AFRICAN JOURNAL OF MEDICINE and medical sciences

VOLUME 43 NUMBER 2 JUNE 2014

ISSN 1116–4077

Afr. J. Med. med. Sci. (2014) 43, 135-138

Pattern of childhood leukaemia in University College Hospital, Ibadan

TO Babatunde[1], GO Ogun[1], BJ Brown[2], EE Akang[1], and YA Aken'Ova[3]
Departments of Pathology[1], Paediatrics[2] and Haematology[3], College of Medicine, University of Ibadan, Ibadan, Nigeria

Abstract

Background: Leukaemias are haematological malignancies characterized by unregulated clonal proliferation of haematopoietic cells.

Objective: To determine the pattern of childhood leukaemia in Ibadan.

Methodology: This was a retrospective study of leukaemia cases diagnosed at the University College Hospital (UCH), Ibadan between January 1991 and December 2010 in children less than 15 years of age. Data obtained was subjected to statistical analysis using the Statistical Package for Social Sciences version 20.

Results: There were 64 cases of childhood leukaemia, accounting for 10.2% of childhood cancers seen during this study period. The male to female ratio was 2:1 and modal age group was between 10 and 14 years. Thirty (46.9%) cases were acute lymphoblastic leukaemia (ALL), 22 (34.4%) were acute myelogenous leukaemia (AML) and 12 (18.8%) were unspecified acute leukaemias. There was no case of chronic myeloid or lymphocytic leukaemia.

Conclusion: There has been a relative increase in the frequency of leukaemia cases at UCH, Ibadan, which may be largely explained by increased awareness and referrals. There is a need for further collaborative multicentre studies of childhood leukaemias in Nigeria and other developing countries and focused research on childhood leukaemias in order to unravel the aetiology.

Keywords: *Childhood leukaemia, Ibadan*

Résumé

Introduction: Les leucémies sont des maladies malignes hématologiques caractérisées par la prolifération clonale non réglementée des cellules hématopoïétiques.

Objective: Pour déterminer le modèle de la leucémie d'enfance à Ibadan.

Méthodologie: Ceci était une étude rétrospective des cas de leucémies diagnostiquées au Collège Hospitalier Universitaire (CHU), Ibadan entre Janvier 1991et Décembre 2010 dans les enfants âgés moins de 15 ans. La donnée obtenue était à sujet de l'analyse statistique en utilisant l'Emballage Statistique pour les sciences sociales version 20.

Résultats : Ils y avaient 64 cas de leucémies d'enfance, comptant pour 10,2% de cancers d'enfance vue durant cette période d'étude. Le ratio du male à la femelle était 2 : 1 et le groupe d'âge modal était entre 10 et 14 ans. Trente (46,9%) cas étaient la leucémie lymphatique-balistique aigue (LLA), 22 (34,4%) étaient la leucémie de myélose aigue (LMA) et 12 (18,8%) étaient 12 (18,8%) étaient des leucémies aigues non spécifiées. Il n'y avait pas de cas de leucémie myéloïde ou de lymphocyte chronique.

Conclusion : Il y'a eu une croissance relative dans la fréquence des cas de leucémies au CHU, Ibadan, ce qui peut être largement expliquée par l'accroissement de renseignements et de renvois. Il y a un besoin pour plus d'études collaboratives à multi centres de la leucémie d'enfance au Nigéria et autres pays en voies de développement et des recherches foyer sur la leucémie d'enfance dans le but de démêlé l'étiologie.

Mots clé : Leucémie d'enfance, Ibadan

Introduction

Leukaemias are a heterogeneous group of malignant blood disorders, caused by the unregulated proliferation of immature blood cells. The malignant cells arise as a result of abnormal blood cell maturation at an early stage of differentiation [1]. They are characterised by genetic abnormalities in haematopoietic cells giving rise to unregulated clonal proliferation [1]. The progeny of these cells have a growth advantage over normal cellular elements, because of their increased rate of proliferation, and a decreased rate of spontaneous apoptosis. The result is a disruption of normal marrow function and, ultimately, marrow failure. The clinical features, laboratory findings, and responses to therapy vary depending on the type of leukaemia [2].

The age-standardized rates for childhood leukaemias in Ibadan, Nigeria between 1960-1984 and 1985-1992 were 11.8 and 8.3 per million respectively [3,4]. In Europe, America, Oceania, and also in much of eastern Asia, around a third of all childhood cancers are leukaemias, with age-

Correspondence: Dr. G.O. Ogun, Department of Pathology, University College Hospital, PMB 5116, Ibadan, Nigeria.

standardized rates (ASR) of 35-50 per million [4]. Whereas leukaemias account for about 30% and 41% of all malignancies in children less than 15 years of age respectively in Europe and the United States of America [4,5], childhood leukaemias constituted only 7.4% of childhood tumours in a previous study from Ibadan [6].

A previous study showed that acute lymphoblastic leukaemia (ALL) is the most common subtype of leukaemia in Ibadan, accounting for 87% of acute leukaemias, followed by acute myelogenous leukaemia (AML). Chronic myeloid leukaemia is relatively rare in childhood, accounting for less than 5% of all childhood leukaemias in Ibadan [6]. In the United States of America, acute lymphoblastic leukaemia (ALL) accounts for about 77% of cases of childhood leukaemia, acute myeloblastic leukaemia (AML) for about 11%, chronic myelogenous leukaemia (CML) for 2–3%, and juvenile chronic myelogenous leukaemia (JCML) for 1-2%. The remaining cases consist of a variety of acute and chronic leukaemias that do not fit classic definitions for ALL, AML, CML, or JCML [2]. In Europe, acute lymphoblastic leukaemia (ALL) accounts for around 80% of leukaemia among children aged 0-14 years [5].

In developed countries, more than 80% of ALL is of the precursor B-cell subtype, which is responsible it's pronounced peak incidence in early childhood and also largely accounts for the observed variation in the total incidence of childhood leukaemia among countries [5]. The present study has been undertaken in order to determine whether there has been any change in the frequency or in the pattern of occurrence of childhood leukaemia in Ibadan in relation to the total number of childhood malignancies.

Materials and methods

The present study is based on a retrospective review of clinical cases of childhood leukaemia seen between January 1991 and December 2010. The cases were identified from the records and data of the Ibadan Cancer Registry (IBCR) and the Department of Haematology, University College Hospital, Ibadan, Nigeria. Children less than 15 years of age were recruited into the study and divided into three age groups (0-4, 5-9 and 10-14 years) [7].

Clinical information on these cases was extracted from the IBCR data and the case files. The peripheral blood films and the bone marrow aspiration cytology slides of available cases of childhood leukaemia in the Department of Haematology were reviewed, where available. The classification of acute leukaemias was based on the French-American-British classification [8].

The data obtained were subjected to statistical analysis using the Statistical Package for Social Sciences version 20. Ethical clearance for the study was obtained from the joint University of Ibadan-University College Hospital Ethical Review Committee

Results

There were 64 cases of acute leukaemia. During the same period there were 626 cases of childhood cancer. Thus, leukaemias accounted for 10.2% of childhood cancers seen during the study period.

Table 1- Age and sex distribution of specific types of childhood leukaemias

Leukaemia sub type	M	F	0-4	5-9	10-14	Total	%
Acute lymphoblastic leukaemia							
ALL-L1	5	0	2	1	2	5	7.8
ALL-L2	6	1	2	1	4	7	10.9
ALL-L3	0	4	4	0	0	4	6.3
ALL-Unspecified	8	6	4	7	3	14	21.9
Acute myelogenous leukaemia							
AML-M1	3	1	0	1	3	4	6.3
AML-M2	3	1	1	2	1	4	6.3
AML-M3	1	0	0	0	1	1	1.6
AML-M4	2	0	1	1	0	2	3.1
AML-M6	0	1	0	0	1	1	1.6
AML-NOS	7	3	1	6	3	10	15.6
Acute leukaemia, unspecified	7	5	4	3	5	12	18.8
Total	42	22	19	22	23	64	100

L-Lymphoblast subtype, M-Myeloblast subtype, NOS- Not Otherwise Specified

The overall modal age of occurrence of leukaemia was in the 10-14 year age group. Thirty (46.9%) of the 64 leukaemia cases were acute lymphoblastic leukaemia (ALL), while 22 (34.4%) were acute myelogenous leukaemia (AML). An additional 12 (18.8%) acute leukaemias were not specified (Table 1). There was no case of chronic myeloid or lymphocytic leukaemia.

There was a male predominance for all the leukaemia cases (Table 1). The modal age group for ALL was in the first five years (40%) and for AML was between 5 and 9 years (45.5%).

Discussion

Leukaemia accounted for 10.2% of malignant childhood tumours during this study period. Ocheni et al from Enugu Nigeria and Gyasi and Tettey from Accra, Ghana, reported that leukaemias accounted for 7.6% and 6.7% of cases, respectively at their centres [9,10]. The studies from Sagamu by Agboola et al and Zaria by Samaila did not record any case of childhood leukaemia [11,12]. An earlier study from Jos by Tanko et al did not record any case of leukaemia[13] but a more recent study from the same centre by Okpe et al over a four year period (2006-2010) showed acute leukaemia to constitute 13.8% of childhood malignant tumours over the period of study [14].

There has been a rise in the frequency of leukaemia in this environment considering the fact that the relative ratio frequency in Williams' study was 4.5%, 7.4% in Akang's study [15,16] and 10.2% in the present study.

Leukaemias were more common in males, with a male to female ratio of 2.0:1. This trend was similar to Williams' and Akang's studies in which the male to female ratios were 3.2:1 and 2.0:1 respectively [15,16].

In the present study, acute lymphoblastic leukaemia (ALL) and acute myelogenous leukaemia (AML) were the two most common variants. In general agreement with the findings of this study, Ekanem *et al* (1992) from Calabar, Ocheni *et al* (2005) from Enugu, Okpe *et al* (2011) from Jos, Gyasi and Tettey (2007) from Ghana, and Haroun (2006) from Sudan all reported that the two most common childhood leukaemias were ALL followed by AML.[9,10,14,17,18]. However, in a study from Kano (2012) AML was slightly more prevalent than ALL [19]. Of the 29 newly diagnosed cases of acute leukaemia seen in children in the period July 1978 to December 1981 at the University College Hospital, Ibadan, the male: female ratio was 2.8:1 and 4.5:1 for childhood ALL and AML respectively,[20] while in the present study the male: female ratio is 1.7:1 and 3.2:1 for ALL and AML cases respectively. This present study and previous studies from this centre including those of Junaid *et al* (1988) [21] and Thomas *et al* (1998) [3] confirmed that males still ranked higher in number than females in paediatric acute leukaemia (ALL and AML) cases.

Morphology of bone marrow and peripheral blood film was the mainstay of arriving at diagnosis used for most patients in this study hence specific subtyping in many cases was challenging therefore accounting for the high proportion (56%) of non specific subtype of diagnosis. (ALL-unspecified-21.9%, AML-NOS-15.6%, AL-unspecified-18.8%). The modal age group of 0-4 years in ALL observed in this current study is similar to worldwide ALL age group incidence pattern, with peak age group in children under the age of 5years [4-6]. Whereas AML is relatively uncommon in children compared to adults [22]. Finally, in children, embryonal and immature cells can be found at very different stages of development, which can perpetually proliferate and rarely mature, thus accounting for primitive and embryonal tumours like leukaemias arising in childhood [23].

Conclusion

The present study has demonstrated an increase in the frequency of childhood leukaemia cases at the University College Hospital, Ibadan. This may be explained either by improved case ascertainment or by a true increase in the local incidence of childhood leukaemia. This can only be determined by a longitudinal population based survey, in view of the retrospective nature of the present study. There is also need for further collaborative multicentre studies of childhood leukaemias in Nigeria and other developing countries and focused research on childhood leukaemias in order to unravel the causes and further help in its effective treatment.

References

1. Atkinson J and Richardson C. The leukaemias. In: Grundy M (Ed). Nursing in haematological oncology. Elsevier Limited; 2006: pp 61-83.
2. Kadan-Lottick NS. Epidemiology of Childhood and Adolescent Cancer. In Kliegman RM, Behrman RE, Jenson HB, et al (Eds). Nelson Textbook of Pediatrics, 18th edition, Philadelphia, Elsevier Saunders, 2007; 2097-2104.

3. Thomas JO and Aghadiuno PU. Nigeria: Ibadan Cancer Registry, 1985-1992. In: Parkin DM, Kramarova E, Draper GJ, *et al* (Eds). International Incidence of Childhood Cancer (IARC Scientific Publications No. 144), Lyon, IARC, 1998; pp 43-45.
4. Parkins DM, Ferlay J, Hamdi-Cherif M, *et al.* Cancer in Africa. Epidemiology and Prevention. IARC Scientific Publications No.153. IARC Press Lyon 2003, pp 87-97.
5. World Health Organization regional office for Europe. Incidence of childhood leukaemia an ENHIS fact sheet; December 2009. Accessed on 9/11/2013.
6. Akang EE. Epidemiology of cancer in Ibadan: Tumours in childhood. Arch Ibadan Med 2000; 1(2): 7-9.
7. Parkin DM. Materials and methods of the study. In: Parkin DM, Stiller CA, Draper GJ, et al (Eds). International Incidence of Childhood Cancer (IARC Scientific Publications No. 87), Lyon, IARC, pp 17-24.
8. Bennett JM, Catovsky D, Daniel MT, *et al.* Proposals for the classification of acute leukaemias. French-American-British (FAB) co-operative group. Br J Haematol. 1976; 33(4):451-458
9. Ocheni S, Okafor CO, Emodi IJ, *et al.* Spectrum of childhood malignancies in Enugu, Nigeria. Afr. J. Med. med Sci. 2005; 34:371-375.
10. Gyasi RK and Tettey Y. Childhood deaths from malignant neoplasms in Accra. Ghana Med J 2007; 41(2):78-81.
11. Agboola AOJ, Adekanmbi FA, Musa AA, *et al.* Pattern of childhood malignant tumours in a Teaching Hospital in South-Western Nigeria. MJA 2009; 190(1):12-14.
12. Samaila MO. Malignant tumours of childhood in Zaria. Afr J Paediatr Surg. 2009; 6(1):19-23.
13. Tanko NM, Echejoh GO, Manasseh NA, Mandong MB and Uba AF. Paediatric solid tumours in Nigerian children: a changing pattern? Afr J Paediatr Surg. 2009; 6(1):7-10.
14. Okpe ES, Abok II, Ocheke IE and Okolo SN. Pattern of childhood malignancies in Jos, North Central Nigeria. J Med Tropics 2011; 13(2):109-114.
15. Williams AO. Tumours of Childhood in Ibadan, Nigeria. Cancer 1975; 36: 370-378.
16. Akang EE. Tumours of childhood in Ibadan, Nigeria. Pediatr Pathol Lab Med. 1996; 16(5): 791-800.
17. Ekanem IA, Asindi AA, Ekwere PD, *et al.* Malignant childhood tumours in Calabar, Nigeria. Afr J Med Med Sci. 1992; 21(2): 63-69.
18. Haroun HM, Mahfouz MS and Ethaj AM. Patterns of childhood cancer in children admitted to the Institute of Nuclear Medicine, Molecular Biology and Oncology, Wad Medani, Gezira State, Sudan. J Fam Commun Med 2006; 13(2):71-74.
19. Ochicha O, Gwarzo AK and Gwarzo D. Paediatric malignancies in Kano, Northern Nigeria. World J Paediatr 2012; 8(3):235-239.
20. Williams CKO, Folami AO, Laditan AAO and Ukaejiofo EO. Childhood acute leukaemia in a tropical population. Br. J. Cancer 1982; 46: 89-94.
21. Junaid TA and Babalola BO. Nigeria: Ibadan Cancer Registry, 1960-1984. In: Parkin DM, Stiller CA, Draper GJ, et al (Eds). International Incidence of Childhood Cancer (IARC Scientific Publications No. 87), Lyon, IARC, 1988; pp 37-41.
22. Jemal A, Thomas A, Murray T, Thun M. "Cancer statistics, 2002". CA Cancer J Clin, 2002; **52** (1): 23–47
23. Imbach P, Kühne T, Arceci R (Eds.) Paediatric Oncology. A comprehensive guide. Springer-Verlag Berlin Heidelberg; 2006. p. 19–20.