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Research Article

Histological pattern of non-Hodgkin lymphoma of Iraqi patients in Al-Amal hospital

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Abstract

Throughout the world, non-Hodgkin lymphoma (NHL) is among the most prevalent hematologic cancers. From a clinical standpoint, NHLs are classified as either aggressive (high-grade) or indolent (low-grade) tumours. Indolent tumours frequently show no symptoms at all and develop and spread extremely slowly. Depending on the location in which the lymphomatous process exists, aggressive tumours typically advance very quickly, and the majority of patients present with adenopathy along with a variety of other symptoms. The main objectives of this study is to identify the histological pattern of non-Hodgkin lymphoma (NHL) among Iraqi patients at Al-Amal Hospital and determine the most prevalent kind of NHL in patients from Iraq. A descriptive design was used in this study, the present study was carried out at Al-Amal National Hospital for Oncology for the period from 1 October\ 2022 to 1st of May \ 2023. The data for this study was obtained from 40 Iraqi patients with different types of lymphoma (NHL) who attended Al-Amal hospitals during the era 2010-2023 For the purpose of periodic treatment including chemotherapy radiotherapy and other types of treatment. The results of this study showed a higher percentage of female frequency than males, furthermore, there was a significant correlation between socioeconomic status and the histological pattern types of lymphoma, and it is worth mentioning that the findings showed that the most common NHL was diffuse large B- cell lymphomas and the follicular lymphoma in the second place. The recent study concluded that the diffuse large B-cell lymphomas were the most common sub-types of NHL placed in the first level and follicular

lymphoma comes in the second highest level, moreover, there is a significant correlation between the socio-economic status and the histological pattern types of lymphoma.

Keywords: DLBCL, Follicular lymphoma, Burkitt lymphoma, Mantel cell lymphoma**,** Marginal zone lymphoma

Introduction

Tumors of lymphatic tissue are known as lymphomas. Recent research has showed that the incidence of lymphomas has grown at a rate of 4% annually over the past two decades (Susan et al., 1982). Non-Hodgkin lymphomas (NHL) that develop outside of the lymph node make up about one-third of all NHL cases; these cases are sometimes referred to as extra-nodal lymphomas (EL) and can affect any organ (Zeggai et al., 2016).The most typical location of EL manifestation, however, is the gastrointestinal (GI) tract (Ansell, 2015).

One of two types of lymphomas are non-Hodgkin lymphomas (NHLs). Malignant lymphoid neoplasms with a variety of biological and clinical characteristics are known as non-Hodgkin lymphomas. Patients usually show up with a chronic, painless lymphadenopathy; however, some may show up with constitutional symptoms or with organs other than the hematopoietic and lymphoid systems involved. Treatment selection is based on a precise diagnosis, meticulous staging of the disease, and identification of unfavorable prognostic markers. Initial treatment for patients usually consists of chemo-immunotherapy; if the patient has an early-stage disease, radiation therapy may be given. Although the majority of patients react favorably to treatment, relapses are common and further therapies, such as stem cell transplants, are sometimes required. Because many subtypes of lymphoma remain incurable with current management strategies, clinical trials are in progress to identify novel therapies with promising activity in this disease (Leukemia and lymphoma society fighting blood cancers, revised, 2013).

On the other hand (Katarzyna and Sophie, 2015) pointed out (NHL) is the name given to a variety of blood cancers that all have one thing in common: they are solid tumors of lymphoid tissues that develop as a result of damage to the DNA of lymphocyte parent cells. The DNA damage is not inherited; rather, it is acquired (occurs after birth). One lymphocyte experiences a malignant transformation due to changed DNA. The lymphocyte grows out of control and excessively as a result of this change. These lymphocytes and the newly generated cells have a higher survival rate than usual. Tumor masses in the lymph nodes and other parts of the body are the result of the accumulation of such cells. The lymphatic tissue of organs like the stomach,

intestines, or skin is where NHL typically originates. NHL can occasionally include both blood and marrow, the spongy tissue found in the hollow center of bones where blood cells are formed. The body can have one or more locations where lymphoma cells can form ((Katarzyna and Sophie, 2019).

Over 70 entities make up NHLs, and each of these entities has a unique biology, manifestations, and management needs (Huang, et al., 2007).

One of the two categories of lymphomas (solid tumors of lymphoid tissues) is Non-Hodgkin lymphoma (NHL). With more than 70 definite or tentative entities recognized in the World Health Organization's (WHO) current classification, NHLs are a sizable and extremely varied category of malignancies. With the first of these types (B-NHLs) accounting for up to 90% of all NHL cases, they can come from mature B cells (B-NHLs), T cells, or NK cells (T/NK-NHLs). Diffuse large B-cell lymphoma (DLBCL), followed by follicular lymphoma (FL), is the most prevalent kind of NHL. When combined, these two NHL subtypes represent 50%–60% of all NHL cases (Huang, et al., 2007).

Non-Hodgkin lymphoma (NHL) incidence is rising more quickly globally than any other non-cutaneous tumor (National Cancer Registry) NHL incidence rates vary up to five times across the globe, with Asia reporting the lowest rates; Leo et al. (2022) reported that the United States and Europe reporting the highest rates. On the other hand (Nimmagadda et al.,2013) reported that the seventh most prevalent malignancy among adults in the US is non-Hodgkin lymphoma (NHL).

Additionally, there are regional variations in the prevalence of different NHL subtypes (Nimmagadda et al.,2013) .

The main diagnostic criteria are if lymph nodes are involved in a nodular (follicular) pattern and the cytological characteristics of the malignant cells. (Lukes and Collins , 1974) Have put out an alternative classification that emphasizes a cell's outward appearance as a sign of where it came from. With radiotherapy, single agent chemotherapy, or combination chemotherapy, patients with non-Hodgkin's lymphoma that has a nodular histologic pattern and a small cleaved cell type in

(Lukes and Collins , 1974) (nodular poorly differentiated lymphoma) experience prolonged survival. However, the majority of patients will experience nodular lymphoma recurrence after successful therapy or show only partial responses to treatment.(Hoppe et al, 1981, Young et al., 1977, Jones et al., 1972) Contrarily, when treated with radiotherapy or single agent chemotherapy, the majority of patients with lymphomas that have a diffuse distribution and are made up of big undifferentiated cells, often known as "histiocytic" cells, have an aggressive clinical course with a median survival of 3-6 mo.8 Patients with diffuse large cell lymphomas, however, respond quite well to treatment in combination. With vigorous pharmacological therapy, at least 40% of these individuals experience prolonged disease-free survival. (DeVita et al., 1975) Contrary to popular belief, vigorous chemotherapy may be effective in curing patients with diffuse, "poor prognosis" lymphomas while ineffective chemotherapy is ineffective in treating patients with indolent, "good prognosis" lymphomas .

Based on autopsy data, Rappaport hypothesized in 1956 that nodular lymphomas frequently develop to diffuse forms with the same cellular makeup. Furthermore, according to (Rappaport and Winter, 1956) nodular lymphomas can change from having a nodular histologic pattern with small cleaved cells to having a diffuse mixed or big cell histologic type, albeit at varied rates of speed.

NHL categories and subtypes:

Leukemia and lymphoma society fighting blood cancers, (2013)Reported that Lymphoma is classified in a complex way that has changed throughout time. According to the kind of lymphocytes affected (B cells or T cells) and how quickly the cancer is spreading (aggressive or indolent), NHL subtypes are categorized. Beyond those that are mentioned in this article, NHL has other subtypes. Selected lymphoid malignancies according to the most recent WHO classification are listed below. Small lymphocytic lymphoma (SLL) and chronic lymphocytic leukemia (CLL), which are two variations of the same illness, are among them.

❖ Subtypes of aggressive b-cell NHL include the following :

- ✓ Diffuse large B-cell lymphoma (DLBCL), Burkitt lymphoma, and primary mediastinal B-cell lymphoma
- ✓ Double-hit lymphoma (DHL), also referred to as high-grade B-cell lymphoma

✓ Mantle cell lymphoma (MCL), which is occasionally categorized as indolent

❖ The following subtypes of aggressive t-cell NHL include the following:

✓ Peripheral T-cell lymphoma (PTCL), Anaplastic Large Cell Lymphoma (ALCL), and others .

✓ Adult T-cell leukemia/lymphoma (ATLL), Angioimmunoblastic T-cell lymphoma (AITL), and

❖ The following subtypes of indolent b-cell NHL include the following:

✓ follicular lymphoma (FL),

✓ marginal zone lymphoma (MZL),

✓ lymphoplasmacytic lymphoma/ Waldenstrom macroglobulinemia (WM), chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL),

✓ lymphoplasmacytic lymphoma.

❖ The following subtypes of indolent t-cell NHL are included:

✓ Cutaneous T-cell lymphoma (CTCL), which includes mycosis fungoides (MF).

NHLs are divided clinically into slow-growing (low-grade) and fast-growing (high-grade) tumors. Indolent tumors often develop and advance very slowly and frequently show no symptoms. According to Leukemia and lymphoma society fighting blood cancers, (2013) the majority of patients with aggressive tumors appear with adenopathy and a variety of symptoms depending on where the lymphomatous process is located.

Materials & methods

A descriptive design were used in this study, the data collection was ranged during the era 2010-2023.

Setting of the study

The present study was carried out at Al-Amal National Hospital for Oncology.

Data collection

The data for this study was obtained from 40 Iraqi patients with different types of lymphoma (NHL) that attending to Al-Amal hospitals during the era 2010-2023 For the purpose of periodic treatment including chemotherapy and radiotherapy and other types of treatment.

Ethical Considerations

The researcher of this study received the first permission to accomplish the study from the Ethical Committee of the dentistry college of Al-Bayan university.

The Instrument Construction

According to the hospital files of patients and because of the lack of data in the hospital a questionnaire were constructed based on the contents of hospital files of patients includes 2 parts: The first part of the questionnaire sheet includes (6) item relative to the demographic data including Gender, age, address , occupation , socio-economic status and marital status. Moreover the 2nd part of the questionnaire sheet includes the differential histological pattern diagnosis of the patients with NHL include , rate of growth , diffuse large B-cell lymphomas(DLBCLs), follicular lymphoma, Burkitt lymphoma, mantel cell lymphoma, marginal zone lymphoma and Lympho-plasmacytic lymphoma.

Data Collection Method

The data were collected from (40) patients for the period from 1 of October\ 2022 to 1st of May \ 2023, by using the study questionnaire (checklist).

Statistical Analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences) version 23.0 including both descriptive and inferential statistics.

Results

The finding of the data analysis systematically Shown in tables and their correspondence with the objectives of the study as shown below:

Variable	Groups	Study group	
		Freq.	%
Age/ years	Less than 20	7	17.5
	20-30	6	15.0
	Above 30	27	67.5
	Total	40	100.0
Gender	Male	19	47.5
	Female	21	52.5
	Total	40	100.0
Socio- Economical status	High	13	32.5
	Moderate	22	55.0
	low	5	12.5
	Total	40	100.0
Address	Baghdad	20	50.0
	Other city	20	50.0
	Total	40	100.0
Marital Status	Single	14	35.0
	Married	26	65.0
	Total	40	100.0

Table 1. Distribution of the Study Samples according to the demographical Data.

(Table 1) showed that the group of the study represents about 17.5 % in range of age less than 20 years while 15 % represents 20-30 years , moreover the percentage of the group of the study above 30 years was 67.5 %. In addition the table (1) also showed that the male gender

represents about 47.5 % while females 52.5 %. Furthermore the socio-economical status in high level showed the percentage about 32.5 % while about 55% & 12.5 % for moderate and low level respectively. Moreover the study group was distributed in capital city about 50 % and other cities also about 50%. According to the data collected for this study only 35% was married while about 65% was single (not married).

Variable	**Groups**	**Study group**	
		Freq.	**%**
Histological type	Focal	32	80.0
	Diffuse	8	20.0
	Total	40	100.0
Rate of growth	Slow	32	80.0
	Aggressive	6	15.0
	Highly aggressive	2	5.0
	Total	40	100.0
DLBCL	Present	26	65.0
	Absent	14	35.0
	Total	40	100.0
Follicular lymphoma	Present	5	12.5
	Absent	35	87.5
	Total	40	100.0
Burkitt lymphoma	Present	1	2.5
	Absent	39	97.5
	Total	40	100.0
Mantel cell lymphoma	Present	2	5.0
	Absent	38	95.0
	Total	40	100.0

Marginal zone lymphoma	Present	10	25.0
	Absent	30	75.0
	Total	40	100.0
Lympho plasmacystic lymphoma	Present	2	5.0
	Absent	38	95.0
	Total	40	100.0

Table 2. Distribution of the Study Samples according to the differential Histological Pattern diagnosis

DLBCL: The diffuse large B-cell lymphomas are characterized by a diffuse proliferation of large cells with a high mitotic rate and frequent mitotic figures present.

As we can see the (Table 2) showed that the study samples in histological types appeared to be focal about 80% while only 20% appeared to be diffused. Moreover the rate of growth of tumors seen as slow in percentage of 80% in their growth, in addition the rate of growth seen about 15% aggressive and only 5% highly aggressive. According to the data were collected for this study the differential type of histological pattern for non-Hodgkin lymphoma showed that the highest frequency seen in DLBCL that represents about 65% and about 25% seen in Marginal zone lymphoma, while about 12.5% in Follicular lymphoma**.** In addition the percentage of the study group was 5% in both Mantel cell lymphoma and Lympho-plasmacystic lymphoma, and finally the lowest percentage found in Burkitt lymphoma that represented about only 2.5% from the study group.

No.	**Variables** / **Histological pattern type**	**X^2***	**df***	**P. value ≤0.05**	**Significance**
1	**Age**	8.999	8	0.342	N. S
2	**Gender**	4.518	4	0.340	N. S

3	**Socio- Economic status**	15.242	8	0.05	S
4	**Address**	2.490	4	0.646	N. S
5	**Marital status**	2.428	8	0.965	N. S

Table 3. The relationships between the demographical data and the histological patterns of Non-Hodgkin lymphoma

(X^2*= Chi Square df* = degree of freedom Sig*= significance)

According to the data collected for this study the (Table 3) showed that the significant variable was only the socio-economical status that interact with the histological pattern types and the other variables showed a non -significant relationship.

Discussion

Al-Naeeb et al, (2018) described that NHL (Non-Hodgkin Lymphomas) Considered as a heterogenous group of lymphoproliferative malignancies that are much less predictable than Hodgkin's lymphomas and have a far greater predilection to disseminate to extra-nodal locations. Nearly 25% of NHL cases arise in extra-nodal locations and most of them are seen involving both nodal and extra-nodal sites.

Results of the present study showed that the about 17.5 % of the study group was in range of age less than 20 years while 15 % represents 20-30 years , moreover the percentage of the group of the study above 30 years was 67.5 %. However 47.5% represents male of the group of the study while females 52.5 %, so this findings that showing the frequency of females in the group of the study was higher than males could reflect to the hormonal changes that every female undergoes or having an impaired immune system and may due to the circumstances that they going through during their life time especially in Iraq (The researcher), which this findings conflict with (Chung et al., 2016) that indicate to that NHL incidence among males is significantly higher than in females. Furthermore most common subtypes of Non-Hodgkin lymphoma was the diffuse large B-cells lymphoma that appeared 65% and follicular lymphomas in a percentage of 25%, which this findings agreed with (Singh et al., 2020 & Abreu et al., 2007), in addition to that (Horesh et al., 2014) also agree with this finding which pointed out that DLBCLs is more common in older patients with a median age of diagnosis of 70 years, and the follicular lymphoma comes in the second highest level. Furthermore as described in the results section the socio- economical status has a significant relationship on a P. value ≤ 0.05 with the histological pattern type of NHL, which that may indicate to the life style that they have depending on such as (healthy food, habits, mode of living, doing exercise, attitude, differential health-seeking behavior, access to care, … etc) (the researcher) and this findings also agreed with (Kolokotronis et al.,2005) that suggested a persistent positive relationship existed between socioeconomic status (SES) and health status, with high SES correlating with better survival outcome in lymphoma, including Hodgkin and non-Hodgkin types.

Limitations

It should be noted that in this study the researcher had restricted and found only this number of group of the study due to the lack and missing of the hospital files of patients in Al-Amal hospital.

Conclusions

The recent study concluded that the diffuse large B-cell lymphomas was the most common sub-types of NHL which placed in the first level and follicular lymphoma comes in the second highest level , moreover there is a significant correlation between the socio-economic status and the histological pattern types of lymphoma.

References

Al-Naeeb, A.B., Ajithkumar, T., Behan, S., Hodson, D.J., (2018). Non-Hodgkin lymphoma. Bmj. 2018 , 362.

Ansell, S.M., (2015). Non-Hodgkin Lymphoma: Diagnosis and Treatment. Mayo Clin Proc. 2015 (90),8, 1152-63.

Chung, L.H., Chih, Y. O., Hung, Chih, L., Yi-Ting, C., Ching-C, L., Szu-Chin, L., Yu-Chieh, S., (2016). High combined individual and neighborhood socioeconomic status correlated with better survival of patients with lymphoma in post-rituximab era despite universal health coverage, Journal of Cancer Research and Practice, 2016(3),4, 118-123.

Devita, J.V., Canellos, G.P., Chabner, B.A., Schein, P., Hubbard, S.P., Young, R.C., (1975). Advanced diffuse histiocytic lymphoma (reticulum cell sarcoma) a potentially curable disease: results of a study employing combination therapy. Lancet. 1975(1), 248-50.

Hoppe, R.T., Kushlan, P., Kaplan, H.S., Rosenberg, S.A., Brown, B.W., (1981).The treatment of advanced stage favorable histology non-Hodgkin's lymphoma: a preliminary report of a randomized trial comparing single agent chemotherapy, combination chemotherapy, and whole body irradiation. Blood. 1981(58),3, 592-8.

Horesh, N., Horowitz, N.A., (2014). Does gender matter in non-hodgkin lymphoma? Differences in epidemiology, clinical behavior, and therapy. Rambam Maimonides Med J. 2014(5),4.

Huang, S.Y., Yao, M., Tang, J.L., Lee, W.C,. Tsay,W., Cheng, A.L., Wang, C.H., Chen,Y.C., Shen, M.C., Tien, H.F., (2021). Epidemiology of multiple myeloma in Taiwan: increasing incidence for the past 25 years and higher prevalence of extramedullary myeloma in patients younger than 55 years. Cancer: Interdisciplinary International Journal of the American Cancer Society. 2021(110),4, 896-905.

Jones, S.E., Rosenberg, S.A., Kaplan, H.S., Kadin, M.E., Dorfman, R.F., (1972). Non-Hodgkin's lymphomas. II. Single agent chemotherapy. Cancer. 1972 (30),1, 31-8.

Katarzyna, S., Sophie, P., (2019). Encyclopedia of Cancer (Third Edition) , (2019),44-47, Non-Hodgkin Lymphoma: Diagnosis and Treatment.

Kolokotronis, A., Konstantinou, N., Christakis, I., Papadimitriou, P., Matiakis, A., Zaraboukas, T., Antoniades, D., (2005). Localized B-cell non-Hodgkin's lymphoma of oral cavity and maxillofacial region: a clinical study. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology.2005(99),3,303-10.

Leo, I. G., Robert, H.L., Kristie, A.B., John, A.W., Jennifer, E., A., Jonathon, C., Alex, H., Shana, J., Manali, K., Peter, M., Weill, A.M., Neha,M.S., Louis,P.P., (2022).understanding lymphoma series.

Leukemia and lymphoma society fighting blood cancers, revised 2013.

Lukes, R.J., Collins, R.D.,(1974). Immunologic characterization of human malignant lymphomas Cancer,1488-1503.

National Cancer Registry. Annual Report of Taiwan Cancer Registry.

Nimmagadda, R.B., Digumarti, R., Nair, R., Bhurani, D., Raina, V., Aggarwal, S., Patil,S., Gogoi, P.K., Sundaram, S., Goswami, C., Apte, S., Chakravarthy, S., Pathak, A., (2013). Histopathological pattern of lymphomas and clinical presentation and outcomes of diffuse large B cell lymphoma: A multicenter registry based study from India. Indian J Med Paediatr. Oncol.2013(34),4 ,299-304.

Rappaport, H., Winter,W., Hicks, E.B., (1956). Follicular lymphoma. A re-evaluation of its position in the scheme of malignant lymphoma based on a survey of 253 cases Cancer, 1956(9), 792-821.

Rappaport, H.,, (1966).Tumors of the hematopoietic system Atlas of Tumor Pathology, Section 3, Fascicle 8, Armed Forces Institute of Pathology, Washington, DC.

Rodriguez, A,D., Bordoni, A., Zucca, E., (2007). Epidemiology of hematological malignancies. *AnnOncol*.

Schein, P.S., Devita, J.V., Hubbard, S., Chabner, B., Canellos, G., Berard, C., Young, R., (1976). Bleomycin, adriamycin, cyclophosphamide, vincristine, and prednisone (BACOP) combination chemotherapy in the treatment of advanced diffuse histiocytic lymphoma. Annals of Internal Medicine.1976 (85),4, 417-22.

Singh, R. S., Shabana, N., Bhupender, S., Rajguru, J., Prasad, P., Pankaj, B., Parihar, A. S., Sharma, U.,(2020). Non-Hodgkin's lymphoma: A review. Journal of Family Medicine and Primary Care, 2020 (9),4, 1834-1840.

Susan, M. H., Bruce, A.C., Vincent,T., DeVita, R. S., Costan W. B., Roy B. J., Julian, A.G., George P. C., Kent, C.O., Robert, C.Y., (1982). Histologic Progression in Non-Hodgkin's Lymphoma Blood, 1982 (59), 2, 258-264.

Young, R.C., Johnson, R.E., Canellos, G.P., Chabner, B.A., Brereton, H.D., Berard, C.W., Devita,V.T.,(1977).Advanced lymphocytic lymphoma: randomized comparisons of

chemotherapy and radiotherapy, alone or in combination. Cancer Treat Rep. 1977(61),6,1153-9.

Zeggai, S., Harir, N., Tou, A., Medjamia, M., Guenaoui, K., (2016).Gastrointestinal lymphoma in Western Algeria: pattern of distribution and histological subtypes (retrospective study). Journal of Gastrointestinal Oncology, 2016(7), 6, 1011-1016.