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Distributions of major sub-types of lymphoid malignancies among adults in Mashhad, Iran

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ABSTRACT

Background: Global variations in the frequency of the major sub-types of lymphoma have been reported. However, studies on different sub-types of adult malignant lymphoma had never been conducted in Mashhad, Iran. In this paper, we aimed to identify the major sub-types of malignant lymphoma in our area and compare the distribution with other published studies. *Methods*: During a retrospective study we evaluate 391 adult patients with lymphoid malignancy from "Omid Hospital" – a cancer research center and an outpatient hematologic clinic in Mashhad – were evaluated from 2000 to 2009. Patients were reclassified using the World Health Organization (WHO) classification. *Results*: The frequency of non-Hodgkin lymphomas (NHL) was 92% ($n = 359$) and Hodgkin lymphoma (HL) was 8% ($n = 32$). The most frequent NHL sub-type using WHO classification was diffuse large B cell lymphoma (DLBCL) and the second most common NHL was chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL). The most common sub-type of HL was mixed cellularity. In this study the frequency of primary extranodal NHL in our study was 11.5%, which slightly less common than other eastern countries. *Conclusion*: Our findings add to the body of knowledge concerning geographic variations in the descriptive epidemiology of the major lymphoma sub-types. Such observations are extremely important since they potentially point to underling etiological variations.

1. Introduction

Lymphoid malignancies represent a heterogeneous group of neoplasms which have been reported to show different histological sub-types according to the geography. Lymphoid neoplasms including Hodgkin's lymphoma, non-Hodgkin lymphoma, chronic lymphocytic leukemia as well as multiple myeloma arise from the malignant transformation of normal lymphoid cells at various stages of differentiation. In comparison to western countries, some regions of Asia including Hong Kong, Japan, China, Korea and Thailand have been reported to have higher rates of aggressive lymphoma and lower rates of follicular lymphoma and Hodgkin's disease [1]. The aim of this study is to investigate the distribution of major sub-types of malignant lymphoma in adult patients in Mashhad, Iran and compare the feature of our series with those of others.

2. Patients and methods

A total of 391 cases of lymphoid neoplasm, diagnosed at "Omid Hospital" – a cancer research center in Mashhad University of Medical Science and an outpatient hematologic clinic – were enrolled in this study from 2000 to 2009. "Omid Hospital" is the biggest referral cancer center in the east of Iran (covering more than four provinces). Most patients suffering from different kinds of malignancies are referred to this center; all kind of adult lymphoma are captured. Initially, all cases were classified using the working formulation and REAL classification. Then, they were translated into the proposed nested classification using data from the inter lymph group [2]. Due to the close relationship between the disease definitions in the REAL and WHO classification, the patients were grouped together. Most cases classified by the working formulation as follicular lymphoma, diffuse large cell lymphoma and lymphoblastic lymphoma, can be reliably translated into major NHL subtypes, even without the incorporation of immunophenotype data, and small noncleaved cell lymphoma can be translated into Burkitt lymphoma based on the inter lymph group study [2]. There are some limitation in translation from the

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Table 1
Absolute number and frequency of lymphoid neoplasms sub-types in adults classified by WHO.

Lymphoma sub-type	No. cases	% of total	% of NHL	Median age	M/F
Lymphoma neoplasm, total	391				
Hodgkin lymphoma	**32**	**8**		**29.5**	**1**
NHL	**359**	**92**		**55**	**1.7**
NHL, B-cell	344	87	95.8		
Mature NHL, B-cell					
CLL/SLL/PLL	86	21.9	23.9	64	1.5
Mantle cell lymphoma	8	2	2.2	55	8
LPL/Waldenstrom	2	0.5	0.55		
Diffuse large B-cell lymphoma	136	34.7	37.8	50	1.9
Burkitt lymphoma	2	0.5	0.55		
MALT lymphoma	8	2	2.2	51	0.5
Follicular lymphoma	5	1.2	1.4	61	0.6
Hairy cell leukemia	11	2.8	3	54.6	11
Plasma cell neoplasm	43	10.9	12	62	1.4
NHL, T-cell	15	3.8	4.2		
Mycosis fungoides	3	0.7	o.8	58	2
Peripheral T cell lymphoma	7	1.7	1.9	53	1.3
Adult T cell lymphoma/leukemia	5	1.2	1.4	45	1.5
Others	43			55	2.1

Abbrevations: M = male; F = female; NHL = non-Hodgkin's lymphoma; HL = Hodgkin's lymphoma; CLL/SLL/PLL = chronic lymphocytic lymphoma/small lymphocytic lymphoma/pro-lymphocytic lymphoma; LPL = lymphoplasmacytic lymphoma; MALT = mucosal associated lymphoid tissue.
Bold numbers are amounts of major subtype of malignant neoplasm.

Table 2
Absolute number and frequency of Hodgkin's lymphoma sub-types in adults classified by WHO.

Sub-type	No cases	% of total	%of HL	Median age	M/F
Hodgkin lymphoma	**32**	**8**		**29.5**	**1**
Classic Hodgkin lymphoma	30	7.6	93.7		
Nodular sclerosis	10	2.5	31.2	23	0.8
Mixed cellularity	16	4	50	33.5	0.8
Lymphoctye-rich	3	0.7	9.3		
Lymphocyte-depleted	1	0.2	3.1		
Nodular lymphocytic predominant Hodgkin lymphoma	2	0.5	6.3		

M = male; F = female; HL = Hodgkin's lymphoma.
Bold numbers are total amounts of HL.

working formulation into the WHO classification, such as malignant lymphoma and mixed small and large cell, therefore, we placed them in the NHL "others" category. Histological and clinical data relating to age and gender were obtained from the medical records.

3. Results

In our study the frequency of non-Hodgkin's lymphoma was 92% (n = 359) and Hodgkin's lymphoma was 8% (n = 32). Based on WHO classification, diffuse large B cell lymphoma was the most common NHL representing 37.8%, SLL/CLL was the second most common, representing 23.9% of NHL. Follicular lymphoma was 1.4% of NHL. NHL was most frequently present in among middle-aged individuals and the elderly, with a median age 55 years and male predominance (M/F = 1.7) (Table 1). The most common sub-type of HL was mixed cellularity included 50% (n = 16) of HL, it was followed by nodular sclerosis, 31.2% (n = 10) of HL (Table 2). The median age for HL was 29.5; 50% of patients were aged between 15 and 30 years old and 34% were aged between 45 and 60 years. The median age of patients with mixed cellular HL was 10 years more than nodular sclerosing. The frequency of primary extranodal NHL in our study was 11.5%, which is less common than other countries. The most common original site was gastrointestinal (GI) tract. The second most common sites were Waldeyer ring and the skin equal to each other (Table 3). Based on the working formula classification, 88.8% of malignant lymphoma was NHL, and 11.5% was HL. 98% of non-Hodgkin's lymphoma was diffuse, and only 2% was follicular.

Table 3
Distribution (%) of sites of primary lesion of extranodal NHL in Mashhad, Iran.

Primary site NHL[a]	No. = 248	
	No.	(%)
Nodal	216	88.5
Extranodal	32	11.5
Gasterointestinal tract	10	31.2
Waldeyer's rings	7	25
Skin	7	18.7
Bone	3	9.3
Thyroid	1	3.1
Genitourinary tract	1	3.1
Others	2	6.2

[a] Non-Hodgkin's lymphoma.

4. Discussion

The relative frequency of some histological subtypes of lymphoma are different between western and eastern countries [2,3], however, diffuse large B cell lymphoma is the most common NHL representing approximately one third of all non-Hodgkin's lymphomas worldwide [4,5]. DLBCL is one type of non-Hodgkin's lymphoma in which the relative incidence does not seem to vary geographically [6]. In almost all parts of the world this is the most frequent occurring non-Hodgkin's lymphoma. In some studies like this, there was a higher rate of aggressive NHL, especially diffuse large B cell lymphoma which occurs more frequently than others. It may relate to the etiology of diffuse large B cell lymphoma such as immune deficient conditions and their treatments which may cause aggressive non-Hodgkin's lymphoma [7]. As well as, genetic