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Original Article

Histological Subtypes of Non-Hodgkin's Lymphoma in Different Age and Sex Groups

A Akhter[1], MR Rahman[2], N Majid[3], S Shermin[4], MS Saleheen[5], RC Rajib[6], SMA Ullah[7], N Haque[8], AK Akond[9]

Abstract:

Non Hodgkin's lymphomas (NHL) constitute a heterogeneous group of neoplasm of the lymphoid system. There are many histological subtype of NHL based on WHO classification of haemotopoietic and lymphoid neoplasm. This cross-sectional study was carried out in the department of Pathology, Dhaka Medical College, Dhaka from January 2009 to December 2010 to observe the different subtypes of NHL in different age and sex groups. A total of 50 microscopically diagnosed case of NHL irrespective of age and sex were included in the study. The diagnostic morphologic criteria of each lymphoma subcategory were compiled and diagnoses were made. Mean age of the study subjects were 42.0±19.7 years with range 3-75 years and male female ratio was 1.8:1. Maximum number of histolgic subtypes belonged to diffuse large B-cell lymphoma (DLBCL) and male was predominant in all histological subtypes, except peripheral T-cell lymphoma (PTCL). The most childhood patients belonged to lymphoblastic lymphoma. Regarding cell lineage B-cell NHL case was more common than T-cell NHL (88% vs. 12%), but high grade pattern was more predominant in T-cell type (83.3% vs. 65.9%).

Keywords: Non Hodgkin's lymphoma (NHL).

1. Dr. Afia Akhter, MD Student, Dept. of Pathology, Dhaka Medical College, Dhaka.
2. Dr. Md. Rezwanur Rahman, MD (Cl. Biochemistry), Assoc. Professor, Dept. of Biochemistry, Delta Medical College, Dhaka.
3. Dr. Nadira Majid, MD (Pathology) Asst. Professor, Dept. of Pathology, Delta Medical College, Dhaka.
4. Dr. Shahana Shermin, SMO, Dept. of Gynae & Obs. BIRDEM, Dhaka.
5. Dr. Mohammad Serajus Saleheen, MS (Orthopaedics) Clinical Assistant, NITOR, Dhaka.
6. Dr. Rubyath Chowdhury Rajib, MD Student, Dept. of Pathology, Dhaka Medical College, Dhaka.
7. Dr. Shah Muhammad Aman Ullah, MS (Orthopaedics) Medical Officer, DMCH, Dhaka.
8. Dr. Naila Haque, Asst. Professor, Dept. of Pathology, Dhaka Medical College, Dhaka.
9. Dr. Abdul Khaleque Akond, Consultant, Dept. of Histopathology, BIHS, Dhaka.

Corresponding Author:

Dr. Afia Akhter, MD Student, Dept. of Pathology
Dhaka Medical College, Dhaka

Introduction:

Lymphomas are malignant disorders of cells residing in lymphoid tissues and are classified into two main types: Hodgkin's disease and non Hodgkin's lymphoma.[1] Non Hodgkin's lymphomas (NHL) are a heterogeneous group of lymphoproliferative malignancies.[2]

With an estimated 54900 new cases projected for the year 2000 in the United States, Non Hodgkin's lymphoma is now the fifth most common malignant neoplasm in USA, after cancers of the breast, prostate, lung and colon and eighth most common cancer in UK.[3,4] According to the cancer registry of NICRH (National Institute of Cancer Research and Hospital) of 2005, it is the fourth common malignancy of Bangladesh after cancers of lung, cervix and breast.[5]

NHL commonly affects the entire lymphatic system including spleen and thymus. Of the all NHL 25% - 40% occurs in extranodal site.[6] The gastrointestinal tract is the most common extranodal site for NHL and the other sites include testis, bones, eyes, brain, heart, white blood cells, skin and kidneys, etc.[7]

The foremost means of diagnosis of NHL is hematoxylin and eosin based morphological examination though immunohistochemistry is capable to differentiate the lymphocyte into T and B cell.[8]

The first attempt to classify NHL according to B-cell and T-cell type was made in 1970, and subsequently two important classifications emerged named, Lukes- Collins and Kiel classification. Both classifications were based on determination of the immunologic origin of NHL by histological features. The two classifications gave much importance to cellular details. In updated Kiel classification, in addition grading of B-cell and T-cell lymphoma has been added.[9] Considerable progress has occurred in the classification of NHL during the past 15 years. Rappaport system, which was introduced 50 years ago, was based on morphologic features and categorized NHL into nodular and diffuse type.[10] The use of multiple system of classification throughout the world posed difficulties for therapeutic research until 1982 when the Working Formulation (WF) was developed as a compromise system In the Working Formulation the NHL has been subcategorized into low grade, intermediate grade and high grade.[11] In 1990, with the advances in understanding the biology of the immune system a new system name Revised European American Lymphoma classification (REAL) emerged where immunophenotyping of lymphocyte was done to differentiate B and T-cell lineage.[10] This eventually formed the base for the new WHO (World Health Organization) classification of haemopoietic and lymphoid neoplasm which can also be correlated with the earlier practiced Working Formulation.[12]

Our aim was to observe the occurrence of different subtypes of NHL among the different age and sex group in a small Bangladeshi population.

Materials and Methods:

This cross-sectional study was carried out in the department of Pathology, Dhaka Medical College, Dhaka from January 2009 to December 2010 to observe the different subtypes of NHL in different age and sex groups. A total of 50 microscopically diagnosed case of NHL irrespective of age and sex were included in the study. The diagnostic morphologic criteria of each lymphoma subcategory were compiled and diagnosis were made.[10,13-17] Data were collected from the study subjects by a predefined data collection sheet after taking written informed consent. Data were processed and analyzed using SPSS (Statistical Package for Social Science). Descriptive statistics like frequency and its corresponding percentage were used to analyze the data.

Results:

A total number of 50 histologically diagnosed cases of non Hodgkin's lymphoma were included in the study.

Table I shows that highest number of non Hodgkin's lymphoma patients among male were in the 6th decade and among female were in the 5th and 7th decade. The age range of the patients was 3-75 years and the mean age was 42.0 19.7 years. The male female ratio was 1.8:1.

Table I: Age and Sex distribution of the study subjects (N=50)

Age group (years)	Number of study subjects (%)	Sex	
		Male (%) (n=32)	Female (%) (n=18)
0 - 9	5 (10.0)	4 (12.5)	1(5.6)
10 – 19	4 (8.0)	2 (6.3)	2(11.1)
20 – 29	6 (12.0)	4 (12.5)	2(11.1)
30 – 39	6 (12.0)	4 (12.5)	2(11.1)
40 – 49	10 (20.0)	6 (18.8)	4(22.2)
50 – 59	11 (22.0)	8 (25.0)	3 (16.7)
≥ 60	8 (16.0)	4 (12.5)	4(22.2)

Table II shows sex distribution of the study subjects according to histological subtype. Maximum number belonged to DLBCL and male was predominant in all histological subtypes, except PTCL.

Table II: Sex distribution of the study subjects according to histological subtype (N=50)

Histological subtypes	Number of subjects (%)	Male (%)	Female (%)
DLBCL	17 (34.0)	10 (58.8)	7 (41.2)
CLL	12 (24.0)	10 (83.3)	2 (16.7)
FL	2 (4.0)	2 (100.0)	0 (0)
LBL	7 (14.0)	4 (57.1)	3 (42.9)
IMB	2 (4.0)	1 (50.0)	1 (50.0)
LPC	2 (4.0)	1 (50.0)	1(50.0)
Burkitt lymphoma	4 (8.0)	4 (100.0)	0(0)
PTCL	4 (8.0)	0 (0)	4(100.0)

DLBCL-Diffuse large B-cell lymphoma
CLL-Chronic lymphocytic leukemia
FL-Follicular lymphoma
LBL-Lymphoblastic lymphoma
LMB-Immunoblastic lymphoma
LPC-Lymphoplasmacytic lymphoma
PTCL-Peripheral T-cell lymphoma

Table III shows that DLBCL was predominant of all B-cell NHL. PTCL was predominant of all T-cell NHL. Most B cell NHL patients belonged to 6th and 7th decade and T cell NHL patients belonged to 6th decade. Most childhood patients (0-18 years) belonged to lymphoblastic lymphoma (LB).

Table III: Distribution of the study subjects according to histological subtype (N=50)

Histo logical		Age distribution						
Dignosis		0 – 18	19 – 29	30 – 39	40 – 49	50 – 59	>60	Frequency (%)
B	**High Grade**							
	LB	4	0	0	1	0	1	6 (13.63)
C	IMB	0	1	0	0	0	1	2 (4.45)
E	DLBCL	1	3	1	5	3	4	17 (38.63)
L	Burkit	3	1	0	0	0	0	4 (9.09)
L	**Low Grade**							
	CLL	0	1	1	1	6	2	11 (25.0)
	LPC	0	0	0	0	0	2	2 (4.54)
	FL	0	0	0	1	1	0	2 (4.54)
Total		**8**	**6**	**2**	**8**	**10**	**10**	**44**
T	**High Grade**							
C	LB	1	0	0	0	0	0	1 (16.67)
E	PTCL	0	0	0	2	2	0	4 (66.66)
L	**Low Grade**							
L	CLL	0	0	0	0	1	0	1 (16.67)
Total		**1**	**0**	**0**	**2**	**3**	**0**	**6**

Table IV: Distribution of the study patients according to grade of lymphoma by histological diagnosis (n=50)

Grade of lymphoma	T cell (n=6)	B cell (n=44)
Low Grade		
CLL	1(16.7 %)	11 (25.0 %)
LPL	0(0%)	2(4.5 %)
FL	0(0%)	2(4.5 %)
High Grade		
LB	1(16.7 %)	6(13.63)
IMB	0(0%)	2(4.5)
DLBCL	0(0%)	17 (38.63)
PTCL	4(66.7)	0(0%)
Burkitt	0(0%)	4(9.1)

Table IV shows that T-cell lymphoma more into high grade with compared to B-cell lymphoma, which were 83.4% and 65.9% in T-cell lymphoma and B-cell lymphoma respectively. However, T-cell lymphoma was 1(16.7%) and B-cell lymphoma was 15(34.09%) in low grade.

Discussion:

Out of 50 studied subjects 12% (6 cases) were T-cell lymphoma and 88% (44 cases) were B-cell lymphoma, which is very close to the study done by Skarin, Dorfman.[10] In their study they found of all NHL 15% were T-cell and 85% were of B-cell origin.

The result of the 50 cases of NHL in the present study demonstrated that the highest incidence of NHL is in the 6th decade with most male patients in the 6th decade and female patients in the 5th and 7th decade. It also showed that, of all B-cell lymphoma highest number of patients are in the 6th and 7th decade and of T-cell lymphoma in the 6th decade. Yu, Chen and O'Connel[18] with an observation period of 1985 to 2004 reported highest incidence in the 7th decade, which was higher in respect to our study. A similar study was done with an observation period of 1991 to 2000 in Austria by Mitterlechner, Fiegl and Muhlbock and they found both in case of male and female, it was in the 7th decade.[19]

The possible explanation for this discordance is that the previous two were population based studies, where sample size was larger than the present one, which is a hospital based study. Moreover the people of Bangladesh has a life expectancy much lower than that observed by the previous investigators and this was reflected few number of patient in 7th decade.[5]

The ratio of male to female in the present study was 1.8:1. It also showed male to female ratio in case of B-cell lymphoma was 2.14:1 and in case of T-cell lymphoma was 1:2.

Several similar studies had been done previously. Groves et al.[3] in United States, with a observation period of 1978 to 1995 showed male to female ratio was1.7:1 that is very close to our study and reported incidence rate was higher in male than female. Another study was done in Austria, where the ratio was 1.52:1, that study also revealed NHL affected men more frequently than women.[19] In our study also male were affected more than female except in case of T-cell lymphoma where female were affected more. The possible explanation is due to small sample size so the sex distribution of T-cell lymphoma might not be the reflection of the actual scenario.

All subtypes of NHL in the present study showed slight male predominance, which correlates with different epidemiological statistical data of NHL.[20] However difference was found in case of follicular lymphoma, which is epidemiologically a female predominant NHL, but in our study it also showed male predominance. The cause behind this discrepancy again may be due to small sample size.

In the present study, DLBCL was the highest (34%) among all NHL. It was also most frequent (38.63%) of all B-cell lymphoma and the second highest was CLL (25%). Yu, Chen and O'Connel[18], in Australia with an observation period of 1985 to 2004 reported a similar study where highest frequency was found in DLBCL and the next highest frequency was in CLL.

Though the percentage of DLBCL coincide with the previous reports of United States and Western Europe, but that of follicular lymphoma is much lower (4.54%) of all B-cell lymphoma in this study. Similar findings have been reported in South America, Eastern Europe, Africa and Asia where follicular lymphoma is uncommon.[20]

In the present study of the total B-cell lymphoma 29 were high grade. DLBCL, Lymphoblastic lymphoma, Burkitt's lyhmphoma and Immunoblastic lymphoma all fall in this category. No intermediate grade was included in the study. Fifteen cases belonged to low grade- includes Follicular Lymphoma, Lymphoplasmacytic lymphoma and CLL. The frequency of T-cell lymphoma in the present series was 12%. A number of similar series about frequency of T-cell lymphoma had been reported previously. Piccaluga et al.[21] reported in Italy and USA a frequency of 12% which was similar with the findings of the present study. A similar observation was found in USA by Vose, Neumann and Midred[12] and that was 10% which was quite close to our study.

In Uganda Tumwine et al.[22] found 7.9% of NHL patients suffering from T-cell lymphoma, which is lower than our study. In Korea T-cell lymphoma account for 11% of NHL Choi et al.[23] which is very similar to our study.

In our neighboring country India Sathiya and Muthuchelian[24] found 10% of NHL patients suffering from T-cell lymphoma. In Bangladesh one similar study had done previously by Haque[25] and that was 21.36% which was higher than our study. He used non specific immuno markers UCHL /CD45 and MT-1 / CD43 to differentiate T-cell lymphoma in adjunct to histopathology which might be the possible explanation of different result.

In our study the proportion of high grade lymphoma in T-cell is higher than B-cell, which correlates with the two previous studies. In Tehran (1987) a series of studies was done and reported 8.8% of NHL was T-cell type and most of the T-cell lymphoma was high grade lymphoma.[26] In Korea (1990) Yang, Jung, Choi reported among all diagnosed T-cell NHL, high grade lymphoma was predominant.[27]

The study revealed 12% of the cases were T-cell lymphoma and 88% were B-cell lymphoma. The highest incidence of NHL is in the 6th decade with most male patients in the 6th decade and female patients in the 5th and 7th decade. The ratio of male to female in the present study was 1.8:1. All subtypes of NHL in the present study showed slight male predominance. In the present study, DLBCL was the highest (34%) among all NHL. It was also most frequent (38.63%) of all B-cell lymphoma and the second highest was CLL (25%). In the present study of the total B-cell lymphoma 29 were high grade.

Conclusion:

This study of a small Bangladeshi population revealed male predominance of NHL in the 6th decade and that of female in the 5th and 7th decade. Male were affected more than female with the ratio of 1.8:1. Though B-cell NHL case was more common than T-cell NHL (88% vs. 12%), but high grade pattern was more predominant in T-cell type (83.4% vs. 65.9%).

Histologically DLBCL was the predominant B-cell NHL with the males affected more (58.8%) whereas PTCL was the predominant T-cell NHL and all the cases were female.

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