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CBC Finding and LDH Estimation in Newly Diagnosed Patients with NHL

ALAA MUSTAFA ALZAIN SALIEM
Department of Heamatology, Faculty of Medical Laboratory Science
University of Al-Neelain, Khartoum, Sudan
ENAAM ABDELRAHAMAN ABDELGADER
Associate Professor of Heamatology
Faculty of Medicine, University of Alneelain, Khartoum, Sudan

Abstract:

***Objective**: To evaluate CBC finding and LDH estimation in newly diagnosed patient with NHL.*

***Methodology**: This study was carried out to detect CBC finding and LDH estimation in newly diagnosed patient with Non Hodgkin lymphoma in Khartoum –Sudan and to determine the certain factors such as gender and age. It was descriptive cross-sectional study conducted from April –July 2016 . Total of 30 patients attended to radio isotopes center Khartoum .30 patient NHL diagnosed by clinical, morphological and immunophenotyping criteria for studied LDH and CBC.*

***Result:** LDH found to be normal in about (20%), mildly elevated (30%), moderately elevated (26 .8%), and severely about LDH (20%). **CBC found** the WBCs was normal about (76.7%) and less than range about (16.7) and more than range (6.7%), the PLTs was normal about (60%) ,less than normal (30%), more than normal (10%) and Hb is normal about (50%) and less than normal bout(50%).*

***Conclusion:** LDH and CBC are very important marker for foll0w up and diagnosed for patient with newly diagnosed NHL. We have observed that LDH result significantly affected by age.*

Key words: Non Hodgkin lymphoma (NHL), lactate dehydrogenase, LDH, CBC.

INTRODUCTION

Non-Hodgkin lymphomas (NHLs):
also known as **non-Hodgkin disease** are diverse group of blood cancer that include any kind of lymphoma except Hodgkin's lymphoma .Types of NHL vary significantly in their severity, from slow growing to very aggressive types. Generally develops in the lymph nodes and lymphatic tissues. In some cases, NHL involves bone marrow and blood. The non-Hodgkin's lymphomas (NHL) are a group of cancers that develop in the body's lymphatic system.

Pathophysiology of NHL: Most (80 to 85%) NHL arises from B cells; the remainders arise from T cells or natural killer cells. Either precursor or mature cells may be involved**.**

Type of NHL: There are many different types of non-Hodgkin's lymphoma. Most types of NHL involve B cells, while a small percentage involves T cells. Common types of B-cell non-Hodgkin's lymphomas include diffuse large B-cell lymphoma (DLBCL) and follicular lymphoma. Non-Hodgkin's lymphomas are classified as indolent (slow-growing) or aggressive (fast-growing). +- Aggressive lymphomas, such as DLBCL, are often curable. Indolent lymphomas, such as follicular lymphoma, are more difficult to treat and tend to recur after periods of remission. With the advancement of new treatments and drugs, survival rates for patients with NHL have significantly improved the risk of NHL increases with age. Most patients are diagnosed when they are in their 60s and 70s. However, NHL can develop in people of any age, including Children. People who have immune system impairment because of infections, disease, or exposure to certain types of chemicals appear to have increased risk. Still, people without any known risk factors can develop NHL. (1)

Etiology: The many different forms of lymphoma likely have different causes. These possible causes and associations with at least some forms of NHL include the following:

_ Infectious agent

_Epstein-Barr virus – associated with Burritt's lymphoma, Hodgkin's lymphoma, follicular Follicular_dendritic_cell_sarcoma"sarcoma

_NK-T-cell lymphoma" NK-T-cell lymphoma (2)

_Hepatitis C virus – associated with splenic marginal zone lymphoma, lymphoplasmacytic lymphoma and diffuse large B-cell lymphoma HYPERLINK Diffuse_large_B-cell_lymphoma" large B-cell_lymphoma. (3)

_Some chemicals, like polychlorinated -- biphenyls (PCBs), diphenylhydantoin, dioxin, and phenoxy herbicides(4).

_Autoimmune diseases, like Sjögren's syndrome, Celiac_sprue"sprue, rheumatoid arthritis, and systemic lupus Systemic_lupus_erythematosus"erythematosus (5).

+

Staging NHL

CT scans of the neck, chest, abdomen, and pelvis, as well as bilateral bone marrow aspirate and biopsy, are necessary to stage the lymphoma.

The Ann Arbor staging system is the most commonly used staging system for patients with NHL.

Table 14–3. CLINICAL STAGES OF HODGKIN'S AND NON-HODGKIN'S LYMPHOMAS (ANN ARBOR CLASSIFICATION)*

STAGE	DISTRIBUTION OF DISEASE
I	Involvement of a single lymph node region (I) or involvement of a single extralymphatic organ or site (I_E).
II	Involvement of two or more lymph node regions on the same side of the diaphragm alone (II) or with involvement of limited contiguous extralymphatic organ or tissue (II_E).
III	Involvement of lymph node regions on both sides of the diaphragm (III), which may include the spleen (III_S) and/or limited contiguous extralymphatic organ or site (III_E, III_{ES}).
IV	Multiple or disseminated foci of involvement of one or more extralymphatic organs or tissues with or without lymphatic involvement.

* All stages are further divided on the basis of the absence (A) or presence (B) of the following systemic symptoms: significant fever, night sweats, and/or unexplained weight loss of greater than 10% of normal body weight.

In addition to the 4 stage designations, subscript letters designate involvement of extralymphatic organs, as follows:
L - Lung
H - Liver
P - Pleura
B - Bone
M - Bone marrow
D - Skin
E - Extranodal lymphoid malignancies in tissues that are separate from but near the major lymphatic aggregates.(7)

NHL- WORKUP:
-Diagnosis by lymph node biopsy, immunohistochemistery and complete blood cell (CBC) count
-Serum chemistry studies, including lactate dehydrogenase (LDH)
-Serum beta2-microglobulin level.
-HIV and hepatitis serology.
-Computed tomography (CT) and BM biopsy for staging.
-Echocardiography.(7)

Non-Hodgkin's Lymphoma
Working Classification

Low Grade:
Small Lymphocytic .
Follicular small-cleaved cell.
Follicular mixed small-cleaved and large cell.
Follicular large cell.

Intermediate grade:
Diffuse small cleaved cell.
Diffuse mixed small and large cell.
Diffuse large cell.

High grade:
Large cell immunoblastic.
Lymphoblastic.
Small non-cleaved cell (Burkitt's and non-Burkitt's type).(7)

A **CBC** measures the number of blood cells circulating in the bloodstream. Specifically, it measures the level of red blood cells (which carry oxygen throughout the body), white blood cells (which fight infection) and platelets (which help with blood clotting) in a blood sample. The test also measures hemoglobin (a protein in red blood cells that carries oxygen) and hematocrit (the ratio of red blood cells to plasma)

CBC IN NHL:
In the early stage of disease, patient with NHL may have blood count within the reference rang. As the disease progress, aCBC count with differential and platelet count in patient with NHL may show the following:

- Anemia secondary to bone marrow infiltration, autoimmune hemolysis (particularly associated with small lymphocytic lymphoma [SLL] \ chronic

lymphocytic leukemia [CLL], bleeding, anemia of chronic disease.

- Thrombocytopenia, leucopenia, or pancytopenia secondary to bone marrow infiltration or autoimmune cytopenias
- Lymphocytosis with circulating malignant cells (common in patients with low-grade lymphomas).
- Thrompocytosis (paraneoplastic, syndrome associated with lymphomas or reactive secondary to blood loss)

LDH

The serum level of lactate dehydrogenase (LDH) is commonly elevated in lymph proliferative disorders. In patients with non-Hodgkin's lymphoma (NHL), LDH values have prognostic value and are commonly used to assess treatment response and monitor for tumor recurrence A lactate dehydrogenase (LD or LDH) test is a non-specific test that may be used in the evaluation of a number of diseases and conditions. LD is an enzyme that is found in almost all of the body's cells (as well as in bacteria) and is released from cells into the fluid portion of blood (serum or plasma) when cells are damaged or destroyed. Thus, the blood level of LD is a general indicator of tissue and cellular damage. The level of LD may also rise in other types of body fluids (e.g., cerebrospinal fluid, pleural fluid, etc.) in the presence of certain diseases.

The serum level of lactate dehydrogenase (LDH) is commonly elevated in lymph proliferative disorders.

In patients with non-Hodgkin's lymphoma (NHL), LDH values have prognostic value and are commonly used to assess treatment response and monitor for tumor recurrence. LDH is widely distributed in mammalian tissues, and high concentrations are found in muscle and liver cells in addition to haemopoietic cells and their descendants (Henry, 1996). Because of this distribution, there are other causes of an elevated serum LDH in addition to malignancy. These include

myocardial or pulmonary infarction, hepatic dysfunction, haemolysis, and myopathy. Elevated serum LDH levels in association with hypothyroidism have also been reported (8)

MATERIAL AND METHOD:

This is descriptive cross section study .Was conducted in radio isotope center Khartoum (RICK) in Khartoum state. In new patient with NHL. The study was conducted from April to July 2016.

A total of 30 patients (13 males and 17 females) with NHL in RICK in Sudan were included in this study .The sex and age range was between 25 to 85 years. Blood sample was collected from each subject in to EDTA containers for immediately analyzed to maesuerment CBC by using Automated Hematology Analyzer (XN 2000). The serum was separated and immediately to analyzed LDH by COBAS 6000.

Technique:

Venous samples were obtained and collected in EDTA container of blood anti coagulant for CBC.

Procedures:

The sample was collected to obtain blood sample in EDTA container and mixed gently then aspairate by complete blood count analyzer to analyzed.

Technique:

Then blood sample was collected in Lithium heparin and centrifuge for seprate to obtain plasma for LDH estimation.

Procedures:

The reaction velocity was determined by adecerased in absorbance at 340nm. resulting from the oxidation of NADH

.one unit causes the oxidation of one micromole of NADH per minute at 25 centigrate and PH 7.3 under the specified.

RESULTS:

This study was conducted on 30 Sudanese patients with NHL to estimate LDH and CBC finding. In this study the test group was composed of 13 males (43%) and 17 females (57%) (Graph 1).

The patient ages were ranged from 25-85 years (mean=51.9).(Graph 2)

Graph (3) showed of LDH mean (524.9).

Graph (4) of WBC mean (7.96) .

Graph (5) of PLTs mean (284) .

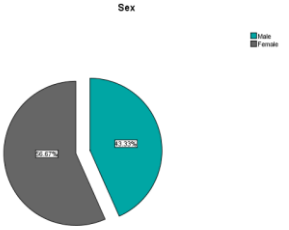
Graph (6) of Hb mean (11.7).

Table (7) showed comparison of mean of LDH (M/F) in male and female of the group with p value 0.543 was considered in significant.

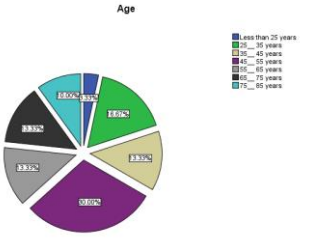
Table (8) showed comparison between LDH and age with p value 0.0262 was considered significant.

Fig (9) Ascattered plots shows the relationship between the LDH (M/F) and age of the test group (r=50%, p=0).

Graph (1) explain Sex:

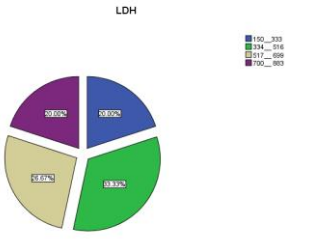


Graph (2) Explain Age:



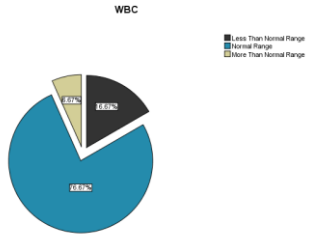
Mean=51.9
Std. Deviation=16.4

Graph (3) Explain LDH:



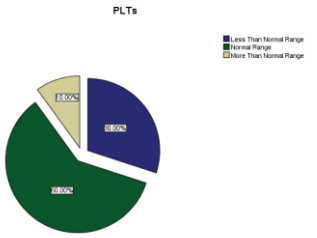
Mean=524.9
Std.Deviation=306

Graph (4) Explain WBC:



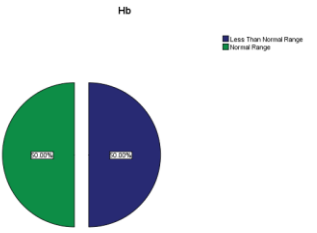
Mean=7.96
Std.Deviation=8.08

Graph (5) Explain PLT :



Mean=284
Std.Deviation=145

Graph (6) Explain HB:



Mean=11.72
Std.Deviation=2.28

Table (8): Comparison of Means of LDH (M/F) in Male and Female of the group.

Variable	Male N=13	Female N=17	P value
LDH (M/L)	571.8 ± 413 (293 – 1847)	489± 323 (158 – 1607)	= 0.543

The table shows the mean ± SD (mini - max) and probability (P)
T-test was used for comparison.
P value ≤ 0.05 was considered significant

Table (9): Age * LDH Cross tabulation

			LDH			
			150__ 500	500__850	1550__ 1900	Total
Age	Less than 25 year	Count	1	0	0	1
		% within Ag	100.0%	.0%	.0%	100.0%
	25__ 35 years	Count	4	1	0	5
		% within Age	80.0%	20.0%	.0%	100.0%
	35__ 45 years	Count	1	2	1	4
		% within Age	25.0%	50.0%	25.0%	100.0%
	45__ 55 years	Count	8	1	0	9
		% within Age	88.9%	11.1%	.0%	100.0%
	55__ 65 years	Count	3	1	0	4
		% within Age	75.0%	25.0%	.0%	100.0%
	65__ 75 years	Count	3	1	0	4
		% within Age	75.0%	25.0%	.0%	100.0%
	75__ 85 years	Count	0	2	1	3
		% within Age	.0%	66.7%	33.3%	100.0%
Total		Count	20	8	2	30
		% within Age	66.7%	26.7%	6.7%	100.0%

P. value=0.0262

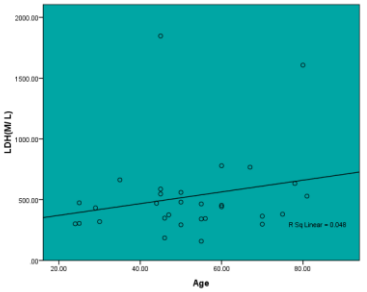


Fig. (9): Ascatter plot shows the relationship between LDH (M/F) & Age of the test group (r=%50, P= 0.024)

DISCUSSION:-

This descriptive cross sectional study was done on 30 patients with newly diagnosed NHL in Khartoum –Sudan from April-july2016.

Our study showed LDH level have been reported in Graph (3) normal about (20%), mildly elevated (30%),

moderately elevated (26.8%) and severely about (20.5%).the mean about (524.9) STD (306). In Graph (4) showed the WBCs was normal about (76.7%) and less than range about (16.7) and more than range (6.7%) the mean (7.96) STD (8).Graph (5) showed the PLTs was normal about (60%) ,less than normal (30%) , more than normal (10%) mean (284) STD (145) .Graph (6) showed the Hb is normal about (50%) mean (11.7) STD (2.28).in table (7) showed comparison of mean of LDH in male and female of the group P.value (0.54) . table (8) showed comparison between LDH and age P. value (0.02) significant .

The serum LDH levels have been reported to be a highly most patient with newly diagnosed NHL with p value (0.0262).This finding is in agreement with a study zanco j.et al(9), and fasola G,et al(10).

CONCLUSSION:-

The result presented in this study showed significant increased serum LDH when compared with age .there is no significant in gender and CBC finding mostly normal.

The LDH is an important clinicaI in prognosis and follow up of patient with NHL

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