the aging process and partly to the difficulty in separating the effects of age per se from the effects of occult diseases that accompany aging (Chatta and Date,1996).

The aging process is associated with the functional decline of several organ system such as cardiovascluar,renal,musculoskeletal,pulmonary and bone marrow reserve.Certain cells lose their ability to divide whereas bone marrow and the gastrointestinal mucosa,remain mitotic.Marrow cellularity begins at 80% to 100% in infancy and decrease to about 50% after 30 yaers,followed by a decline to 30% after age

65 years (Lansdrop,1997).Anaemia is frequently found in the elderly.Males characteristically have higher Hb levels than females,owing to the stimulating effects of androgens on erythropoiesis.However,the difference narrows with decreasing androgen level in elderly (Allan and Alexander,1995).In the healthy elderly with no underlying pathologic condition,there is no statistically significant differences in the leucocyte count or WBC differential between old-old compared with middle-aged adults(Salive et al.,1992).Immune senescence,age-related defects in lymphopoiesis,affets humoral and cellular immunity.The thymus disapears by early middle age and adults depend on T lymphocyte response in the secondary tissue (Globerson,1995).The number of naive T cells of the elderly have impaired responsiveness to mitogens and antigens as a result of a decrease expression of co-stimulator(CD28),B lymphocyte function depends on T cell interation.When T cell inadequacy occurs,there may be a decrease ability to generate an antibody response (Song et al.,1993).The platelet count is not significantly changed with age.There have report of increased level of -thromboglobulin and platelet factor 4 in the granules and decrease platelet membrane protein kinase C activity (Grubeck,1997).

Aim and objectives

1.To determine the prevalence of anaemia among geriatrics in Owerri metropolis.
2.T o determine the level of total white cell.
3.T o assess the level of different white blood cells among this subjects in Owerri metropolis.

Materials and Methods

Study area: The study was conducted at the Federal Medical Centre,Owerri and Imo State Specialist Hospital Umuguma in Owerri.

Study population and enrolment

A total of one hundred (100) subjects were recruited in the study.This comprised 50 subjects for tests (25 males and 25 females) aged 65-100 and 50 control (825females and 25 males) aged 21-40.

Selection criteria: Informed consent was obtained from all subjects selected for the study.Information in respect of age,sex and place of residence was obtained.

Samples collection:3ml of whole blood was collected from each subject using the standard venepuncture technique into EDTA anticoagulated container.

Laboratory methods and procedure

All reagents were commercially purchased and the manufacturers'instructions were strictly followed.

Estimation of haemoglobin using cynmethaemoglobin of Ochei and Kolhaltar (2008)

packed cell volume: This was done using microhaematocrit method of Cheesbrough,2004)
.

Diferential count: This was done using Leishman stain(Cheesbrough,2004).

Statistical analysis: All values were expressed as mean ± standard.The statistical analysis were carried out using student t-test value.Values with level of significance (p<0.05) were statistically significant

Results

TABLE 1:Comparison of Mean Values of some Haematological Parameters of the aged (65-100 years) and the control (20-40 years)

Parameters	65-100 years(50)	20-4- years(50)	Level of significance
Hb(g/dl)	9.5±1.9	11.2±1.9	P<0.05
PCV(%)	28.7±5.7	33.2±5.9	P<0.05
WBC(10^9/L)	2.8±1.1	2.4±0.7	p>0.05
Neutrophil(10^9/L)	1.6±1.1	1.3±0.4	p>0.05
Lymphocyte(10^9/L)	1.0±0.3	1.1±0.5	p>0.05
Eosinophil(10^9/L)	0.1±0.1	0.1±0.0	p>0.05
Monocyte(10^9/L)	0.12±0.1	0.1±0.1	p>0.05

TABLE 2:Comparison of Mean Values of some Haematological Parameters of the aged (65-100 years) based on Gender

Parameters	Male(25)	Feamle(25)	Level of significance
Hb(g/dl)	9.8±2.0	9.2±1.8	P>0.05
PCV(%)	29.7±5.7	27.5±5.9	P>0.05
WBC(10^9/L)	3.2±1.1	2.4±1.0	p>0.05
Neutrophil(10^9/L)	1.9±1.2	1.3±1.9	p>0.05
Lymphocyte(10^9/L)	1.1±0.2	0.9±0.3	p>0.05
Eosinophil(10^9/L)	0.2±0.1	0.1±0.0	p>0.05
Monocyte(10^9/L)	0.1±0.1	0.1±0.1	p>0.05

Discussion

This study was conducted to evaluate the cellular component of blood in elderly person in Owerri Metropolis.Various haematological parameters used were packed cell volume,haemoglobin(Hb),total and differential white blood cell count and film examination.Fifty aged 65 years and above were used for the study.Twenty five (25) of the subjects were males while twenty five (25) were females.

From the findings of this,PCV and Hb concentration of elderly persons appear to be relatively lower when compared with middle aged subjects and normal values with a statistical significant difference (P<0.05) as indicated in table 1.There was no significant differnce (p>0.05) based on gender.However,this finding appears to raise hypothesis by other workers like Guralink et al.(2004) and Howe(1993) that aging is associated with low haemoglobin concentarion.

Blood film examination showed a high percentage of microcytic and hypochromic red blood cells with over 70 of the subjects having symptoms of microcytic hypochromic anaemia.This agreed with similar works conducted by Smith (2002) and Guralink et al.(2004) who reported a high precedence of microcytic hypochromic anaemai in elderly.Lower haemoglobin concentration is believed to be caused by a decline in the stem cell population reserve,imbalance in the haematopoietic cytokine production,decreased sensitivity of stem cells and precursor cell to the action of cytokine and alteration in the microenvironment(Balducii et al.,2005).This call for establishment of a special reference values of Hb and PCV for diagnosis of anaemia in elderly.There was no significant difference (P>0.05) in the values of total and differntial white blood cell count among the subjects when compared to the middle aged adult population that was used as control as indicated in table 1.This agreed with similar work conducted by Salive et al.(1992) who reported that in the healthy elderly with no underlying pathalogical condition,there was no significant difference (P>0.05) in the total and differential count compared with middle aged adults.

Eosinophil can be seen above normal value in helminthes infection,allergic condition,skin infection,Hodgkin lymphoma and malignacies.Basophil which is involved in immediate hypersensitivity reactions such as allergic asthma (Kumar et al.,2004) are not usually seen in peripheral blood except in disease condition such as chronic myeloid leukaemia,Polycythaemia vera,iron deficiency anaemia and myelosclerosis (Ramnik,2006).Monocytes play important role in defense against microorganisms including mycobacteria,fungi,bacteria,protozoa(Cheesbrough,2004).

Conclusion

The stduy showed that there was singnificant diference in the haemoglobin concentration and Packed cell volume in the elderly compared to the young adults.This implies that the aged should be cared adequately for to ensure that theydo not suffer chronic anaemia.There was no significant difference in the total white cell and differential count.This implies that the subjects' immune systems were intact.More training should be done to the medical personel for better wholistic management and improved well-being of the aged.

References

Allan,R.N. and Alexander,M.K.(1995).A Sex Difference in the Leucocyte Count.*Journal of Clinical Pathol.21:691.*

Brady,R.A.(2007).Iron Deficiency Anaemia:a cell for *Southern Medical Journal.100(10):966-967.*

Chatta,G.S.and Dale,D.C.(1996).Aging and haematopoietic Growth Factor's Drugs.*Aging 9:37.*

Globerson,A.(1995).T Lymphocyte and Aging.*Int.Allergy Immunol.107:491.*

Grubeck,L.B.(1997).Changes in the Aging Immune Sysytem.*Biologicals 25:205.*

Guralink,J.M.,Eisenstaedt,R.S.and Ferruci,L.(2004).Prevalence of Anaemia in Persons 65 years and Older in United States:Evidence for high rate of unexplained anaemia.*Blood 104:2263.*

Howe,R.B.(1993).Anaemia in the Elderly.*Post Grand.Med.73:153.*

Kumar,V.,Abbas,A.K. and Fausto (2004).Robbin and Cotran:Pathologic Basis of Disease.*Elservier Inc:India.1525.*

Cheesbrough,M.(2004).District Laboratory Practice in Tropical Countries. *Cambridge University Press.*

Ochei,J.and Kolhatkar,A.(2008).Medical Laboratory Science Theory and Practice. *Tata McGraw Hill Publishing Company Limited.New Dell.*

Ramnik,S.(2006).Textbook of Medical Laboratory Technology.*Jayspee Brother Medical Publisher.*

Salive,M.E.,Plis,J.and Segal,G.B.(1992).Anaemia and Haemoglobin level in Older Persons.Relationship with Age,Gender and Health Status.*JAM.Geriatr.Soc.40:489.*

Smith,D.(2002).Management and Treatment of Anaemia in the Elderly.*Cli.Geri.10:8.*

Song,L.A.,Palin,J. And Segal,G.B.(1993).Age Related Effects in T Cell Activation and Proliferation.*Exp.Ger.28:313.*

Landsdrop,P.M.(1997).Self Renewal of Stem Cells Boil.*Blood Marrow Transplant 3:171.*