

Original Research Article


# Clinicopathological profile of peripheral blood lymphocytosis

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	International Archives of Integrated Medicine, Vol. 6, Issue 5, May, 2019. Copy right © 2019, IAIM, All Rights Reserved. Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a>	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 04-05-2019	Accepted on: 11-05-2019
	Source of support: Nil	Conflict of interest: None declared.
<b>How to cite this article:</b> Karthika Rajendran, Elancheran. Clinicopathological profile of peripheral blood lymphocytosis. IAIM, 2019; 6(5): 166-170.		

## Abstract

**Background:** Reactive lymphocytes can be presented with a different number of morphologies. The significance of evaluation of lymphocytes on peripheral smear tests and its clinical correlation are still neglected.

**Materials and methods:** Clinical details along with other clinical investigations like cell counter results of patients presented with lymphocytosis and other hematological parameters including hemoglobin, total WBC count and platelet count, were collected from Department of Pathology, Dhanalakshmi Srinivasan Medical College and Hospital, India.

**Results:** A total number of 120 cases were studied, out of which 82 patients showed absolute lymphocyte count more than 4000/ul. Out of the 120 patients, a total of 31 patients had history of smoking/tobacco chewing. 18(58%) of them showed reactive/ atypical lymphocyte morphology and 13(41%) of them showed mature lymphocytes. Of the 10 patients with alcoholism history, only 4 of them showed a normal morphology of lymphocytes, other 6 patients showed reactive lymphocyte morphology. Only one patient in the study population showed atypical lymphocytes and in peripheral smear and subjected to lymph node biopsy and rest of the patient failed to follow up after advised biopsy.

**Conclusions:** Current study also reports that, lymphocytosis with reactive lymphocytes have a correlation with acute stress, smoking, and other ailments.

## Key words

Lymphocytosis, Atypical lymphocytes, Peripheral smear.

## **Introduction**

Examination of the peripheral smear, manually is essential to determine the course of action. In the case of lymphocytosis, the precarious decision is whether the lymphocytosis characterizes a benign reactive condition or a disorder that is neoplastic.

Disorders related to lymphocytes may sometimes occur along with abnormality in morphology of the lymphocytes, hence it is important to identify and report abnormal lymphocytes, such as atypical lymphocytes and lymphoblasts. There is lack of appropriate skills among technicians for identifying abnormal lymphocytes and consistent in reporting [1]. There are no specific and standardized definitions regarding the morphology of the different cells, and analysis is based on individual experience and reliant on on the availability of additional clinical information. Frequently, provisional and transitional forms between lymphocytes and plasma cells are observed in the blood of patients with viral infections. These cells are commonly known as atypical lymphocytes, lymphocytoid plasma cells or plasmacytoid lymphocytes [2].

Normal lymphocytes consist of mixed and a varied set of cells differing in multiple aspects like, morphologic characteristics, immunophenotype, and functional capabilities. These are B, and T, and natural killer cells, the latter presenting the large granular lymphocyte morphologic characteristics and capable of spontaneous cytotoxicity [3].

Even today, the blood smear test is considered to be a very important diagnostic tool. Identification of abnormal lymphocytes in the blood smears can assist to a quick diagnosis of different diseases, both reactive and neoplastic, and permits rapid therapeutic intervention. Some rare diseases may be diagnosed quicker by a critical review of the lymphocytes [4]. The actual need for recognition of abnormal lymphocytes is often underestimated.

Lymphocytosis cases are usually neglected by the clinicians without proper clinicopathological workup.

This study was an attempt to evaluate the significance of morphological evaluation of lymphocytes on peripheral smear examination in adult patients with lymphocytosis and its clinical correlation in a tertiary care centre.

## **Objectives**

- To evaluate the morphology of the lymphocytes on peripheral smear examination in patients with lymphocytosis and its clinical correlation

## **Materials and methods**

This current cross sectional study was carried out in the department of pathology in Dhanalakshmi Srinivasan Medical College, for duration of 6 months from September 2018 to February 2019. Clinical details along with other clinical investigations like cell counter results of patients presented with lymphocytosis and other hematological parameters including hemoglobin, total WBC count and platelet count, were collected from the study site.

## **Statistical Analysis**

Peripheral smear and lymphocytes etc. were considered as primary outcome variables. Age, gender etc. were considered as primary explanatory variables. Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Non normally distributed quantitative variables were summarized by median and interquartile range (IQR). The data was analyzed using IBM SPSS statistical software version 22 [5].

## **Results**

A total number of 120 cases were included in the study, among which the males 64 (53.33%) were predominant over females 56 (46.67%). Out of the total study population, 82 patients reported to have an absolute lymphocyte count of more than

4000/ul, whereas relative lymphocytosis (< 4000/ul) was observed among 38 patients. Descriptive analysis of Age and Lab parameter of the study population was as per **Table – 1**.

The mean neutrophil count was  $42.51 \pm 8.51$  in the study population, which ranged from 64 to 40.97 (95% CI 40.97 to 44.05). Similarly, the

mean neutrophil count was  $50.61 \pm 9.88$  in the study population, which ranged from 36 to 78 (95% CI 48.82 to 52.39). The mean eosinophil was  $1.86 \pm 2.72$  in the study population, ranging from 0 to 14 (95% CI 1.37 to 2.35). Clinical correlation of the causes and morphology of the lymphocytes were as per **Table – 2**.

**Table - 1:** Descriptive analysis Age and Lab parameter of the study population.

Parameter	Mean $\pm$ SD	Median	Minimum	Maximum	95% C.I	
					Lower	Upper
Age	45.93 $\pm$ 16.76	43.00	8.00	79.00	42.90	48.96
Tc	8652.5 $\pm$ 3176.96	8600	2300	35700	8078.24	9226.76
Neutrophils	42.51 $\pm$ 8.51	42.00	21.00	64.00	40.97	44.05
Lymphocytes	50.61 $\pm$ 9.88	47.50	36.00	78.00	48.82	52.39
Monocytes	5.03 $\pm$ 3.45	6.00	0.00	16.00	4.41	5.66
Eosinophil	1.86 $\pm$ 2.72	0.00	0.00	14.00	1.37	2.35
Absolute Lymphocytes	4160.43 $\pm$ 1012.81	4227	447	6600	3977.36	4343.51
Platelets	294941.67 $\pm$ 126841.68	290000	22000	752000	272014	317869

**Table - 2:** Clinical correlation of the causes and morphology of the lymphocytes.

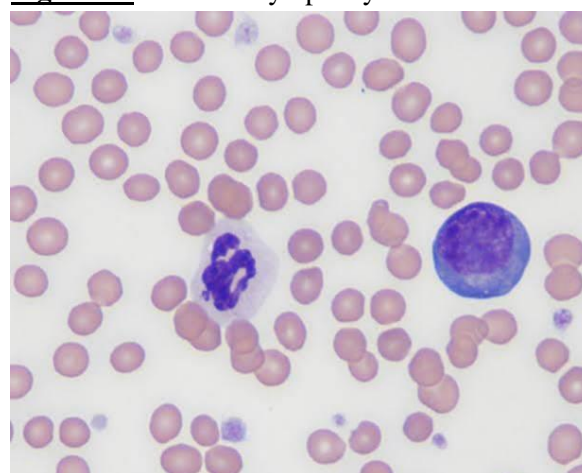
Cause	Mature lymphocytes	Reactive lymphocytes	Atypical lymphocytes
Fever (N=30)	12 (40%)	15(60%)	3(10%)
Smoking (N=31)	-	31(100%)	-
Alcohol (N=10)	3(30%)	7(70%)	-
Stress (N=23)	4(17.3%)	19(82.6%)	-
Lymphadenopathy for evaluation (N=8)	1(12.5%)	6(75%)	1(12.5%)
Asymptomatic patient(N=15)	14(93.3%)	1(6.6%)	-
Diabetes melitus (N=3)	2(66.6%)	1(25%)	-

Reactive lymphocytes are large, immune-stimulated lymphocytes with dark-blue cytoplasm and irregular, scalloped, or cleaved nuclei. They are also called immunocytes, virocytes, and variant lymphocytes (**Figure - 1**).

### Discussion

The current study was carried out to assess the lymphocyte morphology in lymphocytosis in adult patients and its correlation with various clinical, hematological and biochemical parameters.

**Figure - 1:** Reactive lymphocyte.



In the current study, 23 patients reported initially with an acute stressful event, whereas majority of them were reported to have an absolute lymphocyte count more than 4000 with reactive lymphocytes in the peripheral smear. These were similar to those reported by Nitin J. Karandikar, et al. [6], where they have reported that among patients whose absolute lymphocyte count was more than 4000/ul initially following an acute stressful event along with presence of different morphological forms of reactive lymphocytes, which were labelled as transient stress lymphocytosis, have reported to show a reversal to normal lymphocyte count and morphology within 24 to 48 hours after initiation of the stressful incident.

Fever as a cause among the current study population, was seen among 30 patients, among whom mature, reactive and atypical lymphocytes were reported to be 12 (40%), 15(60%) and 3(10%) respectively, similarly in a study, Burke A Cunha, et al. [7] have studied and proven the association of atypical lymphocytes in acute malarial infection.

In the current study, 31 patients were identified to have a past history of smoking. Approximately more than 50% of these patients reported an absolute lymphocyte count of greater than 4000/ul and about 60% of the 31 cases showed a reactive lymphocyte morphology. Our study results were in line with those reported by Dasanu, et al. [8], who reported that their study population showed B cell lymphocytosis with reactive form of lymphocytes, similarly Xavier Troussard, et al. [9] have reported that most of the study population with absolute lymphocytosis related with chronic smoking indicated binucleate reactive forms of lymphocytes. Among the study population, 80 (66.67%) participants were with reactive lymphocytes, 36 (30.00%) participants were with mature lymphocytes and remaining 4 (3.33%) participants were with atypical lymphocytes.

Out of the 120 patients assessed in the current study, 80 patients were reported to have absolute

lymphocyte count more than 4000/ul and 40 had an absolute lymphocyte count ranging from 3000 to 4000/ul. Out of the total 80 patients with ALC more than 4000 / ul, 68 patients reported a reactive morphology of lymphocyte. However, in the 40 patients with an ALC between 3000/ul to 4000/ul, 17 of them reported reactive forms of lymphocytes.

Reactive lymphocytes have many etiologies but their close association with acute stress induced history, chronic smoking, stress events seen in this study show that the reactive change in lymphocytes does not pertain to viral infections or neoplastic process alone.

This study paves a platform for further studies on lymphocytes and its correlation with various hematological and biochemical parameters.

## **Conclusion**

From the results and observations of the present study, it is concluded that an absolute lymphocyte count more than 4000/ul always requires an extensive assessment of lymphocytes to estimate the cause of the condition. Current study also reports that, lymphocytosis with reactive lymphocytes have a correlation with acute stress, smoking, and other ailments.

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