



Cytomorphological Study Of Lymph Node Lesions- A Retrospective Study Of 206 Patients

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Abstract

Introduction: Lymph nodes are an integral component of our body's immune system and is involved in a wide range of pathological conditions.[1] Lymphadenopathy can be seen in both neoplastic and non- neoplastic conditions.[1] Fine needle aspiration cytology is a safe and rapid technique, which helps to identify the benign and malignant lesions in the lymph nodes.[2] In this study we quantify the frequency of the lesions occurring in the lymph nodes and to classify them into neoplastic and non- neoplastic lesions. To study the cytomorphology of the lymph node lesions, and to correlate the study findings with the available national data.

Materials And Methods: This retrospective study includes data from May 2020 to August 2021, retrieved from the archives of Department of Pathology in Saveetha medical college. The cytomorphology of the lymph nodes sampled via FNAC was analyzed and studied in relation to the patient's age, gender, topography, and method employed for aspiration.

Results: In our study, a total of 206 patients presented with lymphadenopathy - In 151 patients direct FNA and in 55 patients USG guided FNAC was done. Cervical group of lymph nodes (66%) were the most frequently involved group. Non neoplastic lesions (76.21%) were more frequently observed, out of which tuberculous lymphadenitis was the most common lesion noted.

Conclusion: FNAC is first line investigation of choice for lymphadenopathies. It can be used as an adjunct for investigations like gene-Xpert in detecting tuberculosis. This study aims to emphasize the tuberculosis burden in the area of study.

Keywords: FNAC, gene-Xpert, lymphadenopathy, tuberculous lymphadenitis

Introduction

Lymph nodes are major components of body's defence mechanism, where both T and B lymphocytes interact with antigens and antigen presenting cells resulting in generation of immune response and are one of the frequently sampled sites for cytological analysis.[1] Fine needle aspiration cytology (FNAC) of lymph nodes is a safe and rapid technique[2], that can help differentiate neoplastic from non-neoplastic lesions occurring in the lymph nodes.[3,4] A wide range of pathological conditions occurring in adult and paediatric populations like

lymphadenitides, lymphadenopathies, lymphomas, metastases, and many other entities can be diagnosed by FNAC. FNAC can be done directly if the superficial lymph nodes are involved, and USG-guided FNAC or other modalities like CT are employed if the deeper nodes are involved. The purpose of this study is to analyse the cytomorphology of lymph nodes sampled via FNAC, study its relation to the patient's age, gender, topography, method employed for aspiration and to classify the lesions into neoplastic and non-neoplastic

processes, and quantify their frequencies. This can help us determine the most common lesions occurring in the area of study and to correlate it with the available national data, in order to understand the burden of disease in the population studied. We also aim at emphasizing the utility of FNAC as a screening procedure in patients presenting with lymphadenopathy.

Materials And Methods:

This study was done in the Department of Pathology, at Saveetha Medical College, Thandalam, Chennai. This was a retrospective study done on 206 patients, including both adult and paediatric populations who presented with lymphadenopathy, and were evaluated by FNAC between May 2020 and August 2021. A complete enumeration sampling method was used. Study participants were subjected to standard FNAC procedure after obtaining informed consent.

In case of superficial lymph nodes, FNAC was performed under aseptic precautions using 10 ml disposable syringes connected with 22 to 24 bore hypodermic needles, and the material was aspirated and smeared on the slides. Smears prepared were fixed in 95% ethyl alcohol. USG-guided FNAC samples were also received in appropriate fixatives. The cytological smears prepared from the aspirate were stained with standard hematoxylin and eosin stain. Special stains such as modified Ziehl-Neelsen stain, Periodic Acid-Schiff and Grocott’s Methenamine silver were used wherever necessary. In all the cases, a short history and physical examination was done and the relevant investigations, if available were also evaluated. All the stained smears were examined under the microscope, and diagnosis was given based on the cytomorphological features and clinicocytological correlation. The cases were categorized into neoplastic and non-neoplastic lesions, and the data was analyzed. Those smears which were haemorrhagic or with very scanty cellularity were excluded from the study.

Results:

Among the 206 patients who presented with lymphadenopathy, direct FNA was done in 151 patients (73.3%) and USG-guided aspiration was done in 55 patients (26.7%). [Graph 1] Cervical group of lymph nodes were the most frequently involved (66%), followed by the inguinal group of lymph nodes (12.6%) [Graph 2].

There was a female preponderance in the lymph node lesions, involving 108 female patients (52.4%) as opposed to 98 male patients (47.6%) [Graph 3].

The youngest and oldest patients in the present study was a 3month-old child, and 85 years old respectively. In our study, the predominantly affected patients belong to the age group 21 to 30 years [Table 1], which included 47 patients (22.8%), of which 31 patients were females and 16 were males [Graph 4]. The second most affected age group in our study was 41 to 50 years (43 patients) [Table 1].

Out of the 206 cases studied, non-neoplastic lesions in the lymph nodes were more frequently reported, constituting 157 cases (76.21%). Based on cytomorphology, tuberculous lymphadenitis was categorized as A- Necrotising granulomatous lymphadenitis, B- Epithelioid granuloma positive for AFB, C- Epithelioid granuloma with neutrophilic infiltrate, according to which 63 cases were diagnosed as tuberculous lymphadenitis, which was the most common lesion reported in the present study, followed by reactive lymphadenitis (46 cases). [Table 2].

Among the neoplastic lesions (49 cases), secondary metastasis (21.3%) was most frequently reported, of which squamous cell carcinoma deposits in the lymph node (11.1%) were the most common type observed. Lymphoproliferative disorders constitute only 0.97% of the total cases included in the present study [Table 2].

Table 1 - Age wise distribution of patients

Age Range	Number of patients
0 to 10	4
11 to 20	33

21 to 30	47
31 to 40	34
41 to 50	43
51 to 60	22
61 to 70	16
71 to 80	5
81 to 90	2

Table 2- Cytological spectrum of lesions in lymph node

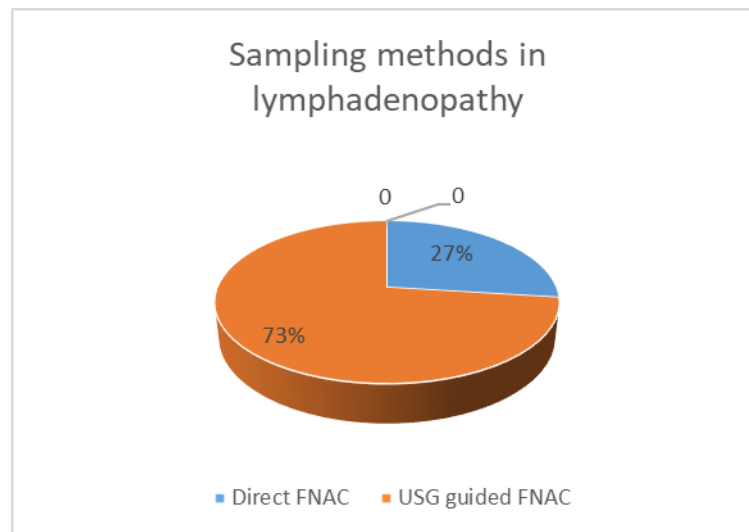
Lesions	Number of cases
I. Non- Neoplastic lesions	
Nondiagnostic	14 (6.79%)
Reactive lymphadenitis	46 (22.3%)
Granulomatous lymphadenitis	34 (16.5%)
Tuberculous lymphadenitis	
Necrotising granulomatous lymphadenitis	29 (14.07%)
Epithelioid granuloma positive for AFB	19 (9.22%)
Epithelioid granuloma with neutrophilic infiltrate	15 (7.28%)
II. Neoplastic	
Metaplastic lesions	
Squamous cell carcinoma	23 (11.1%)
Adenocarcinomatous deposits	5 (2.42%)
Malignant melanoma deposits	2 (0.97%)
Other lesions	14 (6.79%)
Negative for malignancy	3 (1.45%)
Primary	
Lymphoproliferative disorder	2 (0.97%)
TOTAL	206

Table 3

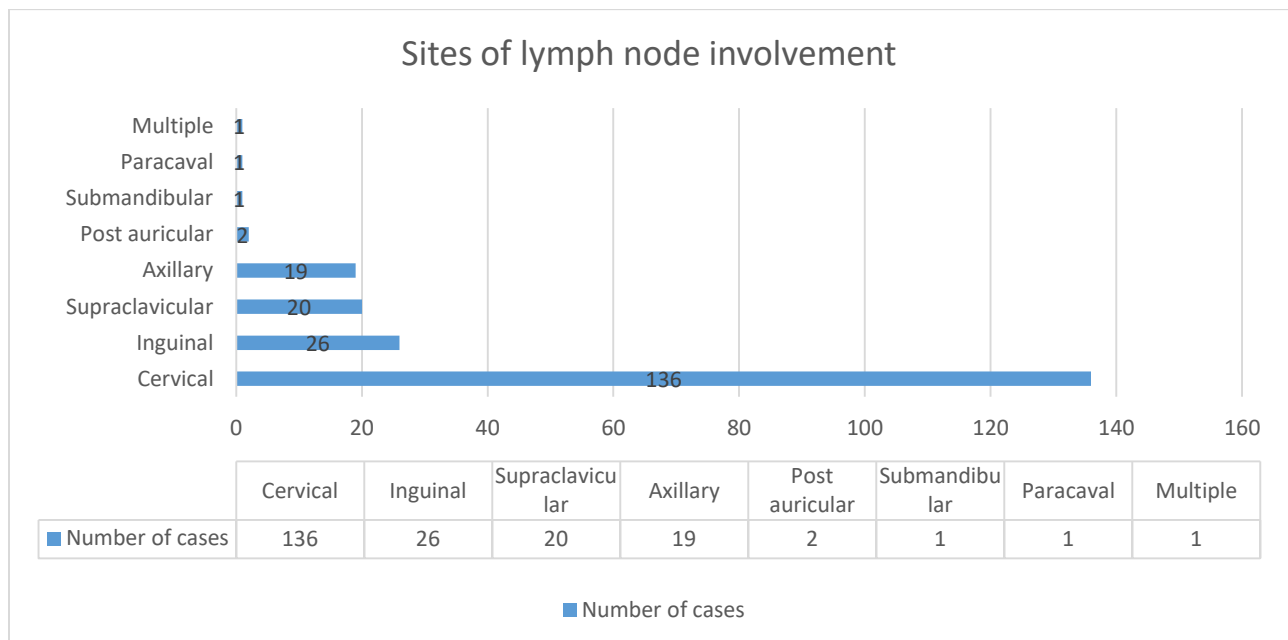
Authors	Tuberculous lymphadenitis	Reactive lymphadenitis	Granulomatous lymphadenitis	Metastatic lymphadenitis	Lymphoproliferative disorders

Present study	23.3%	22.3%	16.5%	21.3%	0.97%
Patro et al	32.12%	25.45%	23.33%	3.33%	0.33%
Patil et al	40.6%	37.2%	-	16.4%	0.4%
Gayatri et al	14.5%	26.2%	14.7%	21.32%	0.17%
Smita et al	44.25%	42.48%	7.97%	30%	4.17%
Uma et al	28.54%	47.3%	7.21%	3.52%	1.55%

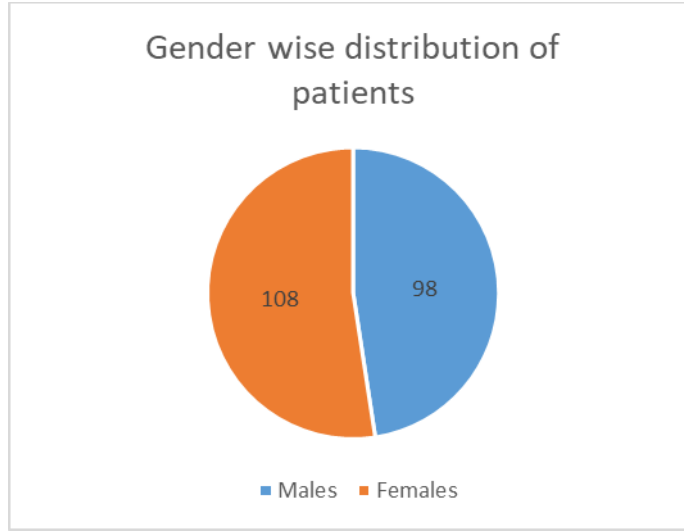
Graph 1



Graph 2



Graph 3



Graph 4

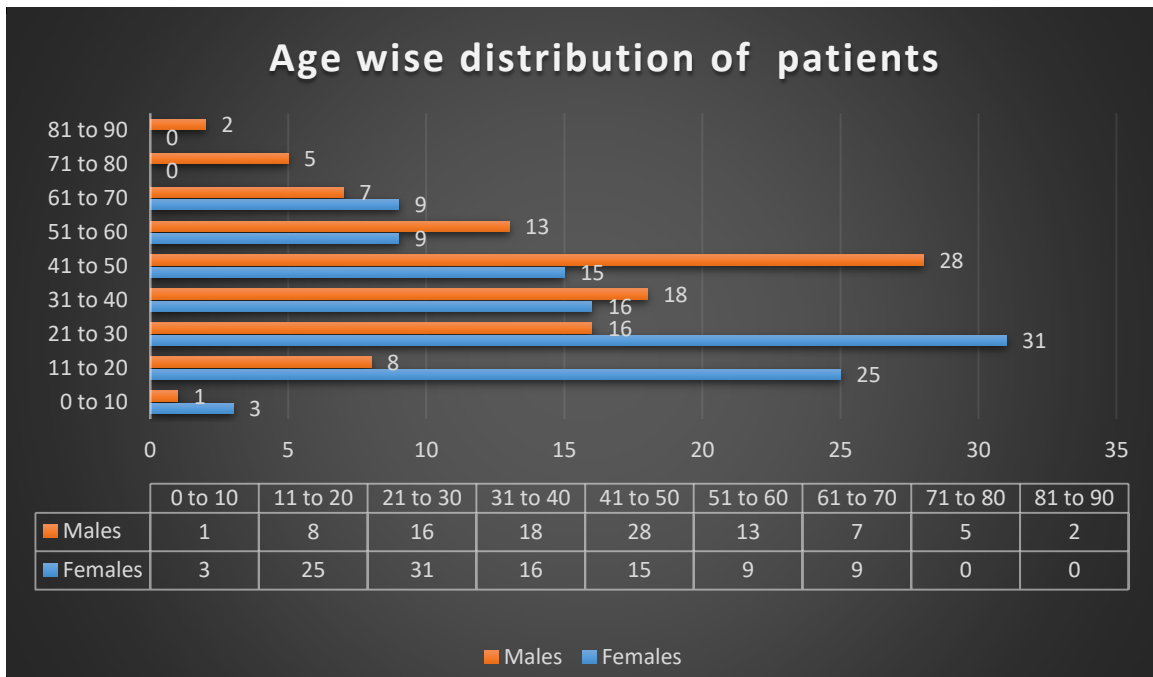


Figure 1

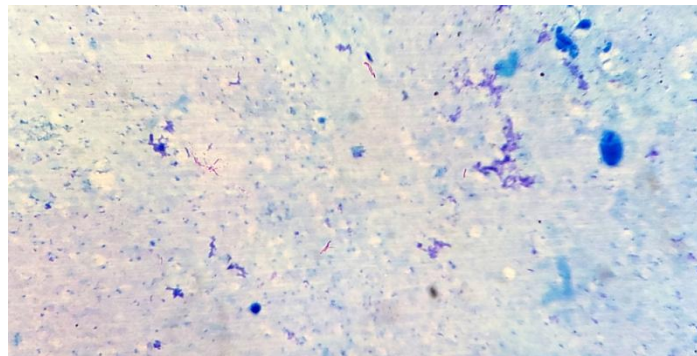


Figure 2: Metastatic Squamous cell carcinoma deposits; in Low power

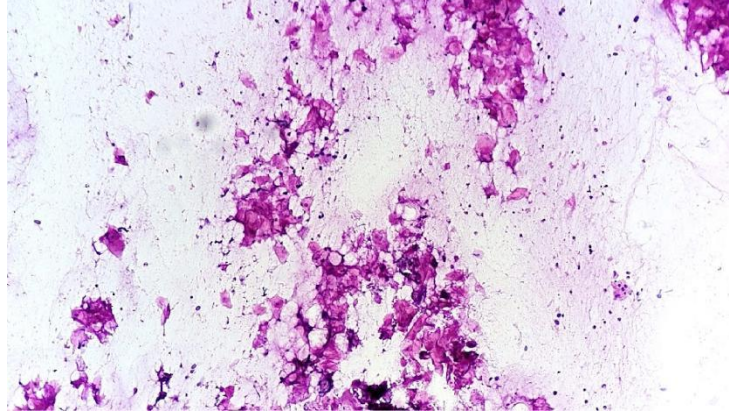


Figure 3: Metastatic Squamous cell carcinoma deposits; in High power

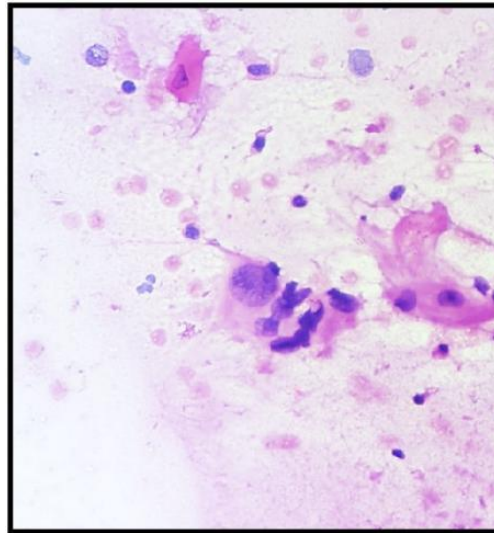
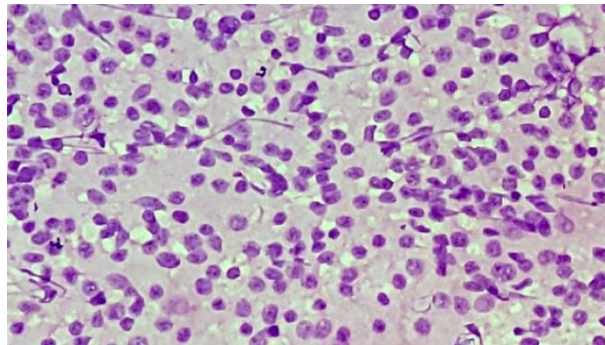


Figure 4: Lymphoproliferative disorder



Discussion:

Lymphadenopathy is defined as an abnormal increase in the size and /or altered consistency of the lymph nodes in the body.[3] It can be seen in many systemic

or local diseases giving a clue to the underlying disease in the patient.[3,5] It can arise due to a wide range of aetiologies ranging from infectious causes to malignant neoplasms.[6]

These lesions can be diagnosed based on cytology and thus, treatment can be started immediately, thereby avoiding unnecessary surgical interventions and delay in initiation of treatment.[6] FNAC is a rapid and simple technique for diagnosing superficial and deep lesions, at the bed side of the patient. [2,7]

In the present study, maximum number of cases were recorded in the age group 21-30years (22.8%) [Table 1], which was comparable to the study conducted by Bhide SP et al, who had reported that maximum number of cases in the age group 21-30 years(21.2%).[3] Similarly, in the Vimal S et al study, the most affected age group was 20-30 years.[7] However in the studies conducted by Madan Y et al and Thaker B et al, the maximum number of patients belonged to the 11-20 years group.[2,8]

Our study showed a slight female preponderance for lymphadenopathy [Graph 3]. Female preponderance for lymphadenopathy was also seen in the studies conducted by Bhide SP et al and Patro P et al.[1,3] On the contrary, a male preponderance for lymphadenopathy was reported by Vimal S et al, Madan Y et al and Gayathri MN et al.[2,7,9]

In the present study, the most common group of lymph nodes affected were the cervical group of lymph nodes (66%) [Graph 2]. This was consistent with the findings of Bhide SP et al, Patro P et al, Khajuria R et al, Vimal S et al, Madan Y et al, Thaker B et al, and Jadhav R et al.[1-3,7,8,10,11] The second most frequently involved group of lymph nodes in the present study was the inguinal group of lymph nodes (12.6%),unlike the findings of Khajuria R et al, Vimal S et al and Thaker B et al, all of whom reported that, the least common single group of lymph nodes to be involved was inguinal lymph nodes.[7,8,10]

Non-neoplastic lesions were more frequently reported than neoplastic lesions in our study. Of these tuberculosis [Figure 1] was the most frequently reported diagnosis (23.3%) followed by reactive lymphadenitis (22.3%) [Table 2]. These findings were comparable to the studies done by Bhide SP et al, Patro P et al, Khajuria R et al, Madan Y et al. [1,2,3,10]

Among the neoplastic lesions reported, secondary metastasis to lymph nodes (21.3%) was the most

encountered diagnosis. This was concordant to the results in the studies conducted by Bhide SP et al, Uma P et al and Jadhav R et al. [3,6,11] Of the metastatic deposits found in the lymph nodes, squamous cell carcinoma deposits [Figure 2 and Figure 3] were the most common (1.1%) in our study, which was comparable to the findings of Bhide SP et al, Bhatt JV et al and Bhagwan IN et al.[3,12,13] Lymphoproliferative disorders [Figure 4] constitute only 0.97%, of the total number of cases included in our study, which was similar to the findings of Kajuria et al and Annam et al in the studies conducted by them.[10,14]

The findings of the current study and the comparison dataset is summarized in Table 3.

Limitations of FNAC include its efficacy in distinguishing reactive hyperplasia from low grade malignant lymphomas. Although cytological examination of lymph node lesions is efficacious in differentiating benign and malignant aetiologies, lymph node biopsies remain gold standard in the diagnosis of malignant lesions. But FNAC is the first line screening investigation of choice in malignant causes of lymphadenopathy, as along with primary diagnosis, it also helps detect recurrences, residual disease, progression of the disease and in the staging of disease.[15]

Conclusion:

FNAC is a readily repeatable, preliminary investigation, which reduces the hospitalization period of the patient prior to diagnosis. Apart from aiding in primary diagnosis of tuberculosis, FNA material can also be used for gene-Xpert, a cartridge based nucleic acid amplification test (CBNAAT) in case of negative ZN smear. FNAC analysis in the present study showed that the most common lesion was tuberculous lymphadenitis followed by reactive adenitis and metastatic tumour deposits. This emphasizes the tuberculosis burden in the area of study. However, the study population may be under-represented, due to the occurrence of COVID19 pandemic at the time of study. Hence further population based studies can help frame necessary national policies aimed at eliminating the disease where FNAC can be incorporated as a screening modality.

Declaration Of Patient Consent

The authors certify that they have obtained all the appropriate patient consent forms. The presented patients have given their written informed consent for publication of data and images.

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