Hematological Malignancies in Al-Amal Oncology Unit, Aden

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Abstract The hematological malignancies (HM) are group of neoplasms that arise through malignant transformation of bone marrow derived cells. The great diversity seen in this group of disorders is a reflection of the complexity of normal hematopoiesis and the immune system. In the current study, the author retrospectively studied HM patients from 2008 to 2010, and compared with prevalence of solid tumor, and found HM represented one-fifth of all malignancies managed in the Oncology Unit, and lymphomas were the commonest HM.

Keywords Hematological · Malignancies · NHL · Aden

Introduction

Hematological malignancies (HM) comprise a collection of heterogeneous conditions, all originating from cells of the bone marrow and the lymphatic system. HM represented three major groups; leukemias, lymphomas, and plasma cell neoplasms [1].

In the United States of America, HM represented nearly 106,200 new cases in 2003, it is considered as the second most common cause of cancer deaths, affected approximately 57,000 people in the same year [1, 2]. The incidence was dramatically increased reaching about 135,000 new cases in 2007. In Mexico, they constituted approximately 5.6% out of 56,213 cancer related deaths in 2001 [2, 3].

In Europe, the overall incidence of HM appears to be rising. European data showed that in 2005; the number of diagnosed new patients with HM can be estimated approximately as 230,000 patients, accounting for 8% of all the new cancer patients diagnosed in Europe and 7% of the estimated deaths from cancer-related deaths in 2005 [4].

In a study conducted in Zahedan (Iran) in 2010; HM were the second common malignancies with a frequency of 20% [5].

At Ilorin, North West Nigeria, Babatunde et al. [6], in 2009, reported that HM as 18.05% of all cancers seen at the University of Ilorin Teaching Hospital.

In Aden, Ba Saleem et al. [7], conducted a study at the cancer registry center, for the period 2002–2006, which showed the five most common cancers were breast cancer, leukemia, non-Hodgkin's lymphoma (NHL), brain cancer and Hodgkin's lymphoma (HL, 16.6, 12.6, 7.8, 5.2 and 4.4%, respectively), i.e. HM alone represented 24.8%.

The control and prevention of HM will require a precise understanding of their etiology, which is at present largely unknown. Several risk factors, however, have been shown by epidemiological studies to be associated with the development of these diseases [1, 4].

Avoiding exposure to risk determinants would result in a reduction in cancer risk. The little we know about the risk factors has not yet been translated into consistent attempts to prevent HM [1].

Some general consideration, however, can be done, such as avoidance of exposure to radiation and benzene will reduce the risk of leukemias. Banning or restricting the use of organochlorines might on a long term result in reduction of the NHL incidence. About 20% of adult acute myeloid leukemia (AML) cases are linked to smoking and here prevention is therefore possible. HIV infection is clearly

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preventable and also other infectious agents associated with NHL might be the target of preventive measures, and as expected, more modern and improved cancer therapies will likely result in a lower incidence of second tumors [1, 4].

Although new drugs have emerged in the last decades, and combined schedules were developed in an effort to treat such malignancies, but even after being adjusted by prognostic factors, the results of the chemotherapy regimens are not optimal [8]. Because of that, HM remains one of the worldwide clinical problems associated with poor outcome of patients.

In Al-Amal Oncology Unit in Aden, where resources are very poor, HM are still flooding into the unit in spite of the lack of proper, well equipped, and ready unit for HM. It was decided to conduct this study to have an idea about the frequency of HM and the common types presented to this oncology unit.

Objectives

To determine the frequency of HM among oncology patients treated in Al-Amal Oncology Unit of Al-Gamhouria Modern General Hospital in Aden.

Patients and Methods

This is a retrospective study, conducted in Al-Amal Oncology Unit of Al-Gamhouria Modern General Hospital in Aden, for the period Jan. 1st, 2008–Jul. 31st, 2010.

A thorough review for all records of patients was conducted with categorization into; HM and solid tumors. HM included all cancers of blood or lymphatic origin such as leukemias, myeloma, myelodysplastic and myeloproliferative disorders and lymphomas.

Data were processed by the SPSS 16 statistical program using the χ^2 test for the presence of significant statistical association between qualitative variables. The student *t* test for the presence of significant statistical difference between two means and one way ANOVA test for three means.

The tests were conducted with the 95% confidence interval and *P* values of <0.05 was considered statistically significant.

All records were confidentially handled and patients' names were coded into numbers to guarantee their property.

Results

The total number of patients managed during the study period was 1,190 patients with different malignancies; those with HM were 225 patients and those with solid

tumors were 965 patients. The frequency of HM was 18.9% (225 out of 1,190 patients) (Fig. 1).

HM affected male patients more than females (55.1% vs. 44.9%) and when compared with solid tumors, there was significant statistical relationship between the type of malignancy and patient's sex ($P < 0.05$). Solid tumors were seen in females more than in males (with female to male ratio of 1.5:1), while the reverse was observed in HM (male to female ratio was 1.2:1) (Table 1).

The age of patients with HM ranged from 2 to 85 years, with a mean of 45.3 ± 18.5 years. HM were associated with statistically significant lower mean age (45.3 years) than solid tumors (51.2 years) (Table 2).

Fig. 1 Frequency of HM compared to solid tumors in Al-Amal Oncology Unit, Aden, Jan. 2008–Jul. 2010

Table 1 Sex distribution of HM compared to solid tumors

Sex	Hematological malignancies (n = 225)		Solid tumors (n = 965)	
	No.	%	No.	%
Males	124	55.1	381	39.5
Females	101	44.9	584	60.5
Male:female ratio	1.2:1		1:1.5	

χ^2 test [$\chi^2 = 18.25$, $P = 0.00001$] statistically significant

Table 2 Age group distribution of HM compared to solid tumors

Age group	Hematological malignancies (n = 225)		Solid tumors (n = 965)		<i>P</i> value
	No.	%	No.	%	
Pediatric patients (≤ 14 years)	7	3.1	9	0.9	Significant*
Adult patients (< 50 years)	112	49.8	400	41.5	
Adult patients (≥ 50 years)	106	47.1	556	57.6	
Mean age (years) (range)	45.3 ± 18.5 (2–85)		51.2 ± 15.1 (7–85)		Significant**

* Calculated by the χ^2 test [$\chi^2 = 12.51$, $P = 0.002$] statistically significant

** Calculated by the student *t* test [$t = 24.9$, $P = 0.0000$] statistically significant

When the patients were grouped as pediatric and adult patients, it was observed that the percentage of HM was higher among pediatric age group than solid tumors (3.1% vs. 0.9%). Adult patients below 50 years of age showed slightly higher percentage for HM, while adult patients at 50 years or more showed higher percentage of solid tumors (Table 2).

When comparing the 3 years of the study; the percentage of HM was higher in the year 2008 82 (20.3%), and decreased during the following years to 94 (19.3%) in 2009 and 49 (16.3%) in 2010 (Fig. 2).

As shown by the ANOVA test, the mean age of patients with HM was not significantly differing during the 3 years of the study although this Oncology Unit did not accept pediatric patients (<14 years) in the last 2 years (Fig. 3).

Most patients with HM were residents of Aden ($n = 90$), Lahj ($n = 42$) and Abyan ($n = 41$) governorates and similarly solid tumors showed the same trend, and statistically there was no significant difference in the distribution of HM and solid tumors by residence of the studied patients ($P > 0.05$) (Fig. 4).

The common HM reported in this study were NHL (57.3%) and HL (29.3%). Followed by acute leukemias (8%); acute lymphoid leukemia (ALL, 4%) and AML (4%), chronic leukemias (2.7%); chronic myeloid leukemia

Fig. 2 Percentage of HM in the 3 years of the study

Fig. 3 Mean age of patients with HM in the 3 years of the study. ANOVA test [$P = 0.728$] statistically insignificant

Fig. 4 Residence of patients with HM compared to solid tumors. χ^2 test [$\chi^2 = 16.04$, $P = 0.098$] statistically insignificant

Table 3 Type of HM managed in Al-Amal Oncology Unit during the study period

Types of HM	No.	%
Non-Hodgkin's lymphoma (NHL)	129	57.3
Hodgkin's lymphoma (HL)	66	29.3
Acute lymphoid leukemia (ALL)	9	4.0
Acute myeloid leukemia (AML)	9	4.0
Multiple myeloma (MM)	6	2.7
Chronic myeloid leukemia (CML)	5	2.2
Chronic lymphatic leukemia (CLL)	1	0.5
Total	225	100.0

(CML, 2.2%) and chronic lymphatic leukemia (CLL, 0.5%) and multiple myeloma (MM, 2.7%) (Table 3).

Discussion

HM are heterogenous group of disorders, their descriptive epidemiology as well as the identification of etiologies has been hampered by the many changes overtime in diagnostic practice and disease classification [1].

The estimated incidence before 2002, in Australia, the USA and Canada was 8–9% in men and 8% in women [1]. However, recent documents showed that HM constitutes one-fifth of the total malignancies [2, 4]. Such finding is not far from that reported in this study, where HM represented 18.9% of the total malignancies managed during the study period. This is also coinciding with the observation

of Iran (2010), where HM represented the second common malignancies in Zahedan with a frequency of 20% [5].

This study showed significant association between patient's sex and hematological versus solid tumors ($P < 0.05$). It was observed that more males affected with HM and more females affected with solid tumors. This is also reported in other studies such as the study of King Abdul-Aziz University Hospital (Saudi Arabia), they reported significant relationship between sex of patients with hematological versus solid tumors. In HM; they reported 20 males out of 27 patients, and in solid tumors they reported 32 females out of 46 patients [9].

In regard to the age of patients, the current study showed significant age relationship to HM, such as pediatric age group and adult patients below 50 years of age. This is consistent with the findings of McNally et al. in UK [10], where they described in details the age specification for each specific type of HM.

At the start of this Oncology Unit, in Aden, all patients were accepted, regardless to their age. Later on with the arrangement of pediatric oncology unit in Al-Wahda Teaching Hospital, only adult patients were accepted. In spite of this selection the mean age for HM was not differing significantly in 2008 when pediatric patients were included and in 2009 or 2010 when adult patients only were included. There is an associated slight decline in the frequency of HM when pediatric patients were not included. This is may be a sign indicating higher frequency of pediatric patients in HM more than in solid tumors in our patients, and this was obvious in Table 2, in this study, where pediatric patients represented 3.1% in HM while 0.9% in solid tumors.

HM in this study represented lymphomas more than leukemias and myelomas. Lymphomas either in general or as non-Hodgkin's and Hodgkin's represented the common types of HM in this study.

It is supposed that this is not the real situation for HM in Aden due to three main aspects. First, leukemias and mainly the chronic leukemias and myelomas are not usually presented to the out-patient clinic of Al-Amal Oncology Unit in our hospital and thus not registered, because most of them managed in private hematology clinics and only those in need for admission they were registered.

Second, a lot of HM including leukemias (acute and chronic), myelomas as well as lymphomas were not registered and missed in this study, due to the presence of multiple private hospitals in Aden that provide health insurance for those working with governmental or private productive companies. This insurance covers all the family members with availability of drugs and good nursing care that led the patients to refuse attendance and registration in the Oncology unit.

Third, most cases of acute leukemias present with acute dramatic presentation such as bleeding and/or severe infection and death may precede the establishment of accurate diagnosis from the bone marrow.

In the study of Bahammam et al. [11], in Saudi Arabia, about HM admitted to the intensive care unit (ICU), they reported the common HM in ICU as ALL (34%), AML (25%) followed by NHL (20%).

It is important here to emphasize that Al-Amal Oncology Unit is not supported by an ICU. The medical and surgical ICUs of Al-Gamhouria Modern General Hospital are not accepting emergency oncology cases, and these cases are not registered in the hospital either due to early referral to private hospitals or death during transfer from hospital to hospital searching for medical support.

This study supports the idea that lymphomas are the common HM in Aden, since it depends upon the available data of registry in Al-Amal Oncology Unit which is the only Adult Oncology Unit in Aden.

Similar to our finding was observed in the island of Sardinia [12], from 1974 to 1993, where they reported the common HM as NHL (27.6%), followed by acute leukemias (18.2%), chronic leukemias (16.9%), myelomas (11.6%) and then HL (11.2%). As well as in the year 2001 [13], in Sardinia, the common HM was NHL (31.3%), followed by chronic leukemias (23.4%), acute leukemias (13.7%), myelomas (11.6%) and then HL (7.9%).

Some European and American studies showed over representation of MM. Such as in France; the most frequent HM among French West Indies were MM (34%), followed by NHL (23%). The increased incidence of MM has been also reported among Afro-Americans in the USA [14].

The current study showed that MM is not quite common in our oncology practice in Aden, this is may be attributed to some factors such as the underdeveloped cancer registry program in Yemen with the escape of a lot cases due to improper diagnosis at the neurological, nephrological or orthopedic parts, and the low life expectancy for Yemenis compared to other populations. Taking in consideration the common age presentation of MM, which is nearly 68 years for men and 70 years for women [15]. According to data of 2010 from life expectancy charts, the life expectancy of Yemeni peoples is 63.36 years [16]. It is lower than that estimated in France (81.09 years) or the USA (78.24 years) [16]. This low life expectancy age may hamper the prevalence of myelomas among our patients.

Conclusion and Recommendation

This study concluded that HM are among the common malignancies in our patients, since it represents one-fifth of

all malignancies managed in our Oncology Unit and lymphomas are the common HM.

HM are not taking the proper serious concern during diagnosis and management, since they need special privacy, special protocols, and special handling, seriously more than solid tumors.

This study recommends the institution of separate diagnostic and management unit for HM for their prevalence and the property of management protocols in HM, aiming to achieve earlier cancer detection, better response to treatment at an earlier disease stage, and more effective treatment protocols.

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