

**ORIGINAL RESEARCH**

# Cytomorphological spectrum of lymph node lesions by Fine needle cytology in a tertiary care hospital

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**ABSTRACT**

**Aim:** To evaluate the cytomorphological spectrum of lymph node lesions at a tertiary care hospital. **Materials and method:** A total of 100 cases of fine-needle cytology (FNC) of lymph nodes were examined at the Department of Pathology. The patients were provided with a detailed explanation of the procedure, and their consent was obtained. Using aseptic procedures, a 23-gauge needle and a 10 ml syringe were used to aspirate the lesion. Aspiration and non-aspiration techniques were used to extract a suitable amount of material. Slides were coated with the aspirate to create smears. According to the staining process, the smears were air dried or alcohol fixed to preserve them. Then, they were stained using H&E, PAP, Giemsa stain, and ZN stain to detect AFB. The FNAC diagnosis was correlated with pertinent clinical information and investigations. **Results:** Cervical lymphadenopathy (internal jugular chain & posterior triangle lymphadenopathy) was seen in 77 cases (77%) out of total 100 patients. Subsequently, submandibular lymphadenopathy was found in 8 cases (8%). The other sites of lymphadenopathy included supraclavicular in 5 cases (5%), axillary in 5 cases (5%), inguinal lymph nodes in 3 cases (3%), and the least prevalent location being submental with 2 cases (2%). The non-neoplastic lesions were more prevalent and diagnosed in 77 patients (77%), compared to neoplastic lesions in 23 cases (23%). Among non-neoplastic lesions, the most common diagnosis was non-specific reactive lymphadenitis, accounting for 39 cases (39%). **Conclusion:** Lymph node cytology is an effective and less invasive method for diagnosing lymphadenopathies. It aids in distinguishing between non-neoplastic and neoplastic etiology. Therefore, preventing unnecessary surgical procedures. FNAC, when paired with clinic-radiological correlation, may serve as the first diagnostic test for evaluating lymph node lesions.

**Keywords:** Cytological spectrum, lymph node, cervical

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**INTRODUCTION**

A lymph node is a significant anatomical structure of the immune system [1,2]. Lymph nodes are found in clusters or chains at certain sites, where they collect lymph from different sections of the body via the lymphatic veins. Drainage encompasses both the mechanical filtering of foreign substances in the lymph and the identification and handling of antigens. The number of peripheral nodes is higher in younger individuals compared to older individuals, whereas they are not present in newborns [3]. The lymph node is enclosed by a connective tissue capsule and consists of two main parts: the outer cortex and the inner medulla. Both the cortex and medulla are classified as B zones and are therefore involved in humoral immune responses [4]. The paracortex mostly houses

the majority of T-cells [5]. The appearance of the follicles in the cortex changes according to their level of activity. Primary follicles are seen as circular clusters of lymphocytes, whereas secondary follicles emerge after exposure to antigens and are distinguished by the presence of germinal centers [6]. Lymph nodes primarily serve to filter lymph and process antigens. The immune response occurs within a cohesive lymphoid system, which comprises the lymph nodes, spleen, and mucosa-associated lymphoid tissues (MALT) [7]. The size of a node that might be associated with pathological importance varies depending on its location. In the cervical and axillary areas, a lymph node larger than 1.0 cm is regarded significant, but in the epitrochlear region, a node as tiny as 0.5cm is deemed relevant. Conversely,

a node in the inguinal area must have a size more than 1.5 cm in order to be classified as abnormal [8]. Superficial lymphadenopathy is often seen and might result from inflammation, metastatic malignancy, or lymphoma [9]. Small lymph nodes, measuring less than 1 cm, are seldom malignant [10]. Lymph nodes are often affected by metastatic cancer and may sometimes be the first indication of a disease [11,12,13]. Axillary and cervical lymph nodes are more likely to provide useful information in situations of widespread lymphadenopathy. Avoidance of inguinal lymph nodes is recommended whenever feasible due to high chances of chronic inflammatory and fibrotic alterations. Superficial nodes that are small in size may just have non-specific excessive growth, whereas a deeper node within the same group may exhibit distinctive characteristics that might aid in diagnosis [6].

The majority of swollen lymph nodes are non-neoplastic and result from a response to a wide range of antigens. Typically, the occurrence of lymph node neoplasia in medical practice is rare, accounting for around 1.1% of biopsies. However, at specialized medical centers, the frequency of lymph node neoplasia may be as high as 60% [14,15,16]. Reactive lymphoid hyperplasia is perhaps the most common diagnosed condition in individuals visiting outpatient departments [17]. Patients' age is a crucial determinant in characterizing swollen lymph nodes. Most cases of swollen lymph nodes in children are not malignant, but the likelihood of malignancy rises with age in adults [18]. Non-neoplastic causes [19] of lymphadenopathy include reactive lymphadenopathy due to rheumatoid arthritis, toxoplasmosis, early stages of HIV infection, paracortical hyperplasia due to acute viral infections such as infectious mononucleosis (IM), sinus histiocytosis/reticular hyperplasia due to chronic gastritis caused by *Helicobacter pylori*, rheumatoid arthritis, and granulomatous lymphadenitis such as tuberculosis and sarcoidosis. The neoplastic etiology includes primary forms such as Non-Hodgkin's and Hodgkin's lymphoma, as well as secondary forms such as metastatic deposits. Additional uncommon conditions such as silicone lymphadenopathy and dermatopathic lymphadenopathy have been documented. The purpose of this research was to examine the occurrence of neoplastic and non-neoplastic disorders in lymph nodes, and to determine

their frequency based on age group and gender. The significance of this study is in the fact that FNAC results serve as crucial diagnostic tools for assessing enlarged lymph nodes, therefore facilitating the early detection of the pathology. This is of paramount relevance at the basic health care level. Lymph node biopsy is a crucial procedure for determining the type of lymphoma and is particularly useful in situations when a diagnosis cannot be made using fine needle aspiration cytology (FNAC) [20].

## MATERIALS AND METHOD

A total of 100 cases of fine-needle aspiration cytology (FNAC) of lymph nodes were examined at the Department of Pathology. Upon gathering clinical facts, pertinent inquiries about the underlying etiology, as well as the history of the lesions, were recorded. The patients were provided with a detailed explanation of the procedure, and their consent was obtained. Using aseptic procedures, a 23-gauge needle and a 10 ml syringe were used to aspirate the lesion. Aspiration and non-aspiration techniques were used to extract a suitable amount of material. Slides were coated with the aspirate to create smears. According to the staining process, the smears were air dried or alcohol fixed to preserve them. Then, they were stained using Hematoxylin & Eosin, Papanicolaou and Giemsa stain. Ziehl-Neelsen stain was used to detect acid-fast bacilli (AFB). The FNAC diagnosis was correlated with pertinent clinical information and other relevant investigations.

## RESULT

We conducted this study on 100 cases of fine needle cytology (FNC) of palpable lymph nodes. The age of the patients varied from infancy to 65 years, with an average age of  $33.87 \pm 4.23$  years in men and  $32.34 \pm 4.12$  years in females for all lymph node lesions. The youngest patient presented with reactive lymphadenopathy, whereas the oldest patient had lymphoproliferative disease. The highest proportion of cases, 29 (29%), were above 40 years. This was followed by 21 (21%) patients in the age group of 20-30 years, and 18 (18%) cases in the age group of 30-40 years. A total of 15 cases, or 15% of the total, were detected in the age bracket of 10-20 years. This research observed a slight male prevalence, with a male-to-female ratio of 1.22:1. Out of 100 patients, 55 (55%) were male and 45 (45%) were female. Table 1

**Table 1: Gender and Age of the participants**

	Number	Percentage	P value
Gender			0.14
Male	55	55	
Female	45	45	
Age			0.16
Below 10	17	17	
10-20	15	15	
20-30	21	21	
30-40	18	18	

Above 40	29	29	
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The cervical lymph nodes were the most often afflicted group among the major anatomical categories of lymph nodes in all forms of lymph node lesions. The cervical lymphadenopathy (internal jugular chain and posterior triangle lymph nodes) was seen in 77 out of 100 patients, accounting for 77% of the total. Subsequently, submandibular

lymphadenopathy was found in 8 cases, representing 8% of the total. The other categories of lymph nodes comprised supraclavicular with 5 cases (5%), axillary lymph nodes with 5 cases (5%), inguinal lymph nodes with 3 cases (3%), and the least prevalent location being submental with 2 cases(2%). (Table 2).

**Table2: Site wise distribution**

Site	Number	Percentage
Jugular chain and posterior triangle of neck	77	77
Supraclavicular	5	5
Submental	2	2
Submandibular	8	8
Axillary	5	5
Inguinal	3	3

The spectrum of lymph node lesions analyzed using FNAC was categorized as non-neoplastic and neoplastic. The non-neoplastic lesions were more prevalent, diagnosed in 77 patients (77%), compared to neoplastic lesions found in 23 cases (23%). Among non-neoplastic lesions, the most common diagnosis was non-specific reactive lymphadenitis, accounting for 39 cases (39%), with other lesions being less prevalent. Out of the total 37 cases of granulomatous lymphadenitis, 20 cases (54.05%) were positive for acid-fast bacilli (AFB). These cases were identified as

tuberculous lymphadenitis. The other 17 cases, which represented 45.95% of the total, were described as granulomatous lymphadenitis. A single case (1%) of Rosai-Dorfman disease was identified in a 18-year-old female patient who presented with enlarged right cervical lymph node. Metastatic squamous cell carcinoma was seen in 16 out of 100 patients (16%), whereas primary neoplastic lesions of the lymph node (lymphoproliferative disease) accounted for only around 7 out of 100 cases (7%). The information shown in Table 3.

**Table3: Cytomorphological spectrum of lymph node lesions**

Diagnosis	Number	Percentage
Non-neoplastic lesions		
Reactive/Non-specific reactive lymphadenitis	39	39
Tuberculous lymphadenitis	20	20
Granulomatous lymphadenitis	17	17
Rosai Dorfman disease	1	1
Total non-neoplastic lesions	77	77
Neoplastic lesions		
Metastatic Squamous Cell Carcinoma	16	16
Lymphoproliferative disease	7	7
Total neoplastic lesions	23	23

**DISCUSSION**

In this study, we examined a total of 100 cases of lymphadenopathies. Of these, 77 cases (77%) were determined to be non-neoplastic, whereas 23 cases (23%) were found to be neoplastic. Bhatta et al also reported a similar observation, with 189 (91.74%) instances being non-neoplastic and 17 (8.26%) cases being neoplastic out of a total of 206 cases [21]. The male to female ratio in our research was 1.22:1, which is comparable to the study conducted by Bhatta et al, where the male to female ratio was 1.1:1 [21]. In our investigation, the anterior and posterior triangle of the neck (cervical lymph nodes) was the most common site of lymphadenopathy. Out of 100 patients, 77 cases (77%) were found in this area. B. Nikethan et

colleagues also noticed a similar result, with 256 instances (80%) of cervical lymphadenopathy out of a total of 1800 [12]. Out of the 100 cases examined in this research, 39 cases (39%) were diagnosed as reactive lymphadenitis, whereas 20 cases (20%) were identified as tuberculous lymphadenitis. The results of this investigation were consistent with the findings of a study conducted by Bhatta et al, which reported 112 cases (54.36%) of reactive lymphadenitis and 74 cases (35.92%) of tuberculous lymphadenitis out of a total of 206 cases [21]. Hashmi et al found that tuberculous lymphadenitis was the most prevalent pathology in 207 instances, accounting for 44.02% of the total. Similarly, Patil RK et al reported that it accounted for 40% of 592 cases. Nirmal AK et al observed that it

was present in 124 cases, making up 44.60% of the total. B. Nikethan et al also found it to be the most common pathology, accounting for 60.9% of 89 cases [22-25]. In our analysis, tuberculous lymphadenitis accounted for 20% of cases with lymphadenopathy, making it the second most common cause. The differences seen in comparison to previous studies might be due to the influence of demographic and socio-economic factors. Among the 23 cases of neoplastic etiology in our study, metastatic carcinoma was seen in 16 cases, accounting for 69.57% of the total. Bhatta et al reported a similar finding, with 13 (76.47%) out of 17 cases of neoplastic etiology showing metastasis. Nirmal AK et al also found that 23 (76.67%) out of 30 cases of neoplastic lymphadenopathy had metastatic lesions. [21,25].

## CONCLUSION

Lymph node FNAC is an effective and less invasive method for diagnosing lymph node lesions. It aids in distinguishing between non-neoplastic and neoplastic etiology. Therefore, preventing unnecessary surgical interventions. FNAC, when correlated with clinic-radiological findings, may serve as the first diagnostic test for evaluating lymph node lesions.

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