Madonna University Journal of Medicine and Health Sciences. Volume2 issue 3(2022),Pp. 58-63© Madonna University Press,
Inc.2022http://madonnauniversity.edu.ng/journals/index.php/medicine

EVALUATION OF HAEMATOLOGICAL MANIFESTATIONS IN PATIENTS WITH ACUTE MYELOID LEUKAEMIA IN A TERTIARY HOSPITAL IN UGANDA

Emmanuel Ifeanyi Obeagu[1] https://orcid.org/0000-0002-4538-0161, Sarah Nakyeyune[1,] Emmanuel Muhimbura[2], Tochi Andrew Owunna[3] and Onyekachi Splendid Uwakwe[1]

[1]Department of Medical Laboratory Science, Kampala International University, Western Campus, Uganda.
[2]Department of Pathology and Laboratory Medicine, Kabale University, P.O. Box 317, Kabale, Ugnada.

[3]Maintenance, Babcock University Teaching Hospital, Ilishan Remo, Ogun State, Nigeria.

emmanuelobeagu@yahoo.com

ABSTRACT

The study was done to determine the haematological features of patients with acute myeloid leukaemia in a tertiary hospital in Uganda. The study was done in Ishaka Uganda at Kampala International University Teaching Hospital, Ishaka, Uganda. The study adopted hospital based cross-sectional design where patients who attended the hospital with acute myeloid luekaemia (AML) were selected for the study on purposive sampling technique and the haematological variables evaluated with the apparently healthy individuals. The ages of the patients were below 25 years. A total of eighty (80) subjects comprising forty (40) acute myeloid patients and forty (40) apparently healthy subjects were recruited for the study using purposive sampling technique. The data were analysed using student t-test and present as mean ± standard deviation using SPSS version 20 and level of significance set at P<0.05. The results showed decrease in WBC (*P=0.012*),

Obeagu, E.I., Nakyeyune, S., Muhimbura, E., Owunna, T.A. and Uwakwe, O.S. (2022). EVALUATION OF HAEMATOLOGICAL MANIFESTATIONS IN PATIENTS WITH ACUTE MYELOID LEUKAEMIA IN A TERTIARY HOSPITAL IN UGANDA. Madonna University Journal of Medicine and Health Science. 2 (3):58-63

neutrophils *P=0.040*), HB (*P=0.002*), RBC (*P=0.008*), PCV (*P=0.005*) and increase in RDW (*P=0.017*) and no significant changes in LYM (*P=0.089*), MCV (*P=0.543*), MCH (*P=0.057*) and MCHC (*P=0.051*). The results showed decrease in total white cell count, neutrophils, haemoglobin, red blood cells, packed cell volume and increase in Red cell distribution width and no significant changes in Lymphocytes, Mean cell volume, Mean cell haemoglobin and Mean cell haemoglobin concentration.

Keywords: *haemtological parameters, acute myeloid leukaemia, Uganda*

INTRODUCTION

Acute myelogenous leukemia (AML) is a group of neoplastic hematologic diseases classified by the proliferation and growth of immature hematopoietic cells in the bone marrow and blood. A high incidence of AML is observed in adults, accounting for nearly 80% of adult acute leukemias and only 20% of childhood acute leukemias (ACS, 2016). Although AML is a fairly rare disease, it accounts for only about 1.2% of cancer deaths in the United States (Jemal *et al.*, 2002). It is most commonly seen in adults with acute leukemia. Their incidence increases with age. The average age of acute myeloid leukemia (AML) patients is approximately 70 years (Ossenkupplunge and Löwenberg, 2015). Most studies have found a higher prevalence of AML in men. This equates to her male to female ratio of 2.5:1 (Belson et al., 2007). In 2013, more than 57% of his new leukemia cases were male (ACS, 2013). Acute myeloid leukemia (AML) is actually a diverse selection of numerous malignant neoplastic diseases that can be grouped on morphological, cytogenetic, as well as molecular and genetic criteria (His, 2012). The Franco-American British (FAB) system has generally become the standard for classifying AML into different subtypes (Bennett *et al.*, 1976). Different subtypes of AML are classified according to the stage of progenitor cell maturation in WBC and the characteristics of malignant transformation at initial diagnosis. In developing countries, population growth, aging and urbanization, changing diets, better control of infections, and increased smoking are increasing the burden of cancer, including haematological malignancies (Rathee *et al.*, 2014).).

MATERIALS AND METHODS

Study area

The study was done in Ishaka Uganda at Kampala International University Teaching Hospital, Ishaka, Uganda. Kampala International University Teaching Hospital, Ishaka, Uganda. Is located in the Western part of Uganda and serves both Western Uganda populace and entire Uganda. A lot of Health staff drawn from different continent work in the hospital.

Study Design

The study adopted hospital based cross-sectional design where patients who attended the hospital with acute myeloid luekaemia (AML) were selected for the study on purposive sampling technique and the haematological variables evaluated with the apparently healthy individuals. The ages of the patients were below 25 years.

Subjects

A total of eighty (80) subjects comprising forty (40) acute myeloid patients and forty (40) apparently healthy subjects were recruited for the study using purposive sampling technique.

Ethical issues

Ethical approval was obtained from the institution and informed consent obtained from the subjects. The details of the study were fully explained to the subject before they gave their consent and they willing participated in the study and confidentiality assured to them.

Laboratory Investigations

The laboratory investigations were carried out at Haematology Laboratory of Kampala International University Teaching Hospital, Ishaka, Uganda. The full blood counts of the subjects were determined using MIndray BC-3000 Plus.

Data analysis

The data were analysed using student t-test and present as mean ± standard deviation using SPSS version 20 and level of significance set at P<0.05

RESULTS

Table 1: Mean ± Standard deviation of AML and Control subjects

Parameters	AML	CONTROL	t-value	*P-Value*
WBC (X 10^9/L)	3.00±0.14	5.00±0.28	-8.944	*0.012**
LYM(X 10^9/L)	1.60±0.14	1.96±0.07	-3.130	*0.089*
NEU(X 10^9/L)	1.05±0.7	3.50±0.71	-4.876	*0.040**
HB (g/dl)	3.00±0.00	13.50±0.71	-21.000	*0.002**
RBC (X 10^{12}/L)	1.15±0.07	4.50±0.42	-11.015	*0.008**
PCV (%)	10.00±0.01	44.50±3.54	-13.800	*0.005**
MCV(fl)	89.50±0.71	88.00±2.83	0.728	*0.543*
MCH (pg)	27.00±0.01	31.00±1.41	-4.000	*0.057*
MCHC(g/dl)	30.50±0.71	33.50±0.71	-4.243	*0.051*
RDW (fl)	55.50±0.71	43.50±2.12	7.589	*0.017**

The results showed decrease in WBC (3.00±0.14 X 10^9/L, 5.00±0.28 X 10^9/L, *P=0.012*), Neutrophils (1.05±0.70 X 10^9/L, 3.50±0.71 X 10^9/L, *P=0.040*), haemoglobin (3.00±0.00 g/dl, 13.50±0.71 g/dl, *P=0.002*), red blood cells (1.15±0.07 X 10^{12}/L, 4.50±0.42 X 10^{12}/L, *P=0.008*), Packed cell volume (10.00±0.01%, 44.50±3.54%, *P=0.005*) and increase in RDW (55.50±0.71fl, 43.50±2.12fl, *P=0.017*) and no significant changes in Llymphocytes (1.60±0.14 X 10^9/L, 1.96±0.07 X 10^9/L, *P=0.089*), MCV (89.50±0.71fl, 88.00±2.83fl, *P=0.543*), MCH (27.00±0.01pg, 31.00±1.41pg, *P=0.057*) and MCHC (30.50±0.71g/dl, 33.50±0.71g/dl, *P=0.051*).

DISCUSSION

Acute myeloid leukaemia alters the bone marrow activities by altering the haematopietic activities of the stem cells which affect the peripheral circulation of formed elements. The total leucocytes

were affected by the acute myeloid leuakmeia in the patients' by suppressing the level of white cells (Obeagu *et al.*, 2020). This will affect the immunity in the patients and they will be highly vulnerable to infections and inflammatory processes. This will lead to increased release of cytokines especially the inflammatory cytokine which may be hyper regulated thereby damaging the patients systems and altering the well-being the patients. There was also decrease in the neutrophils which can affect cell mediated immunity of the patients (Belson *et al.*, 2007). This will lead to immunosuppression in terms of phagocytic and opsonisation of microbial agents. The red blood cells were deceased such as the red blood cells, haemoglobin and packed cell volume. This shows why the patients may be highly anaemic and may need exchange blood transfusion. Human umbilical cord blood should be utilized in the management of the patients to improve the haematopoietic activity of the bone marrow and quick recovery of the patents (Rathee *et al.*, 2014). The red cell indices were not affected in the acute leukemia patients.

CONCLUSION

The results showed decrease in total white cell count, neutrophils, haemoglobin, red blood cells, Packed cell volume and increase in Red cell distribution width and no significant changes in Lymphocytes, Mean cell volume, Mean cell haemoglobin and Mean cell haemoglobin concentration.

American Cancer Society (2013). Cancer Facts and Figures .Atlanta, Ga: American Cancer Society.

American Cancer Society (2016). Cancer Facts and Figures. Atlanta, Ga: American Cancer Society.

Belson, M., Kingsley, B. and Holmes, A. (2007). Risk factors for acute leukemia in children: A review. Environmental Health Perspectives 115: 138-145.

Bennett, J.M., Catovsky, D., Daniel, M.T., Flandrin, G. and Galton, D.A. (1976). Proposals for the classification of the acute leukaemias (FAB cooperative group). Brj Haematol 33: 451-458.

His, E.D. (2012). Pathologic and molecular genetic features of chronic lymphocytic leukemia. Seminars in Oncology 39: 74-79.

Jemal, A., Homas, A., Murray, T. and Hun, M. (2002).Cancer statistics, 2002. CA Cancer J Clin 52: 23-47.

Obeagu, E.I. Otuadinma, R.N. and Aliyu, H.S. (2020). Acute Leukaemia: A Sudden Killer to Human Beings". EC Emergency Medicine and Critical Care 4 (6): 154-167 Ossenkoppele, G. and Löwenberg, B (2015). How I treat the older patient with acute myeloid leukemia. Blood 125: 764-774.

Rathee, R., Vashist, M., Kumar, A. and Singh, S. (2014). Incidence of Acute and Chronic Forms of Leukemia In Haryana. Int J Pharm Pharm Sci 6: 323-325.