
Pattern of adult leukemias at Al-Jomhori Educational Hospital, Sana'a, Yemen

Jameel AL-GHAZALY

Al-Jomhori Hospital, Medicine-Haematology, Sana'a, Republic of YEMEN

Turk J Haematol 2005;22(1): 31-35

Received: 03.09.2004 **Accepted:** 16.12.2004

ABSTRACT

There is lack of information about leukemias in Yemen. The purpose of this study is to evaluate the pattern of adult leukemias at Al-Jomhori Educational Hospital in Sana'a, Yemen and to compare it with available data from Saudi Arabia. Data concerning age, sex, area of residence whether rural or urban and the type of leukemia were collected and analyzed. The age range of patients was 15 to 96 years. Diagnosis was based on bone marrow aspiration cytology and cytochemistry. Between November 1999 and November 2003 a total of 169 cases of leukemia were diagnosed. AML was the most common (39.1%) followed in descending order by CML (25.4%), ALL (23.7%) and CLL (11.8%). The male to female ratio was 1.14:1 for all the types, 1.06:1 for AML, 2.64:1 for ALL, 0.65:1 for CML and 1:1 for CLL. AML was most common among patients aged 40-59 years old (30.3%) followed by ≥ 60 years old (25.8%). ALL was most common among young patients < 20 years old and CLL among elderly patients whereas CML was most common among middle aged patient. The rural to urban residence ratio was 2.8:1 for all the types. Leukemia is an important health problem in Yemen and the pattern of adult leukemias is comparable in certain aspects to that reported from different regions of Saudi Arabia. The study recommends implementation of preventive, diagnostic and therapeutic strategies for leukemias in Yemen.

Key Words: Leukemia, Adult, Epidemiology, Yemen.

ÖZET

Yemen Sana'a Al-Jomhori Eğitim Hastanesi'nde erişkin lösemilerin özellikleri

Yemen'deki erişkin lösemiler hakkında bilgi sınırlıdır. Bu çalışmanın amacı Yemen Sana'a Al-Jomhori Eğitim Hastanesi'ne başvuran erişkin lösemili hastaların özellikleri hakkında bilgi edinmektir. Yaş, cinsiyet, yerleşim yeri ve lösemi tipi ile ilgili veri toplanmış ve değerlendirilmiştir. Hastaların yaşı 15-96 arasında değişmektedir. Hasta tanıları kemik iliği aspirasyon sitolojisi ve sitokimya ile yapılmıştır. En sık AML gözlenirken (%39.1), bunu azalan sıklıkta KML (%25.4), ALL (%23.7) ve KLL (%11.8) izlemektedir. Tüm lösemiler için erkek/kadın oranı 1.14:1 iken, bu oran AML'de 1.06:1, ALL'de 2.64:1, KML'de 0.65:1 ve KLL'de 1:1 bulunmuştur. Kırk-ellidokuz yaş arasında en sık AML gözlenirken (%30.3), 60 yaş üzerinde %25.8'dir. ALL 20 yaşından küçük genç hastalarda, KLL yaşlı hastalarda ve KML orta yaşlı hastalarda siktir. Kırsal kesim/şehir oranı ise tüm tiplerde 2.8:1'dir.

Lösemi, Yemen'de önemli bir sağlık sorunudur ve akut lösemilerin dağılımı çeşitli yönleri ile Suudi Arabistan'ın değişik bölgeleri ile benzerlik taşır. Bu çalışma Yemen'de lösemiler için koruyucu, tanı koyucu ve tedavi edici stratejilerin oluşturulmasını önermektedir.

Anahtar Kelimeler: Lösemi, Erişkin, Epidemiyoloji, Yemen.

INTRODUCTION

Leukemia is a dreadful disease causing tremendous suffering to patients and relatives. Physicians dealing with leukemias in developing countries face a great challenge with their diagnosis and management, which demand advanced and very expensive facilities. Most of these facilities are lacking in Yemen, which constitute an impediment for standard management. Lack of information about leukemias in some developing countries may be a factor that health authorities do not include it seriously in their plans. Epidemiologic observations indicate that environment and life style are the major determinants of the geographical pattern of cancer^[1]. The purpose of this study is to evaluate the pattern of leukemias at Al-Jomhori Educational Hospital in Sana'a, Yemen and to compare it with available data from Saudi Arabia, with a view of elucidating possible etiological factors. Study of the epidemiological pattern of leukemia is helpful in planning preventive and management strategies. This is the first study of its kind in Yemen.

MATERIALS and METHODS

Al-Jomhori Educational Hospital is one of the largest hospitals in Sana'a, the capital of the Yemen Republic. The Hematology unit was established in November 1999 within the medical department with the aim of dealing with hematological diseases including hematological malignancies. We have limited diagnostic facilities and inadequate facilities for standard management. The study included all adult patients with leukemia who were diagnosed at our hospital between November 1999 and November 2003. Most of these

patients were referred from other hospitals and clinics in Yemen with non-specific diagnosis such as fever, anemia, pancytopenia or splenomegaly for investigation. Unfortunately many of these patients were misdiagnosed and given courses of antimalarials, antileishmanials and antibiotics before referral. Some also were given haematincs and several units of blood transfusion. Few patients were referred with the suspicion of leukemia because of high WBC count. All patients included in the study are Yemenis and came from the different regions of Yemen. After evaluating the clinical and laboratory data diagnosis was based on bone marrow aspiration cytology and cytochemistry for subtyping acute leukemias. Immunophenotyping, cytogenetics and molecular biology facilities are not available in Yemen. However for some patients with chronic myeloid leukemia blood samples were sent abroad for cytogenetic analysis showing the Philadelphia chromosome positive result. Data concerning age, sex, area of residence whether rural or urban and the type of leukemia were collected. A total of 169 cases of leukemia were analyzed. The age range of patients was 15 to 96 years.

RESULTS

A total of 169 patients with leukemia were diagnosed during the 4 years study period between November 1999 and November 2003.

Acute myeloid leukemia (AML) was the most frequent morphologic type [n= 66 (39.1%)] followed in descending order by chronic myeloid leukemia (CML) [n= 43 (25.4%)], acute lymphocytic leukemia (ALL) [n= 40 (23.7%)] and chronic lymphocytic leukemia (CLL) [n= 20 (11.8%)]. The male to

female ratio for all leukemias was 1.14:1, for AML 1.06:1, for ALL 2.64:1, for CML 0.65:1 and for CLL 1:1 (Table 1). Table 2 shows the age-related distribution of leukemias. AML was most frequent in patients aged 40-59 years old (30.3%) followed in descending order by ≥ 60 years old (25.8%), 20-29 years old (18.2%) and 30-39 years old (13.6%). It was least common among patients < 20 years old (12.1%). ALL was most frequent among patients < 20 years old (60%) followed in descending order by 20-29 years old (22.5%), 30-39 years old (10%) and ≥ 60 years old (5%). It was least common among patients 40-59 years old (2.6%). CML was most frequent among middle aged patients 30-39 years old (32.6%) and 40-59 years old (25.6%). CLL was most frequent among elderly patients ≥ 60 years old (60%), none of the patients was less than 40 years old.

One-hundred-twenty-five patients (74%) with leukemia were living in rural areas. This high relative incidence was consistent among

all types: 50 (75.8%) with AML, 29 (72.5%) with ALL, 30 (69.8%) with CML and 16 (80%) patients with CLL were living in rural areas (Table 3).

DISCUSSION

Leukemia is an important group of the malignancies reported in the Middle East. It was hypothesized that the Middle East countries have higher rates of leukemias, with respect to non-Hodgkin's lymphoma, which were claimed to be three times more common than in Europe and the USA^[2]. This hypothesis was also claimed by El-Akkad et al who found that relative frequency rate (RFR) of lymphoid and myeloid leukemias in Saudi Arabia were three to four times higher than in other parts of the world^[3]. A high incidence of leukemia relative to other malignancies was reported from several regions of Saudi Arabia. Among 15, 115 cancer patients seen at King Faisal Specialist Hospital and Research Center (KFSH & RC), leukemia ranked

Table 1. The sex distribution of patients with leukemia at Al-Jomhori Educational Hospital, Sana'a, Yemen

Type of leukemia	Male n (%)	Female n (%)	Ratio (M/F)	Total	Percentage
AML	34 (51.5)	32 (48.5)	1.06:1	66	39.1
ALL	29 (72.5)	11 (27.5)	2.64:1	40	23.7
CML	17 (39.5)	26 (60.5)	0.65:1	43	25.4
CLL	10 (50)	10 (50)	1:1	20	11.8
Total	90 (53.3)	79 (46.7)	1.14:1	169	100

Table 2. The age-related distribution of patients with leukemia at Al-Jomhori Educational Hospital, Sana'a, Yemen

Type of leukemia	15-19 years n (%)	20-29 years n (%)	30-39 years n (%)	40-59 years n (%)	≥ 60 years n (%)	Total	Percentage
AML	8 (12.1)	12 (18.2)	9 (13.6)	20 (30.3)	17 (25.8)	66	39.1
ALL	24 (60)	9 (22.5)	4 (10)	1 (2.5)	2 (5)	40	23.7
CML	1 (2.3)	8 (18.6)	14 (32.6)	11 (25.6)	9 (20.9)	43	25.4
CLL	0	0	0	8 (40)	12 (60)	20	11.8
Total	33 (19.5)	29 (17.2)	27 (16)	40 (23.7)	40 (23.6)	169	100

Table 3. The residence distribution of patients with leukemia at Al-Jomhori Educational Hospital, Sana'a, Yemen

Type of leukemia	Rural (R) n (%)	Urban (U) n (%)	Ratio (R/U)	Total
AML	50 (75.8)	16 (24.2)	3.1	66
ALL	29 (72.5)	11 (27.5)	2.6	40
CML	30 (69.8)	13 (30.2)	2.3	43
CLL	16 (80)	4 (20)	4	20
Total	125 (74)	44 (26)	2.8	169

as the second most frequent neoplasm^[4]. Leukemia was the second most frequent cancer in Madina Al-Munawara and the third most common malignancy in the Asir and Al Baha regions^[5-7]. Lymphoma/leukemia was the third most common cancer in the Gizan province^[8]. Leukemia ranked as the seventh most common cancer among 5000 cancer cases seen at Riyadh Armed Forces Hospital^[9]. Among 22, 836 adult cancer cases seen at KFSH & RC, leukemia ranked as the fifth most frequent cancer^[10]. A population based study in the Eastern region of Saudi Arabia point to a high incidence rate of leukemia^[11]. A high incidence rate of leukemia was also reported from Jordan, Syria, Lebanon and from Egypt^[8]. Acute leukemias were among the most common neoplasms reported from Kuwait and from Baghdad tumor registry^[11].

There is no reported data about the epidemiology of cancer in Yemen and this is the first attempt to study the pattern of leukemias. A total no of 169 cases of leukemia over a 4 years period at Al Jomhori Educational Hospital in this study approximate the no of 772 leukemia cases seen over 18 years (1976-1993) at KFSH & RC and 124 cases seen over 2 years among Saudis and non-Saudis in the Eastern region of Saudi Arabia although this figure included both pediatric and adult cases^[10,11]. The figure in this study is higher than the no of 57 adult leukemia/myeloma cases seen during the nine years period (1987-1995) at King Fahd Hospi-

tal in the Al-Qassim region of Saudi Arabia and also higher than the no of 197 cases seen over a 13 years period (1981-1993) in Madina Al-Munawara^[5,12].

The study shows AML to be the most frequent morphologic type and is approximately twice as common as ALL. CML was the second most frequent type followed in descending order by ALL and CLL. In contrast, in both the Eastern region and Al-Qassim region of Saudi Arabia, ALL was the most frequent followed in descending order by AML, CML and CLL^[11,12]. However these two studies included pediatric and adult patients which influences the results because ALL is generally more frequent in the pediatric population.

This study shows a male to female ratio of 1.14:1 for all the types. There is a male preponderance for ALL with a male to female ratio of 2.63:1, and a female preponderance for CML with a male to female ratio of 0.65:1. There is an almost equal sex incidence for both AML and CLL. These findings are in contrast to the male to female ratio of 1.66:1 and 1.4:1 for all the types in Madina Al-Munawara and for Saudis in Eastern region of Saudi Arabia respectively^[5,11]. Most of the above data including ours are hospital based that may be influenced by a referral bias which is influenced by variations in disease awareness, cultural barriers especially linked to the age and sex of the patient, inconvenience of travel and distance involved^[10]. However some data may be related to etiolo-

gical factors which need to be evaluated. In our study patients living in rural areas were more frequent than those living in urban areas with a ratio of 2.8:1. This higher relative incidence is consistent among all types of leukemia. This may give an insight to the possible etiological factors. Most of these patients are farmers and report to be exposed to chemicals and insecticides used in agriculture without regulations and without protective measures. Also it was observed that many patients with acute leukemia in this study gave a history of heavy Qat consumption, which has been exposed heavily to chemicals to hasten its growth. These observations need to be supported by further studies. In the Eastern region of Saudi Arabia chemicals associated with petroleum and petrochemicals were postulated to explain the high incidence of leukemias among males^[11]. It was observed that many patients referred to us from other hospitals were misdiagnosed as malaria, leishmaniasis or bacterial infections and were given treatment accordingly. This misdiagnosis is due to improper evaluation of certain features of leukemia such as fever, anemia and splenomegaly, which are similar to those of common infectious diseases in our country. This causes delay in referral of such cases, which affects treatment outcome and prognosis.

In conclusion, leukemia is an important health problem in Yemen and is comparable in certain aspects to that seen in Saudi Arabia. Chemicals used improperly in agriculture are possible etiological factors in the Yemeni patients, which need to be further studied. Awareness of the magnitude of the problem demands implementation of preventive, diagnostic and therapeutic strategies for leukemias in Yemen as well as planning epidemiologic studies and research programs.

Acknowledgements

The author wishes to acknowledge with thanks Munasser Abdullah BS and Walid Al-Dubai MSc for their laboratory assistance and assistance in data collection and typing the manuscript.

REFERENCES

1. Magrath I, Litvak J. Cancer in developing countries: opportunity and challenge. *J Nat Cancer Inst* 1993; 85:862-74.
2. Othman SB, Rajih SS. Childhood non-Hodgkin's lymphoma in Saudi Arabia: clinical features of 100 cases. *King Faisal Specialist Hospital Med J* 1982; 2:217-24.
3. EL-Akkad SM, Amer MH, Lin GS, Sabbah RS, Godwin JT. Pattern of cancer in Saudi Arabs referred to King Faisal Specialist Hospital. *Cancer* 1986;58: 1172-8.
4. The 1988 Annual Report of the Tumor Registry. King Faisal Specialist Hospital and Research Centre.
5. AlSaigh AH, Allam MM, Khan KA, Al Hawsawi ZM. Pattern of Cancer in Madina Al-Munawara region. *Ann Saudi Med* 1995;15:350-3.
6. Khan AR, Hussain NK, Al-Saigh A, et al. Pattern of Cancer at Asir Central Hospital, Abha, Saudi Arabia. *Ann Saudi Med* 1991;2:285-8.
7. Willen R, Pettersson BA. Pattern of malignant tumors in King Fahad Hospital, Al-Baha, Saudi Arabia. *Saudi Med J* 1989;10:498-502.
8. Tandon P, Pathak VP, Zaheer A, Chatterjee A, Walford N. Cancer in the Gizan province of Saudi Arabia. *Ann Saudi Med* 1995;15:14-20.
9. Koriech OM, AlKuhaymi R. Profile of Cancer in Riyadh Armed Forces Hospital. *Ann Saudi Med* 1994;14:187-94.
10. Ezzat A, Raja M, Te O, Michels R, Bazarbashi S. Frequency and distribution of 22,836 adult cancer cases referred to King Faisal Specialist Hospital and Research Center. *Ann Saudi Med* 1996;16:152-8.
11. Al-Bar AA, Ibrahim EM, Al-Tamimi TM, et al. Leukaemia in the Eastern region of Saudi Arabia: a population based Study. *Ann Saudi Med* 1996;16: 521-6.
12. Akhtor SS, Reyes LM. Cancer in Al-Qssim, Saudi Arabia: a retrospective study (1987-1995). *Ann Saudi Med* 1997;17:595-600.

Address for Correspondence:

Jameel AL-GHAZALY, MD

Al-Jomhori Hospital, Medicine-Haematology,
Sana'a, Republic of, YEMEN

e-mail: jameel-alghazaly@yahoo.com