



Clinico-Cytological Spectrum of Lesions in Lymph Nodes of Patients at a Tertiary Care Centre

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Abstract: Enlarged lymph node is one of the most frequent clinical manifestations of patients visiting the outpatient department subjected to FNAC. It is the first line of investigation in evaluating lymphadenopathy due to the frequent involvement of lymph nodes in regional and systemic disease & due to easy accessibility. Thus, it is often used as a safe substitute for excision biopsy. The present study aimed to study the clinical and cytomorphological features of enlarged Lymph nodes by Fine Needle Aspiration Cytology in patients with Lymphadenopathy. The objective of the study was to describe the cytomorphological features of enlarged Lymph nodes involved in various etiologies, to categorize clinical features in patients with lymphadenopathy, to assess the frequency of lymphadenopathy in different age groups and gender, and to categorize varied etiologies of Lymph node enlargement according to site. It was an observational study. A total of 155 cases with enlarged lymph nodes were studied during the study period from December 2020 to November 2022. The present study found that out of 155 cases, 149 cases (96.12%) were adequate for cytological diagnosis. The study showed slight male preponderance with M: F ratio of 1.06:1, mean age was 45 years. Fever was the most common clinical presentation besides lymphadenopathy, with 53.33% of cases. The cervical group of lymph nodes was the most common group of lymph nodes affected at 41.29%. Of 149 cases, non-neoplastic lesions accounted for 92.61%, and neoplastic lesions for 7.38%. Among the non-neoplastic lesions, caseating tubercular lymphadenitis was the most common finding accounting for 39.85% of cases, followed by reactive lymphadenitis in 35.50%, granulomatous lymphadenitis in 13.04% of cases, suppurative lymphadenitis in 7.24% & cold abscess in 2.89% cases. Infectious mononucleosis and Parasitic infestation were found in one case each. Among the neoplastic lesions, metastasis in the lymph nodes was more common than primary lymphomas; the most commonly involved lymph node was the cervical lymph node. Metastasis from squamous cell carcinoma was seen in 36.36% of cases, metastasis from adenocarcinoma was seen in 9.09% of cases, and from other sites was seen in 36.36% of cases. The present study concluded that tuberculous lymphadenitis is still rampant, the most common cause of lymphadenopathy. FNAC is an excellent diagnostic procedure that can establish a rapid cytological diagnosis in non-neoplastic and neoplastic lesions of lymph nodes and helps in patient care management

Keywords: FNAC, lymphadenopathy, tuberculous lymphadenitis, granulomatous lymphadenitis, metastatic malignancy

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1. INTRODUCTION

Lymph node enlargement is one of the most common clinical presentations of outpatient department patients.¹ Fine needle aspiration cytology (FNAC) is the first line of investigation in evaluating lymphadenopathy due to the frequent involvement of lymph nodes in regional and systemic disease because of easy accessibility. The procedure is minimally invasive and produces quick results.² Lymph node enlargement is the principle indication of performing lymph node FNAC, and its purpose is to establish the cause of lymphadenopathy that cannot be reliably diagnosed on clinical grounds. Neoplastic and non-neoplastic conditions such as inflammation, infection, autoimmune disorders, and hypersensitivity reactions are associated with lymphadenopathy.³ It is a highly acceptable, easy, efficient, and affordable procedure feasible in low-resource countries like India.⁴ It can be used as a safe substitute for excision biopsy.^{5,6} Lymph node enlargement occurs in various diseases, including reactive conditions, tuberculosis, fungal and protozoal infections, primary lymphoid malignancies, and secondary metastatic tumors.⁷ One of the most common etiologies of Lymphadenopathy is tuberculosis, which is rampant in developing countries like India; almost two-thirds of the cases are due to tuberculosis. Tuberculous lymphadenopathy is the commonest form of extra pulmonary tuberculosis.⁸ As tuberculosis lymphadenopathy is a medically treatable condition, FNAC becomes the most rapid and cost-effective investigation to facilitate early diagnosis and treatment in these patients. Also, in suspected Tuberculosis cases, cytology material can be further subjected to culture or gene detection methods like TRUENAT/CBNAAT for confirmation of diagnosis. Lymphadenopathy also occurs in primary and metastatic tumors of the Lymph node. The most common group of lymph nodes subjected to FNAC in clinical practice is the cervical lymph node. Causes of cervical lymphadenopathy may vary. Enlarged cervical nodes and left supraclavicular Lymph nodes in an elderly patient must be considered metastatic until proven otherwise.^{9,10} The search for an unknown primary in a patient presenting with disseminated or metastatic malignancy may present a diagnostic challenge, in which FNAC findings may assist in the tracing of the origin of the metastasis, especially if the sample is further subjected to ancillary techniques.^{11,12} The causes of metastatic lesions of the lymph nodes are carcinomas, including squamous cell carcinoma, adenocarcinoma, anaplastic carcinoma, and carcinoma from specific sites such as the kidney, thyroid, breast, liver, and testis, as well as malignant melanoma, soft tissue and bone tumor and germ cell tumors.^{13,14} Thus, FNAC forms the backbone of cost-effective, reliable diagnostic investigation in patients with lymphadenopathy helping clinicians in patient care management investigation. Looking at the variable causes of lymphadenopathy in diverse geographical regions of India, the present study was undertaken.

The aim of the present study was to study the Cytomorphological features of enlarged Lymph nodes by Fine Needle Aspiration Cytology in patients with Lymphadenopathy. The objectives were-

1. To describe the cytomorphological features of enlarged Lymph nodes involved by various etiologies.
2. To categorize clinical features in patients with lymphadenopathy.
3. To assess the frequency of lymphadenopathy in different age groups and gender.

4. To categorize varied etiologies of Lymph node enlargement according to site.

2. MATERIALS AND METHODS

The study was conducted at the Heritage Institute of Medical Sciences, Varanasi, India. The study protocol was duly approved by Institute Scientific Research Committee, followed by Institute Ethical Committee [Certificate no. Ref. HIMS/IEC/42]. It was an observational study. All patients referred for FNAC to the Department of Pathology from January 2019 - November 2022 were included in this study. A total of 155 cases were included in the present study; a convenient sampling method was done.

2.1 Inclusion-criteria

1. All cases of lymphadenopathy (all age groups and gender) referred to the Department of Pathology and
2. those who gave consent were included.

2.2 Exclusion-criteria:

1. All non-lymphoid aspirates
2. Patient who did not give consent for fine needle aspiration cytology.

2.3 Methodology

After explaining the procedure to the patient, written informed consent was taken in the patient's vernacular language. Clinical history and local examination findings were noted. All smears aspirated from the lymph nodes were subjected to wet fixation by acid alcohol. The smears were stained by standard Papanicolaou¹⁵ and H & E¹⁵ staining procedures. The air-dried fixed smears were stained with the standard Geimsa stain procedure.¹⁶ Zeil-Neelsen¹⁷ stain was also performed wherever indicated. Those with scanty aspirates were subjected to repeat aspirates. On microscopy, cytomorphological findings were noted, and smears were interpreted and analyzed.

3. STATISTICAL METHOD

The collected data were organized and tabulated. Statistical method Tables, bar diagrams, Pie diagrams, and Percentages are used for descriptive purposes. Data were analyzed by using the statistical software SPSS version 24. The p-value < 0.05 was considered statistically significant.

4. RESULTS

Total FNACs received during the study period in the Department of Pathology from different sites were 515, out of which lymph node aspirates accounted for 155 (30.09%) cases. In the present study, out of 155 cases, 149 (96.12%) had adequate aspirate, while 6 (3.87%) cases showed inadequate material even after repeat aspiration.

4.1 Age-wise Distribution of Patients with Lymphadenopathy

The age range for patients subjected to FNAC in the present study was from 11 months to 80 years. The mean age was 45 years, and the median was 40 years.

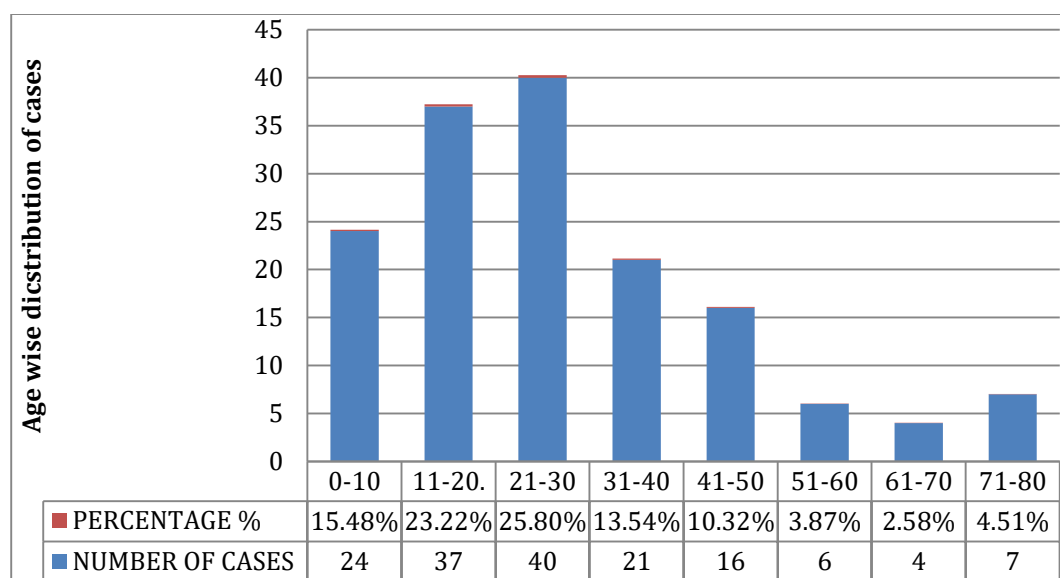


Fig.1 - Age wise distribution of patients with lymphadenopathy

As shown in (Fig-1) among 155 cases, the majority of the patients were in the age group of 21-30 years, accounting for 25.80% (40 cases), followed by 11-20 years in 23.22% (37cases)

4.2 Gender-wise Distribution of Lymphadenopathy

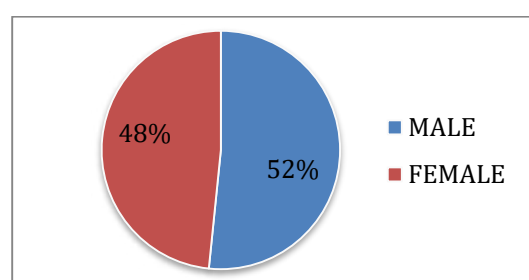


Fig 2: Gender wise distribution of lymphadenopathy

As shown in (Fig 2), out of 155 cases, 80(51.61%) were males, and 75(48.38%) were females; M: F ratio was 1.06:1, thus showing slight male preponderance.

4.3 Clinical Features of Patients with Lymphadenopathy

Clinically, all the patients presented with lymph node swelling. Fever was the second most common symptom in 80 (53.33%) cases, followed by tenderness in 73(47.09%) cases. Past History of tuberculosis with or without ongoing anti-tubercular treatment or history of contact with tuberculosis constituted for 30 (19.35%) cases. Three (1.93%) cases of patients who presented with a history of lymphadenopathy were known cases of malignancy at the primary site; out of three, one was a known case of squamous cell carcinoma of

the oral cavity which involved the cervical lymph node, the second was a known case of infiltrative ductal carcinoma of the breast which involved axillary lymph node, and last one was known case of gastrointestinal malignancy which has involved inguinal lymph node.

4.4 Sites of Lymph Node Aspirates

The patient presented with different sites of lymph node enlargement. Table I showing different sites of lymph node enlargement subjected to FNAC, the cervical lymph node was the most common lymph node aspirated on FNAC constituting 64 (41.29%) cases, followed by submandibular LN 37 (23.87%)cases, and the remaining other groups of lymphnodes.

Table I- Sites of lymph nodes involved (n=155)		
Sr No	Site of LN FNAC	No of cases (%)
1	Cervical	64(41.29)
2	Submandibular	37(23.87)
3	Submental	5(3.22)
4	Supraclavicular	15(9.67)
5	Axillary	14(9.03)
6	Mesenteric	5(3.22)
7	Inguinal	15(9.67)

4.5 Type of FNAC Aspirates of Lymph Node

The material aspirated from the different sites by FNAC was classified under hemorrhagic, purulent, and scanty white material. Out of 155, 107 (69.03%) aspirates were hemorrhagic, followed by 44 (28.38%) purulent aspirates, and 2 (1.29%) were whitish aspirates.

4.6 Consistency of Lymph Node

A wide range of lymph nodes was firm in consistency on

palpation forming a bulk of 101 (65.16%) cases, 30 (13.3%) cases were soft, 23 (14.83%) cases were hard, and single (0.64%) was cystic in consistency.

4.7 Cytological Diagnosis of Lymph Node Aspirates

Out of 149 adequate aspirates, the majority, i.e., 138 (92.61%) cases, were diagnosed as non-neoplastic lesions of lymph nodes, and the remaining 11 cases (7.38%) cases were diagnosed as neoplastic lesions of lymph nodes on FNAC. [Table 2]

Table 2: Distribution of cytology diagnosis rendered on Lymph Nodes aspirate (n=149)	
Lesions of lymph node	Total No.of cases (%) (N=149)
BENIGN	138(92.6%)
Caseating tubercular lymphadenitis	55(39.85)
Reactive lymphoid hyperplasia	49(35.50)
Granulomatous lymphadenitis	18(13.04)
Suppurative lymphadenitis	10(7.24)
Cold abscess	4(2.89)
Parasitic	1(0.72)
Infectious mononucleosis	1(0.72)
MALIGNANT	11(7.4)
Primary	2(1.34)
Non - Hodgkin's Lymphoma	2(1.34)
Secondary	9 (6.0)
Squamous cell carcinoma	4(2.68)
Adenocarcinoma	1(0.67)
Transitional cell carcinoma	1(0.67)
Others	3(2.01)

The most common cytological diagnosis rendered on FNAC in the present study was caseating tubercular lymphadenitis accounting for 55(39.85%) cases, followed by reactive lymphadenitis, 49 (35.50%) cases. On cytology, caseating tuberculous lymphadenitis showed epithelioid cell granulomas on a caseous necrotic background. [Fig 3]. Granulomatous lymphadenitis accounted for 13.04%(18 cases) [Fig.4]. The Zeil-Neelsen stain was performed on 33(84.61%) cases of Caseating tubercular lymphadenitis, out of which 5 (12.82%) cases showed the presence of AFB. [Fig 5] Similarly, in 6 (15.38%) cases of cold abscess, Z-N stain was performed, out

of which 3(7.69%) cases showed AFB positivity. Whereas when a Z-N stain was done on granulomatous lymphadenitis, all cases were Z-N negative. In one case of caseous tubercular lymphadenitis and 3 cases of cold abscess, CBNAAT was reported as available and positive in all four cases. In contrast, the Z-N stain was positive in 3 cases; one case of the cold abscess was Z-N negative, which showed positivity in CBNAAT. One interesting case of microfilariae lymphadenitis was noted (0.72%) in which a microfilariae parasite was aspirated. [Fig 6].

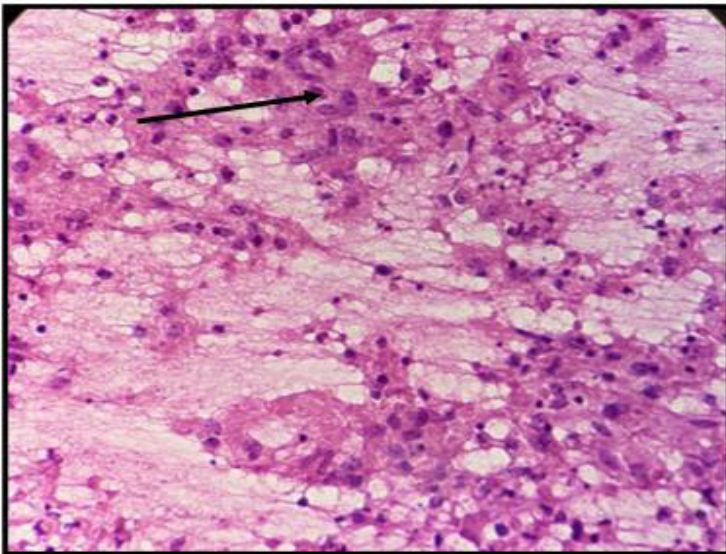


Fig 3: Caseating granulomatous lymphadenitis: Arrow showing epithelioid cell collection in a caseous necrotic background. (40XH&E)

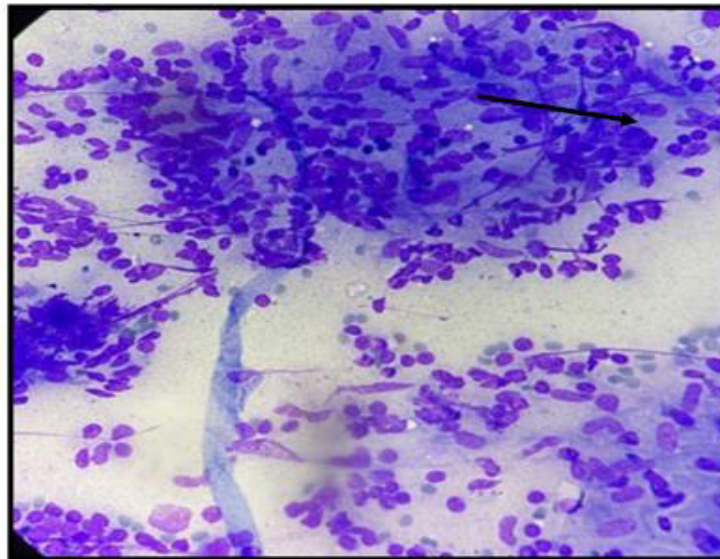


Fig: 4. Granulomatous lymphadenitis -Aspirate showing epithelioid cell granuloma and lymphocytes without necrosis (40XMGG)

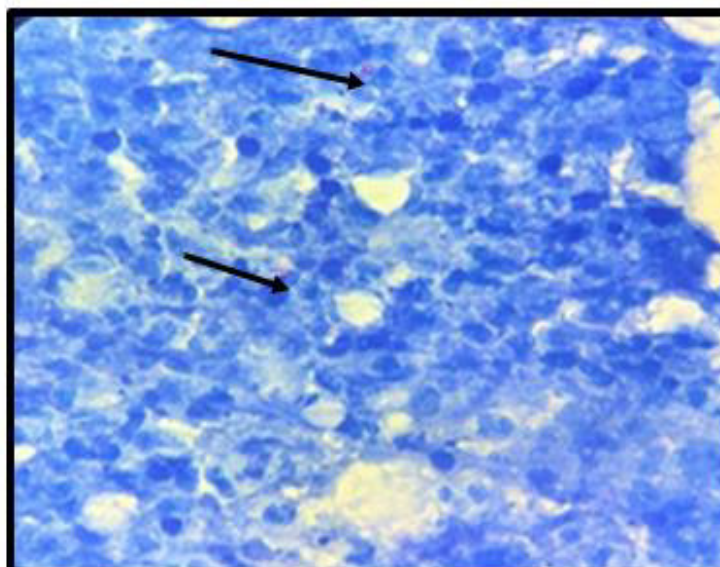


Fig: -5 Smear showing pink slender beaded acid fast bacilli(arrow) (Z-N stain 100X)



Fig -6 Aspirate showing microfilaria in a hemorrhagic background (40XMGG)

4.8 Distribution of Neoplastic Lesions of Lymph Node on Cytology

Out of 149 cases of adequate aspirates of lymph node FNAC, 11 (7.09%) cases were neoplastic lesions, out of which on 2 (1.29%) cases, cytological diagnosis of primary lymphomas

was given, in which one showed cytological features of Burkitt's Lymphoma showing starry sky appearance of intermediate grade lymphoid cells [Fig 7]. Another case was Non-Hodgkin's lymphoma, in which biopsy was advised for further evaluation with immunohistochemistry. Nine (5.80%) showed metastasis from different carcinomas.

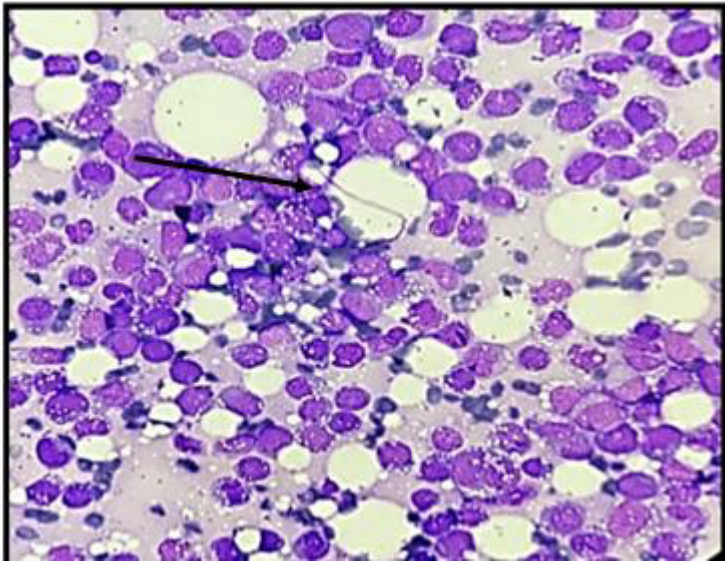


Fig:7- Burkitt's lymphoma-Aspirate shows a monomorphic population of intermediate sized neoplastic lymphoid cells with a nucleus showing granular chromatin, dense blue cytoplasm with lipid vacuoles(arrow) showing starry sky appearance (40X MGG)

Metastasis from squamous cell carcinoma was seen in 4(36.36%) cases from the head and neck region in cervical Lymphnodes [Fig 8], followed by adenocarcinoma was seen in 1(9.09%) case in axillary lymph node from the breast and metastasis from others sites were seen in 4(36.36%) cases.

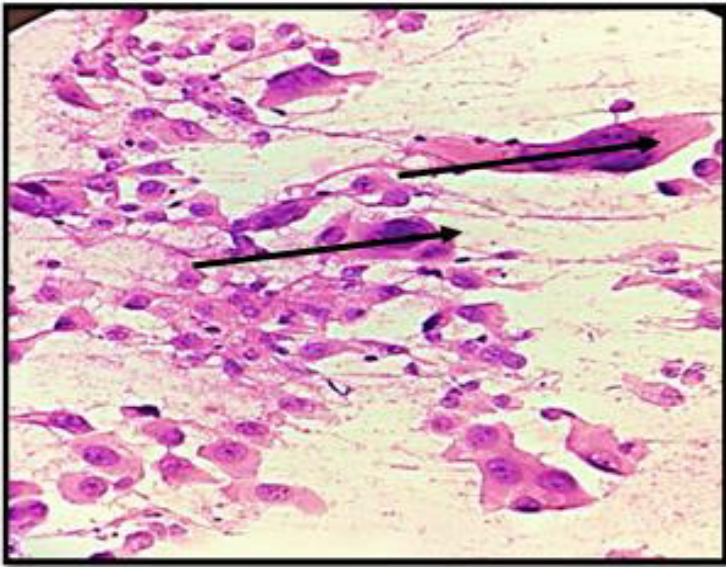


Fig- 8- Squamous Cell Carcinoma metastasis in cervical Lymph node with an arrow showing loosely cohesive pleomorphic malignant cells with dense cytoplasm. (40x H&E)

Table 3: Cytological correlation between age & lesions of lymph nodes								
Lesions of lymph nodes (N = 149)	0-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 Years	61-70 years	71-80 years
Caseating tubercular lymphadenitis	5	20	14	5	4	4	1	2
Reactive lymphoid hyperplasia	11	15	10	4	5	1	1	2
Granulomatous	1	-	7	4	3	2	-	1

lymphadenitis								
Acute Suppurative	2	3	3	-	1	-	1	-
Cold abscess	2	-	-	2	-	-	-	-
Infectious mononucleosis	-	1	-	-	-	-	-	-
Parasitic	-	-	1	-	-	-	-	-
Lymphomas	-	1	-	1	-	-	-	-
Metastasis	-	-	2	2	1	-	2	2

Table-3 shows a correlation between age and lesions of the lymph nodes; a majority of the non-neoplastic lesions were seen in 2nd decade, with 20 (13.42%) cases of Caseating tubercular lymphadenitis, and Reactive lymphoid hyperplasia, 15(10.06%) cases. Metastatic lesions were seen a decade later and showed near equal age distribution till the 8th decade.

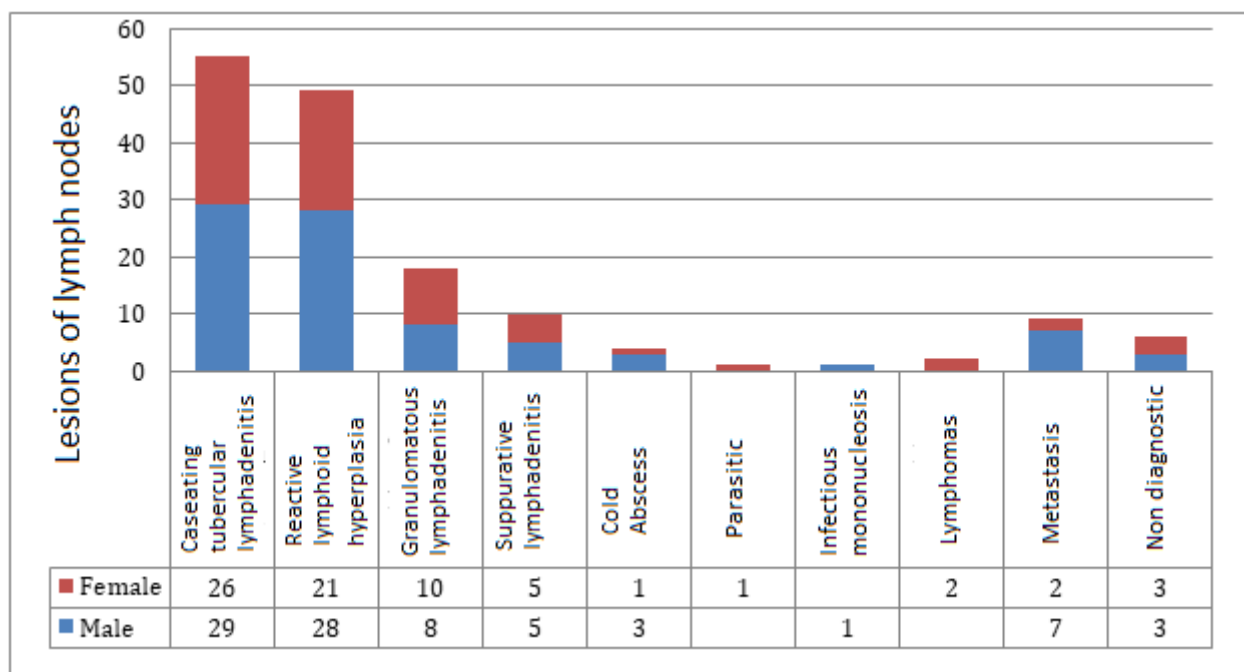


Fig 9 – Cytological correlation of gender and lesions of lymph nodes

From the above Fig.9, male preponderance was seen in most non-neoplastic and neoplastic cases, except two primary lymphoma cases and one microfilaria case, which were seen in females only.

5. DISCUSSION

In the present study, 155 cases of lymphadenopathy were referred to the Department of Pathology for FNAC since it was the commonest organ for which FNAC was performed. Out of 155 cases, 149(96.12%) had adequate aspirate, while 6(3.87%) cases showed inadequate material after repeated aspiration. The unsatisfactory aspirate might be due to the nature of the lesion or the lesion being too small to fix. The percentage of satisfactory aspirate varied between 88.69% and 98.64% in various studies, which were comparable with the present study.^{18,19,20} In the current study, the most common age group presenting with lymphadenopathy subjected to FNAC was (21-30) years; similar observation

was made by Vimal S et al., Kamal M et al., Patro et al.²¹⁻²³ Males were predominantly affected in the present study as compared to female with male to female of 1.06:1 which was comparable with a study by Vimal S et al.²¹, whereas studies done by Kamal M et al.²², Gayen P et al.²⁰, and Sharma DP et al.²⁴, female preponderance was seen. In the present study, the majority of the cases belonged to benign (non-neoplastic) lymphadenopathies constituting (92.61%) of the cases; this was in concordance with other studies, where the frequency of non-neoplastic lesions ranged from 86.32% to 96.36%.^{21,23,25} All the above studies showed that benign lymphadenopathy comprised the major bulk of cytological diagnosis compared to malignant lesions.

Table 4 - Cytological diagnosis of lesions of lymph nodes in different studies.

Authors, year of publication	Total cases	Tubercular lymphadenitis	Reactive lymphoid hyperplasia	Granulomatous lymphadenitis	Suppurative lymphadenitis	Cold abscess	Parasitic	Infectious mononucleosis	Lymphomas	Metastasis	Inadequate for opinion
Sharma P et al. ¹⁸ 2015	376	419(56.92%)	193(26.22%)	-	45(6.11%)	-	-	-	20(2.71%)	47(6.38%)	10(1.35%)
Vimal S et al. ²¹ (2016)	187	54(28.88%)	63(33.69%)	-	12(6.42%)	-	-	-	5(2.67%)	33(17.65%)	19(10.1%)
Patro p et al. ²³ 2018	330	106(32.12%)	84(25.45%)	77(23.12%)	12(3.63%)	-	-	1(0.30%)	1(0.30%)	11(3.335)	7(2.12%)
Majithia S. et al. ²⁶ 2020	100	2(4%)	23(46%)	12(24%)	5(10%)	-	-	2(4%)	-	4(8%)	1(2%)
Sharma DP et al. ²⁴ 2021	235	31(13.19%)	99(42.12%)	69(29.36%)	12(5.1%)	-	-	-	1(0.42%)	12(5.1%)	-
M Dedeepya et al. ³⁴ 2020	274	35 (12.77)	106 (38.69%)	57 (20.80%)	24 (8.76%)	-	-	-	7 (3.11%)	30 (13.33%)	-
Present study	155	55(35.48%)	49(31.6%)	18(10.90%)	10(6.45%)	4(2.58%)	1(0.64%)	1(0.64%)	2(1.29%)	9(5.80%)	6(3.87%)

In the study of 155 cases, the majority of cases, 55 (35.48%), were of caseating tubercular lymphadenitis. Similar findings were noted by Sharma P et al.¹⁸ (56.92%) and Patro P et al.²³ (32.12%), where tubercular lymphadenitis was the most common lesion diagnosed on FNAC, followed by reactive lymphadenitis constituting 49(31.6%) of cases which were similar to the study of Sharma P et al.¹⁸ (26.22%) and Patro P et al.²³ 84 (25.45%). In contrast, studies of Vimal S et al.²¹, Majithia S et al.²⁶, Sharma DP et al.²⁴ and Dedeepya et al.³⁴

showed Reactive lymphadenitis as the most common cytological finding. [Table 4] Thus, as seen in the present study and other studies mentioned above, tuberculosis remains one of the important causes of lymphadenopathy in India. It is important to note this finding as our country is aspiring to eliminate tuberculosis under the National Tuberculosis elimination program, and still, tuberculous lymphadenitis remains one of the important forms of extrapulmonary tuberculosis in India.

Table 5: Age Distribution Of Tubercular Lymphadenitis in different studies

Age (years)	Mitra SK et al ²⁷ 2017 (n=180)	Bhatta S et al ²⁸ 2018 n=126	Anand B et al ²⁹ 2020 (n=81)	The present study (n=155)
0-10	30(16.7%)	8(6.34%)	1(1.23%)	5(9.09%)
11-20	36(20.05)	26(20.63%)	6(7.40%)	21(38.18%)
21-30	62(34.5%)	51(40.47%)	3(3.70%)	15(27.27%)
31-40	36(20.0%)	21(16.7%)	5(6.17%)	5(9.09%)
41-50	9(5.0%)	7(5.55%)	4(4.93%)	5(9.09%)
51-60	6(3.3%)	8(6.34%)	6(7.40%)	4(7.27%)
61-70	1(0.5%)	4(3.17%)	2(2.46%)	1(1.81%)
71-80	-	1(0.8)	0	2(3.63%)

Caseating tubercular lymphadenitis cases predominantly affected the second decade of life in the present study. It was a contrasting finding with other studies where the third decade was the most common age group affected. [Table 5]. It might be due to overcrowding, low immunity, or more number of children with early exposure to infection. In the present study, caseating tubercular lymphadenitis was seen more commonly in males than females, whereas studies by Mitra SK et al.²⁷ (60.5%) and Bhatta S et al.²⁸ showed female preponderance. A few interesting cases, like a case of microfilaria also diagnosed on FNAC in one case in our study, which was not seen in other studies

5.1 Neoplastic lesions on cytology

In the present study, 11 (7.09%) cases were neoplastic lesions; in two (1.29%) cases, a cytological diagnosis of primary lymphomas was given; 9 (5.80%) cases showed metastasis in lymph nodes from different carcinomas. Among two cases of lymphoma, both cases were of Non-Hodgkin's lymphoma. For the confirmatory diagnosis of lymphomas, the FNAC may suggest an initial diagnosis, which needs to be

followed up by histopathology and immunohistochemistry to confirm the diagnosis.³² In the present study, involvement of LN by neoplastic (malignant) lesion was 11(7.09%), in which metastasis from different carcinomas was more common than Lymphomas, findings were similar to other Indian studies.^{18,21,23,24} (Table 4) The commonest lymph node affected by neoplastic (malignant) lesion was the cervical lymph node. This finding was observed in other studies.^{24,33} The most common lesion in the present study was metastatic squamous cell carcinoma from the head and neck region. This finding was also noted by Sharma DP et al.²⁴. In this study, metastatic lesions were more common in the cervical lymph nodes. And the commonest metastatic carcinoma was squamous cell carcinoma. In contrast, the Depeepya et al.³⁴ studies showed poorly differentiated carcinoma as the most common metastatic carcinoma. Lymphomas were most commonly diagnosed in cervical and mesenteric lymph node aspirates in the present study. A similar study was done by Khajuria et al.³⁰, Singh et al.³¹, and Wilkinson et al.³², in which most of the cases of lymphomas involved cervical lymph nodes. In the present study, both cases were of Non-Hodgkin's lymphoma.

Table 6 -Different cytological diagnoses rendered on metastatic deposits in lymph node

Studies	Squamous cell carcinoma	Adenocarcinoma	Others
Wilkinson AR et al ³² (2012) (N= 50)	23(46%)	2(4%)	25(50%)
Chaudhary A et al ³³ (2017) (N=30)	13(43.33%)	10(33.33%)	7(23.33%)
The present study (N=11)	3(27.27%)	1(9.09%)	6(54.54%)

In the present study, metastasis from different carcinomas was more common than Lymphomas. Metastasis from squamous cell carcinoma of the head and neck region, followed by metastasis of adenocarcinomas, was noted. These observations were compared with studies done by Wilkinson AR et al.³² and Chaudhary A et al.³³. [Table 6]

6. CONCLUSION

FNAC is one of the most important tools for diagnosing various lymphadenopathies encountered in the outpatient department and doesn't need hospital admission. It is a very

convenient, safe, effective, economical, and relatively non-traumatic rapid method of diagnosing the underlying pathology of enlarged lymph nodes. The present study highlighted that tuberculosis is the most common etiological factor of lymphadenopathy and contributes to one of the common sites of extra pulmonary tuberculosis. FNAC material obtained can be subjected to special tests like AFB stain and CBNAAT for further evaluation and diagnosis of tuberculosis as it is a medically treatable disease; it is important to diagnose and treat early in the era when the nation is aiming to eradicate TB to lessen the burden of disease in the community. Apart from tuberculosis, other

diseases like metastatic malignancy from the unknown primary can be diagnosed by FNAC. It is an excellent screening procedure for benign and malignant lesions of lymph nodes, and it is also helpful in detecting unsuspected malignancies. Thus, FNAC is a cost-effective, comfortable, minimally invasive tool for diagnosing lymph node lesions. Using FNAC to diagnose lymph node lesions can prevent unnecessary surgery-related complications. Thus FNAC helps the clinician to initiate optimal management.

7. AUTHORS CONTRIBUTION STATEMENT

Dr. Akansha Anu gathered the data and prepared the original draft. Dr. Vaishali Kotasthane and Dr. Dhananjay Kotasthane

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conceptualized and designed the study and provided the necessary inputs. All the authors read and approved the final version of the manuscript.

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9. CONFLICT OF INTEREST

Conflict of interest declared none.

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