



"CYTOMORPHOLOGICAL FNAC STUDY OF LYMPH NODE LESIONS."

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ABSTRACT

Introduction- Fine needle aspiration cytology is becoming method of choice for diagnosis of various lumps and lesions (1). It helps to decide mode of treatment in most cases in both neoplastic and non-neoplastic disorders. **Material And Methods-** 2 years cross sectional study was carried out on the all patients with lymph node lesions coming to OPD at tertiary health care center and patients who are referred to pathology department for lymph node FNAC by the clinicians, during the period of October 2019 to October 2021. **Result-** 450 cases of lymph node lesions were assessed with the help of fine needle aspiration cytology. Peak incidence of lymphadenopathy was found in 2nd and 3rd decades of life. Cervical group of lymph nodes were found to be involved in maximum numbers of cases (71.11%) followed by supraclavicular lymph nodes (7.78%). Reactive hyperplasia of lymph node was the commonest followed by tuberculous lymphadenopathy. Out of total 450 cases, 120 cases underwent both cytopathological and histopathological examination. **Conclusion-** The fine needle aspiration cytology of lymph node is cheap, simple, reproducible, repetitive and less traumatic procedure, which can be easily use for lymph node lesions. FNAC helps in defining the tumor type, staging tumor, while the clinical history and investigation helps in identifying the primary tumor site.

KEYWORDS : Lymph node, Tuberculous, Cytology**INTRODUCTION**

Lymph glands are described as whitish and phlegmy structures, present a wholly consistence to the touch and can be easily squeezed by fingers ⁽¹⁾. The lymph nodes are found around the major blood vessels and have approximately 800 nodes sited in the neck, axilla, thorax, abdomen and groin ⁽²⁾.

Lymph nodes are bean shaped, receive lymph fluid via afferent vessels and filtered lymph then leaves via one or two efferent vessels. The size of lymph nodes depends upon location as well as axis which it being measured, usually range from 1 to 2 cm and are enclosed in adipose tissue fibrous capsule ⁽²⁾.

If lymph nodes lose their oval shape, if there is a loss of hilar fat, if lymph nodes are persistently enlarged with asymmetrical thickening of cortex, they are considered pathological.

Lymph glands may become ill "In sympathy with the body" ⁽¹⁾. Lymph nodes those are abnormal in size or consistency, refers to lymphadenopathy ⁽³⁾. It is one of the commonest clinical presentation of patients attending the OPD in most of the hospitals ⁽⁴⁾. Aetiology of lymphadenopathy varies from inflammatory process to malignant conditions ⁽⁴⁾. Hence peripheral lymphadenopathy is common in all age group ⁽⁵⁾.

In developing countries infective lymphadenopathy is common, mostly due to high prevalence of tuberculosis, however large percentage of adult age group lymphadenopathy turn out to be malignant ⁽⁵⁾. Factors that can assist in identifying the etiology of lymphadenopathy include patient's age, duration of lymphadenopathy, exposures, associated symptoms and location ⁽³⁾.

Fine Needle Aspiration Cytology is cost effective, easy to perform, fast and well established diagnostic cytological method used to triage various lymph node lesions. Definitive diagnosis can be made in majority of cases. It is the initial investigation for determining various lymph node lesions. It is

helpful for clinicians to decide whether to treat the lesion or followed up. In majority of cases, it helps in deciding the treatment avoiding time consuming, costlier and complex excision and unnecessary hospitalization in lymphadenopathy cases.

MATERIALS AND METHODS

2 years cross sectional study was carried out on the all patients with lymph node lesions coming to OPD at tertiary health care center and patients who are referred to pathology department for lymph node FNAC by the clinicians, during the period of October 2019 to October 2021.

Detailed lymph node examination was done and relevant clinical history was noted, before performing FNAC. After selecting the proper site, the procedure is explained to patient. Depending upon the site of aspiration by which the swelling was easily palpable, convenient position was given to patient. FNAC done. The smears are allowed to either fixed immediately by ether alcohol solution or are dried. The air dried smears stained with May-Grunwald Giemsa stain. The solution fixed smears are stained with Papanicolaou (Pap) and Giemsa. Microscopic examinations of the stained smear were carried out.

Inclusion Criteria

- All patients referred to Department of Pathology of GMCH, Aurangabad will be included in the study.

Exclusion Criteria

- Poorly fixed/unfixed specimens.
- Inadequate samples.
- Non Lymph Node sample on FNAC and inadequate material even after repeated aspiration attempts will be excluded from the study.

Lymph node lesions were classified based on following criteria.

- Reactive Lymphadenitis (non-specific lymphadenitis)
- Chronic granulomatous lymphadenitis

- Tuberculous lymph node
- Inflammatory lesion
- Primary lymphoid malignancy
- Metastatic lymph node

RESULT

Over a period of 2 years i.e. from October 2019 to October 2021, 450 patients presented with lymphadenopathy.

Table 1 – Age Distribution Of 450 Cases Studied By FNAC

Age Range	Numbers	%
0-10	38	8.44
11-20	89	19.78
21-30	86	19.11
31-40	59	13.11
41-50	51	11.33
51-60	48	10.67
61-70	61	13.56
71-80	18	4.00
Grand Total	450	100.00

Maximum number of cases were in age group 11 to 20 years i.e. in 2nd decade (19.78%) followed by 3rd decade (19.11%).

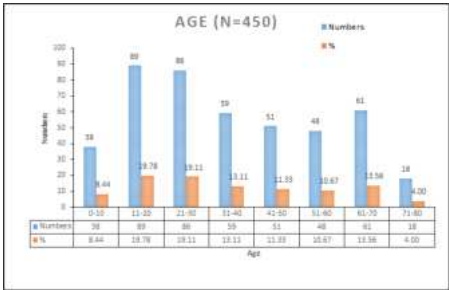


Diagram 1 – Graph showing age distribution.

Table 2- Sex distribution of 450 cases

Gender	Numbers	%
Female	239	53.12
Male	211	46.88
Total	450	

Male: Female ratio being 1.13:1.

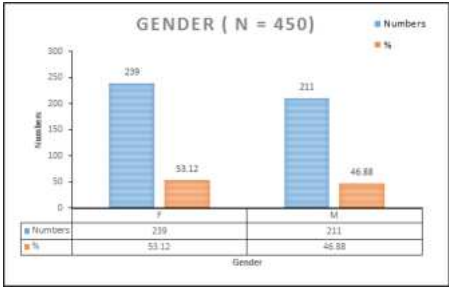


Diagram 2- Graph showing sex wise distribution of cases.

Males were affected in 211 cases constituting 46.66% and Females were affected in 239 cases constituting 53.12% of total cases.

Table 3 – Cytological diagnosis of FNAC of lymph nodes

Lymph node lesions	Numbers	%
Chronic granulomatous lesion	24	5.33
Cryptococcal lymphadenitis	1	0.23
Inflammatory lesion	13	2.88
Primary lymphoid malignancy	9	2.00
Metastatic lymph node	103	22.88
Non specific lymphadenitis	12	2.68
Reactive lymph node	183	40.67
Sinus histiocytosis	1	0.23
Tuberculous lymph node	104	23.11

Total	450	100
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Out of 450 cases, Benign lesions were the commonest cause of lymphadenopathy seen in 43.55% cases, followed by inflammatory lesions in 31.55% cases, metastatic lesions in 22.89% cases and primary malignant in 2% cases.

Out of 338 cases of benign and inflammatory lymph node lesions, the incidence of reactive hyperplasia of lymph node (40.67%) was more than tuberculous lymphadenopathy (23.11%).

Out of 103 cases of metastatic lymph node lesions, the most common cause of lymph node was metastasis of squamous cell carcinoma seen in 55.33% cases followed by adenocarcinoma (21.35%)

Out of 450 cases, primary malignant lymph node lesions recorded in 2% of cases.

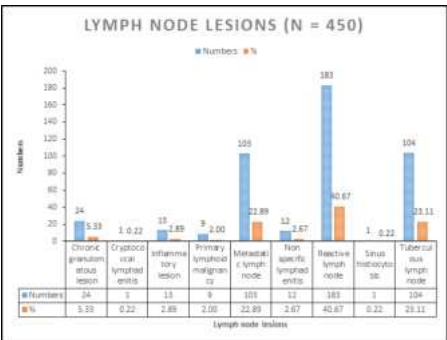


Diagram 3 - Cytological diagnosis of FNAC of lymph nodes

Table 4 – Showing site wise distribution of lymph node lesions

Site of Swelling	Number	%
Axillary	19	4.22
Cervical	320	71.11
Inguinal	23	5.11
Iliac	2	0.44
Occipital	1	0.22
Pre auricular	6	1.33
Post auricular	10	2.22
Supra clavicular	35	7.78
Scalp	1	0.22
Sub mandibular	33	7.33
Grand Total	450	100

Cervical group of lymph nodes were most commonly involved, aspirated in 320 cases (71.11%) followed by supra clavicular lymph node in 35 cases (7.78%) and sub mandibular lymph nodes in 33 cases (7.33%). Inguinal lymphadenopathy were seen in 23 cases (5.11%) whereas axillary lymphadenopathy were seen in 19 cases (4.22%)

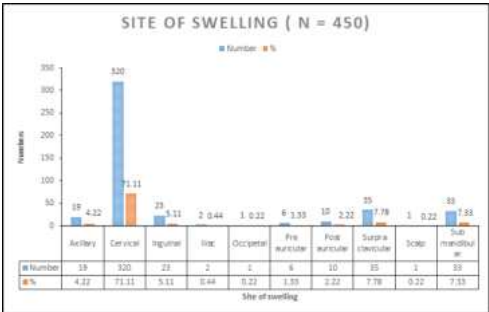


Diagram 4 – Showing site wise distribution of lymph node lesions.

Table 5 – Age and sex wise distribution of lymph node lesions

Age	0-10		11-20		21-30		31-40		41-50		51-60		61-70		71-80		Grand Total		
Sex	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M			
Chronic granulomatous lesion	-	-	7	-	4	2	3	-	-	2	2	-	1	2	1	-	18	6	
Cryptococcal lymphadenitis	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	
Inflammatory lesion	-	1	3	-	1	2	2	-	-	1	1	-	-	2	-	-	7	6	
Primary lymphoid malignancy	-	1	-	2	-	-	-	-	1	-	-	2	1	2	-	-	2	7	
Metastatic lymph node	1	-	-	-	1	3	4	5	9	15	5	14	1	6	9	3	8	39	64
Non specific lymphadenitis	1	2	2	4	-	1	-	1	1	-	-	-	-	-	-	-	4	8	
Reactive lymph node	12	17	19	19	27	12	16	6	5	10	10	11	6	7	2	4	97	86	
Sinus histiocytosis	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Tuberculous lymph node	3	-	23	9	20	13	15	6	5	2	1	2	4	1	-	-	71	33	
Total	17	21	55	34	53	33	40	19	21	30	19	29	2	8	3	6	1	23	21

Age group of 21 to 30 years most commonly affected by reactive hyperplasia of lymph node (8.67%) followed by tuberculous lymph node (6.22%) cases.

Out of 183 reactive hyperplasia of lymph node cases, there was female predominance with Female: Male ratio being 1.12:1.

Table 6 – Cytomorphology of metastatic lymph node lesions

Mets of	Numbers	%
Adenocarcinoma	22	21.4
ca prostate	2	1.94
Epithelioid sarcoma	1	0.97
Invasive breast carcinoma	13	12.6
Melanoma	1	0.97
Non small cell ca	1	0.97
Poorly differentiated carcinoma	5	4.86
Squamous cell carcinoma	57	55.3
Spindle cell neoplasm	1	0.97
Total	103	100

Out of 103 cases of metastatic lymph node lesions, the most common cause of lymph node was metastasis of squamous cell carcinoma seen in (55.33%) cases followed by adenocarcinoma (21.35%). Metastatic Invasive breast carcinoma was seen in 13 cases constituting (12.6%) of total

metastatic lymphadenopathy.

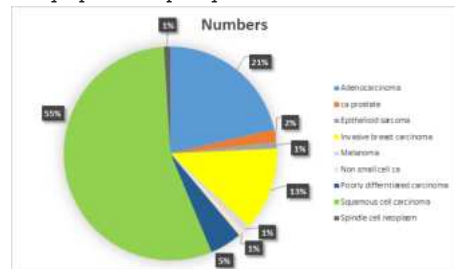


Diagram 5 – Cytomorphology of metastatic lymph node lesions

Metastatic Squamous Cell Carcinoma

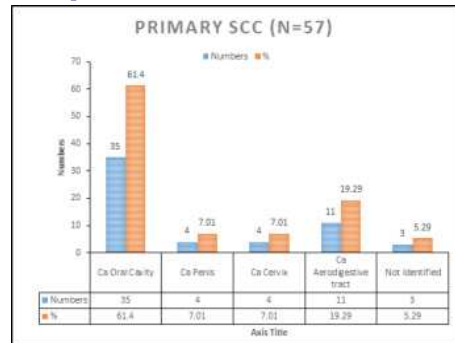


Diagram 6 – Primary lesions of metastatic SCC

Out of total 57 metastatic squamous cell carcinoma, most common primary found was carcinoma of oral cavity seen in 35 cases (61.4%) followed by carcinoma of aerodigestive tract in 11 cases constituting 19.29% of cases.

Metastatic Adenocarcinoma

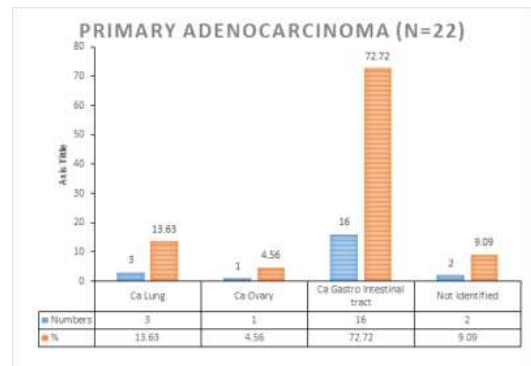


Diagram 7 – Primary lesions of metastatic Adenocarcinoma

Out of total 22 metastatic adenocarcinoma, 20 cases presented with known cases of primary, out of which 16 cases (72.72%) were of adenocarcinoma of gastrointestinal tract, 3 cases (13.63%) were of carcinoma of lung and 1 case was carcinoma of ovary constituting 4.56%.

Cytomorphological And Histopathological Correlation Of Lymph Node Lesions

Out of 450 cases, 120 cases were available for histopathological examination.

Total cases studied 120

Total cytological and histopathological correlated cases 116.

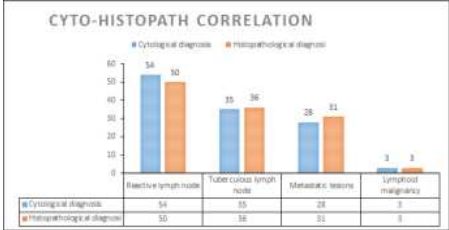
Overall cytological and histopathological correlation rate was 96.66%.

Table 7 - Showing Cytomorphological and histopathological correlation of Lymph node lesions –

	Cytological diagnosis	Histopathologic al diagnosis
Reactive lymph node	54	50
Tuberculous lymph node	35	36
Metastatic lesions	28	31
Lymphoid malignancy	3	3

Out of 183 cases reactive lymph node, 54 patients underwent histopathological examination. Out of those 50 cases were of reactive lymph node on histopathological examination as well.

Out of 4 cases, which were cases of reactive lymph node on FNAC, 1 case was tuberculous lymph node on histopathological examination and 3 cases were of metastatic lymphadenopathy on histopathological examination.



Graph showing Cytomorphological and histopathological correlation of Lymph node lesions –

Benign and inflammatory lymphadenopathy were the most common presentation of lymphadenopathy amounting to 71.66% (– 86).

Among benign and inflammatory lesions, reactive hyperplasia of lymph node was the most common finding amounting to 41.66% (n-50) followed by tuberculous lymphadenitis amounting to 30% (n-36).

Of the 28.33% (n-34) malignant lesions, 25.83% (n-31) were metastatic carcinoma and 2.5% (n-3) patients were cases of primary lymphoid malignancy.

	Cytolog ical dia gnosis	Histopat hologic al diagn osis	Sens itivit y	Spe cific ity	Positive predicti ve value	Negative predictiv e value
Reactive lymph node	54	50	100 %	94%	92.59%	100%
Tuberculous lymph node	35	36	97.22 %	100 %	100%	98.80%
Metastatic lesions	28	31	90.32 %	100 %	100%	96.70%
Lymphoid malignancy	3	3	100 %	100 %	100%	100%

Above table shows sensitivity, specificity, Positive predictive value, Negative predictive value of different lymph node lesions.

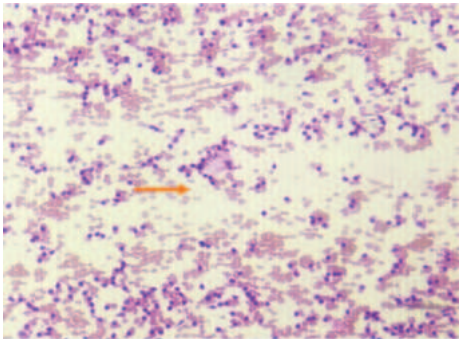


Image 1- Reactive hyperplasia of lymph node, showing polymorphic population of lymphocytes along with few tingible body macrophages(Arrow). [PAP stain 400 X]

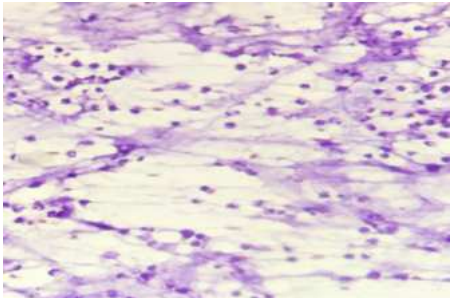


Image 2- Tuberculous lymph node, showing polymorphic population of lymphocytes with caseous necrosis and few epithelioid cells. [PAP stain 400 X]

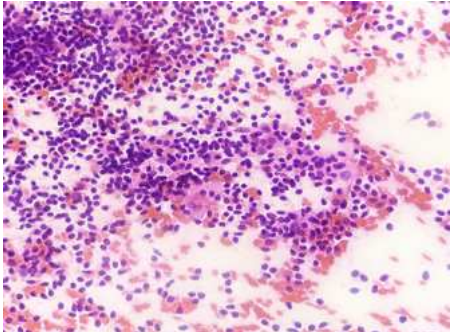


Image 3- Chronic granulomatous lymphadenitis, showing polymorphic population of lymphocytes, histiocytes and few epithelioid cells. [PAP stain 200 X]

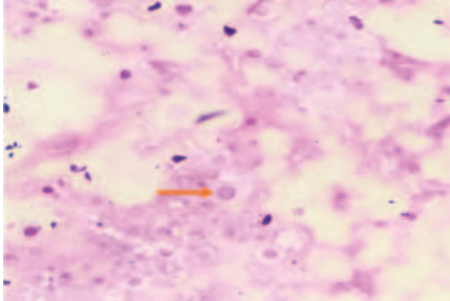


Image 4- Cryptococcal lymphadenitis, showing many macrophages with cryptococcal colonies which are round encapsulated(Arrow). [PAP 200X]

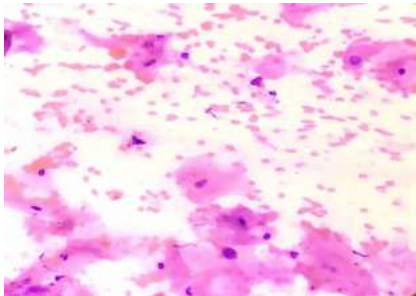


Image 5- Metastatic squamous cell carcinoma, showing round to oval polygonal cells with dense eosinophilic cytoplasm with hyperchromatic and atypical nuclei. [PAP 400 X]

Image 6- Metastatic adenocarcinoma, showing singly scattered and dyscohesive clusters and sheets of round to oval cells with pleomorphic hyperchromatic nuclei and eosinophilic cytoplasm. [PAP 400 X]

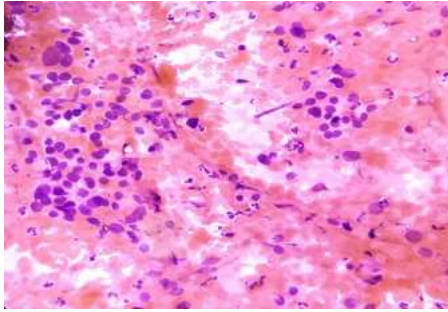


Image 7- Metastatic mucoepidermoid carcinoma, showing singly scattered and clusters of cubocolumnar cells with mildly pleomorphic hyperchromatic nuclei and faintly eosinophilic cytoplasm. [PAP 400 X]

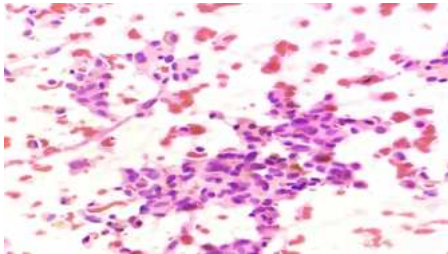


Image 8- Metastatic melanoma, showing clusters of spindle to oval cells with pleomorphic hyperchromatic nuclei. Few cells show intracytoplasmic pigment (Arrow) [PAP 200 X]

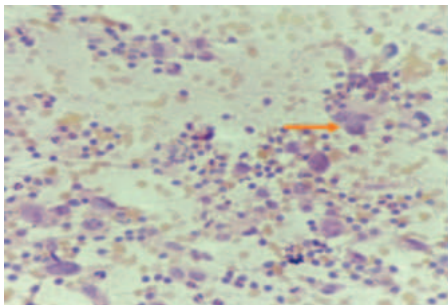


Image 9- Hodgkin's Lymphoma, showing lymphoid cells, plasma cells, eosinophils, few polymorphs and Reed Sternberg cells (Arrow). [PAP 200 X]

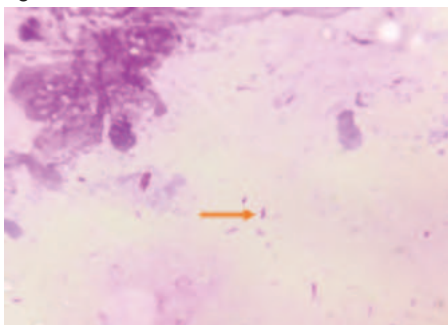


Image 10- Tuberculous lymph node, on ZN staining, showing red slender straight rod like acid fast bacilli (Arrow). [AFB stain 1000 X]

DISCUSSION

This was a study carried out in department of pathology, tertiary care hospital, from October 2019 to October 2021.

The basis of the study is the fine needle aspiration material. A total 450 patients with lymph node lesions were studied, out of

which 120 cases underwent for histopathological examination.

FNAC being simple, cost effective investigatory modality and swollen lymph nodes being easily accessible organ to give lot of information. Several workers have worked on this topic.

Age Group-

In the present study, the age of the patients ranged from as young as 1 year upto 78 years old. Majority of the patients in the age group 11-20 years (19.78%) followed by 21-30 years (19.11%). (Table 1), which is comparable with study carried out by P Patro et al⁽⁶⁾ where maximum cases were recorded in the age group of 21 to 30.

Smita P Bhide et al⁽⁷⁾ found that maximum patients were in the age group of 11-30 years. Gupta et al⁽⁸⁾ also suggested that most patients were in the age group of 0-20 years.

Comparison of other studies with present study-

Auhors	Year	Age group
Pandit AA et al ⁽⁹⁾	1987	0-20
Gupta et al ⁽⁸⁾	2003	0-20
Smita P Bhide et al ⁽⁷⁾	2017	11-30
P Patro et al ⁽⁶⁾	2018	21-30
Gayen P et al ⁽⁵⁾	2019	11-30
Present Study	2021	11-20

Sex

In present study, females (53.12%) were more commonly affected than males (46.88%) with female to male ratio of 1.13:1. (Table 2)

Duraiswami R et al⁽¹⁰⁾ and Gayen P et al⁽⁵⁾ also found a preponderance of female patients which is similar to the present study.

Following table shows F:M ratio of present study in comparison to other studies.

Authors	Year	F:M
Duraiswami R et al ⁽¹⁰⁾	2017	1.56:1
P Patro et al ⁽⁶⁾	2018	1.66:1
S Reddy et al ⁽¹¹⁾	2018	1.08:1
Gayen P et al ⁽⁵⁾	2019	1.50:1
AK Gupta et al ⁽¹²⁾	1991	1:1.14
Present Study	2021	1.13:1

In all the studies, female preponderance was found with variation in ratio, which was comparable to present study, where as AK Gupta et al⁽¹²⁾ reported F:M ration of 1:1.14 which contradict present study.

Sites of involvement in FNAC

The most commonly involved group of lymph node was cervical (71.11%) followed by supraclavicular group of lymph nodes (7.78%) and submandibular group of lymph nodes (7.33%). (Table 4)

This finding is similar to Sidhling Reddy et al⁽¹³⁾ (82%), P Patro et al⁽⁶⁾ (74.24%) and Uma et al⁽¹⁴⁾ (62.9%) cases. This may be due to, cervical group of lymph nodes are easily accessible for examination and evaluation.

The second most common group of lymph nodes affected are supraclavicular group of lymph nodes. Sumytra KM Quadri et al⁽¹⁵⁾ found that axillary group of lymph nodes were 2nd most common group affected.

Following table shows site of involvement of present study in comparison with other studies.

Authors	Cervical LN	Supraclavicular LN
Uma et al ⁽¹⁴⁾	62.90%	2.22%
Shilpa et al ⁽¹⁶⁾	39.30%	6.25%

Shruti et al ⁽¹⁷⁾	50.80%	12.30%
P Patro et al ⁽⁶⁾	74.24%	12.72%
Present study	71.11%	7.78%

Cytological Diagnosis-

In present study, have diagnosed various diseases in the FNAC of different lymph nodes like reactive hyperplasia of lymph node, chronic granulomatous lymphadenitis, tuberculous lymphadenitis, Necrotising lymphadenitis, primary lymphoid malignancy and metastatic lesions in lymph node. (Table 3)

Among these, reactive hyperplasia of lymph node was the most common (40.67%) cytomorphological diagnosis which is comparable to the study done by Gayen P et al⁽⁵⁾ (46%, 23 cases out of 50 FNA samples) and Duraiswami R et al⁽¹⁰⁾ (49.8%, 126 cases out of 253 FNA evaluations).

Present study found that pediatric and adolescents age group most commonly affected by reactive hyperplasia of lymph node. Shrivastav et al⁽¹⁸⁾ also observed that in pediatric and adolescent age group most common cause of lymphadenopathy is reactive hyperplasia of lymph node (52.38%).

Mohenty R et al⁽¹⁹⁾ and Pandey P et al⁽²⁰⁾ also observed that reactive hyperplasia of lymph node was the most frequent diagnosis in palpable lymphadenopathy.

Present study found that tuberculous lymphadenopathy (23.11%) was the second most common cause of lymph node lesions which compares fairly with the findings of the study done by Gayatri et al⁽²¹⁾ (14.5%) and Uma et al⁽¹⁴⁾ (28.54%) whereas tuberculous lymphadenopathy (n=102) was found to be the more common cause of lymphadenopathy (17.67%) in the study of Kumar H et al⁽²²⁾

Present study observed that metastatic lymph node lesion was more common cause of lymphadenopathy (22.88%) that granulomatous lymphadenitis (8.22%) which is similar to the findings of a study conducted by Smita et al⁽⁷⁾ where 30% cases amounted for metastatic lymphadenopathy and 5.33% cases showed granulomatous lymphadenitis.

Following table shows comparison of cytological lesions on FNAC of present study with other studies.

Authors	Reactive LN	Tuberculous LN	Metastatic LN	Granulomatous LN
Gayatri et al ⁽²¹⁾	26.20%	14.50%	21.32%	14.70%
Smita et al ⁽⁷⁾	42.48%	44.25%	30%	7.97%
Uma et al ⁽¹⁴⁾	47.30%	28.54%	3.52%	7.21%
Present Study	40.67%	23.11%	22.88%	5.33%

In present study out of 450 total aspirates, 103 cases (22.88%) were diagnosed as metastatic lymphadenopathy and primary lymphoid malignancy was diagnosed in 9 cases (2%).

It was comparable to K Alam et al⁽²³⁾ in which 80.4% were metastatic lymphadenitis of lymph node and 15.3% cases were of primary malignant lesions. Study conducted by Gayatri et al⁽²¹⁾ found that 21.32% cases were of metastatic lymphadenopathy and 0.17% were cases of primary lymphoid malignancy.

Metastatic Lymphadenopathy

In present study metastatic involvement of squamous cell carcinoma constituted in 57 cases (55.3%) followed by adenocarcinoma in 22 cases (21.4%).

Similar findings were noted by K Alam et al⁽²³⁾ found 67.87% cases of metastatic squamous cell carcinoma and Bagwan et al⁽²⁴⁾ found 36.81% cases of metastatic squamous cell carcinoma.

Nasreen Hafez et al⁽⁴⁾ observed that out of 31 metastatic lymphadenopathy cases, 14 cases (45.2%) were of metastatic squamous cell carcinoma where as 8 cases (25.8%) were of metastatic adenocarcinoma.

An important clue to diagnosis of metastatic squamous cell carcinoma on PAP stain is presence of keratinisation. Cells with abundant sharply demarcated dense orangiophilic cytoplasm and pyknotic nuclei are present in keratinizing cancers. (Image 5)

(Graph 6) The most common primary in case of metastatic squamous cell carcinoma found was carcinoma of oral cavity constituting 35 cases (61.4%) followed by carcinoma of aerodigestive tract constituting 11 cases (19.29%). K Alam et al⁽²³⁾ and K Konal et al⁽²⁵⁾ found carcinoma of oral cavity as the most common primary seen in 24.02% patients and 49.8% cases respectively.

Out of 103 cases of metastatic lymph node cases, 22 cases were of metastatic adenocarcinoma.

(Graph 7) Out of 22 cases, 16 cases presented with known case of adenocarcinoma of gastro intestinal tract, 3 cases presented with known case of carcinoma lung and one case presented with known case of carcinoma ovary. Rest 2 cases presented as lymph node enlargement in which primary tumor searched retrospectively. Similar findings have been reported by SK Sinha et al⁽²⁶⁾ who observed that malignancy of gastro intestinal tract most frequently metastasize to lymph node.

In metastatic adenocarcinoma, tumor cells arranged in mostly glandular pattern. Individual cells show abundant cytoplasm with thickened nuclear membrane and prominent nucleoli. Mucin vacuoles present as small droplets and at places appears as a signet ring (Image 6)

Out of 103 cases of metastatic lesions, 13 cases (12.6%) were of metastatic infiltrating duct carcinoma of breast. Study conducted by K Alam et al⁽²³⁾ found that 11.31% cases of metastatic infiltrating duct carcinoma of breast. Cytologically tumor cells have high N:C ratio, pleomorphic nuclei, coarse chromatin and variable amount of cytoplasm.

Cytomorphological and histopathological correlation of lymph node lesions-

Out of total 450 cases, cytological and histopathological correlated cases were 116. Overall cytological and histopathological correlation rate was 96.66%.

In the present study there were 54 cases of reactive lymph node which were correlating with both FNAC and HPE. Out of 54 cases yielding a correlation rate of 92.59%.

Adhikari et al⁽²⁷⁾ observed a 100% correlation rate where as Sumit Giri et al⁽²⁸⁾ correlated only 2 cases out of 6 leading to 33.3% correlation rate.

In present 35 out of 36 cases of tuberculous lymphadenopathy correlated well with both FNAC and HPE with correlation rate of 97.22%. Sumit Giri et al⁽²⁸⁾ had 94.11% correlation rate. Adhikari et al⁽²⁷⁾ correlated 34 cases out of 39 patients constituting 87% of correlation rate.

For the diagnosis of primary lymphoid malignancy, FNA provides excellent cytomorphological diagnosis if adequately sampled. In present study all cases of primary lymphoid malignancy correlated with both cytomorphologically and histopathologically (100%). Sumit Giri et al⁽²⁸⁾ and Nasreen et al⁽⁴⁾ correlate 14 cases out of 18 Hodgkins lymphoma patients where as reported 100% and 74% correlation of non hodgkins lymphoma cases.

In present study all metastatic lymph node lesions correlated well with both FNAC and HPE (100% correlation), similar findings found in study conducted by **Adhikari et al**⁽²⁷⁾ and **Nasreen et al**⁽⁴⁾ who reported 100% correlation rate of metastatic deposit.

In the present study the overall sensitivity and specificity was 96.88% and 98.5% respectively.

Sumyra et al⁽¹⁵⁾, **Sumit Giri et al**⁽²⁸⁾ and **Nasreen et al**⁽⁴⁾ reported sensitivity rate of 95%, 90.3% and 91% respectively. The specificity of studies conducted by **Sumyra et al**⁽¹⁵⁾, **Sumit Giri et al**⁽²⁸⁾ and **Nasreen et al**⁽⁴⁾ were 91%, 91% and 67.2% respectively.

Pitfalls-

In present study, out of 183 cases of reactive hyperplasia of lymph node, 54 cases underwent for histopathological examination. 50 cases confirmed the diagnosis, while one case was reported as tuberculous lymph node and 3 cases were reported metastatic lesion in lymph node on histology.

Scarcity of aspirate has been reported as one of the major pitfalls in the cytodiagnosis and the polymorphous population of lymphoid cells on cytology led to the wrong diagnosis.

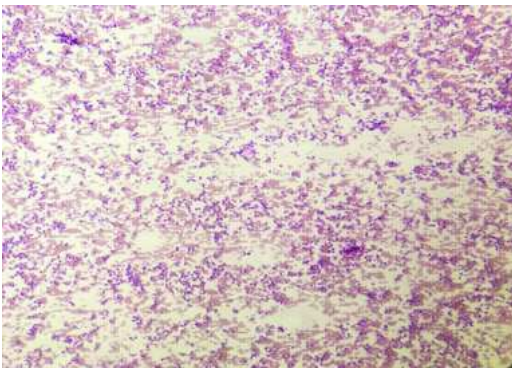


Image 11 - Reactive hyperplasia of lymph node [Cytology]

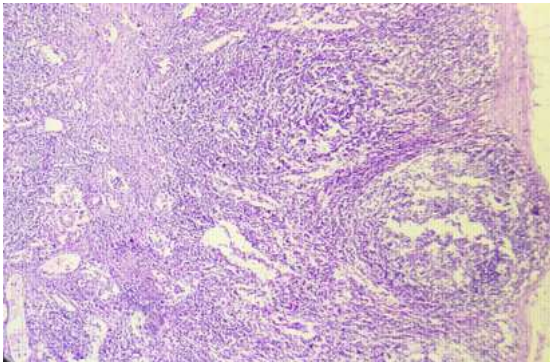


Image 12 - Reactive hyperplasia of lymph node [Histopathology]

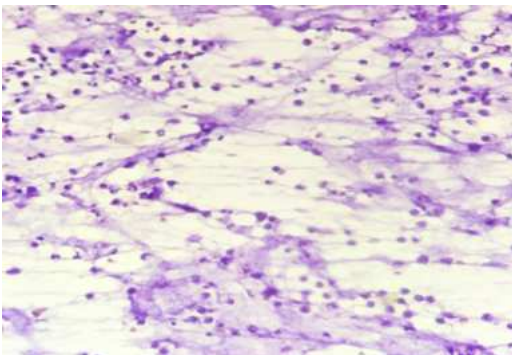


Image 13 - Tuberculous lymph node [Cytology]

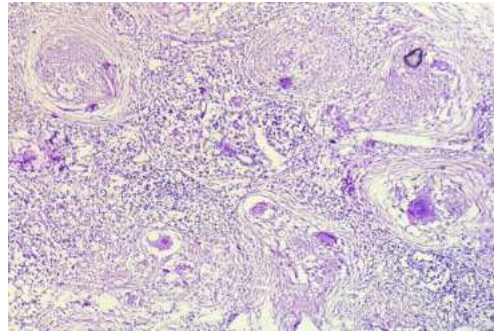


Image 14 - Tuberculous lymph node [Histopathology]

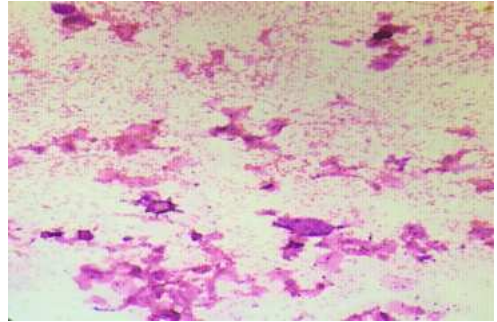


Image 15 - Metastatic squamous cell carcinoma [Cytology]

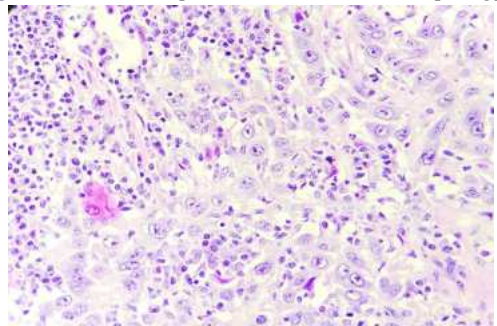


Image 16 - Metastatic squamous cell carcinoma [Histopathology]

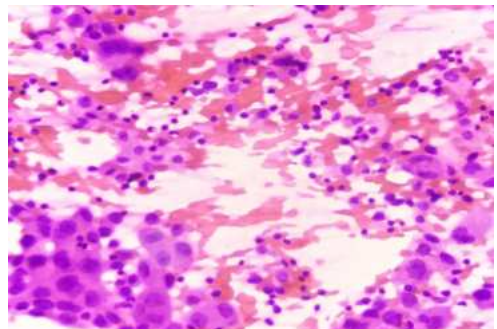


Image 17 - Metastatic Adenocarcinoma [Cytology]

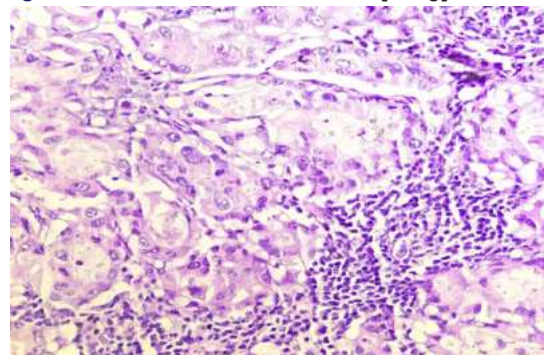


Image 18 - Metastatic Adenocarcinoma [Histopathology]



Image 19- Non-Hodgkin's Lymphoma [Histopathology]

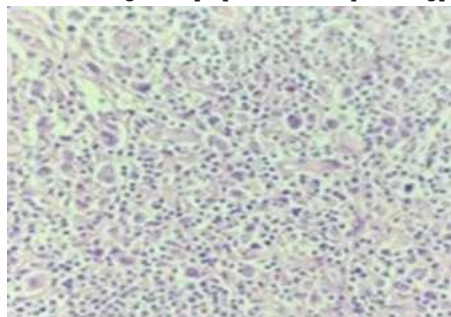


Image 20- Hodgkin's Lymphoma [Histopathology]

SUMMARY AND CONCLUSION

- This study was conducted over a period of 2 years i.e. from October 2019 to October 2021. 450 cases of lymph node lesions were studied with the help of fine needle aspiration cytology.
- There was female predominance with female and male ratio 1.13:1.
- The peak incidence of lymphadenopathy was found in 2nd and 3rd decades of life (19.78% and 19.11%) respectively.
- Cervical group of lymph nodes were found to be involved in maximum numbers of cases (71.11%) followed by supraclavicular lymph nodes (7.78%)
- Reactive hyperplasia of lymph node was the commonest being 40.67% followed by tuberculous lymphadenopathy in 23.11% and metastatic lymphadenopathy (22.88%).
- In metastatic group, the commonest metastatic lesion observed was squamous cell carcinoma (55.3%) followed by adenocarcinoma in (21.4%) cases and infiltrating ductal carcinoma in 13 cases constituting 12.6% of cases.
- The peak age incidence in metastatic lymphadenopathy was seen in the 6th decade with male predominance.
- Out of total 450 cases, 120 cases underwent both cytopathological and histopathological examination. The overall correlation rate was 96.66%.
- In the present study the overall sensitivity and specificity was 96.80% and 98.5% respectively.

Fine needle aspiration cytology helped to confirm the diagnosis, to know response to treatment, for staging the disease and to give clue to occult primary, as far as the management was concerned.

The fine needle aspiration cytology of lymph node is cheap, simple, reproducible, repetitive and less traumatic procedure, which can be easily use for lymph node lesions.

Thus to conclude, Fine needle aspiration cytology is extension of the biopsy procedure, lending itself to saving of time and cost. FNAC is convenient for both patients and physician in the management and follow up of lymphadenopathies.

FNAC helps in defining the tumor type, staging tumor, while the clinical history and investigation helps in identifying the primary tumor site.

REFERENCES

- 1) Crivellato, E., Travan, L., & Ribatti, D. (2007). The Hippocratic treatise 'On glands': the first document on lymphoid tissue and lymph nodes. *Leukemia*, 21(4), 591-592.
- 2) Bujoreanu I, Gupta V. Anatomy, Lymph Nodes. [Updated 2021 Jul 31]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557717/>
- 3) Gaddey, H. L., & Riegel, A. M. (2016). Unexplained lymphadenopathy: evaluation and differential diagnosis. *American family physician*, 94(11), 896-903.
- 4) Hafez, N. H., & Tahoun, N. S. (2011). Reliability of fine needle aspiration cytology (FNAC) as a diagnostic tool in cases of cervical lymphadenopathy. *Journal of the Egyptian National Cancer Institute*, 23(3), 105-114.
- 5) Gayen, P, Ghosh, S., & Naskar, S. (2019). Study of fine needle aspiration cytology evaluation of peripheral lymph nodes.
- 6) Patro, P, Lad, P, Hoogar, M. B., Dhar, R., Sahu, S., Mithila, K. B., & Naik, V. (2018). Spectrum of lesions in lymph nodes-a cytological study. *Int J Health Sci Res*, 8(11), 75-81.
- 7) Bhide, S. P, Katre, R. Y., & Joshi, S. R. (2017). Cytological evaluation of fine needle aspiration cytology in lymph node lesions. *J. Med. Sci. Clin. Res*, 5(8), 26869-76.
- 8) Gupta, R. K., Naran, S., Lallu, S., & Fauck, R. (2003). The diagnostic value of fine needle aspiration cytology (FNAC) in the assessment of palpable supraclavicular lymph nodes: a study of 218 cases. *Cytopathology*, 14(4), 201-207.
- 9) Pandit, A. A., Candes, F. P., & Khubchandani, S. R. (1987). Fine needle aspiration cytology of lymph nodes. *Journal of postgraduate medicine*, 33(3), 134-136.
- 10) Duraiswami, R., Margam, S., Chandran, P., & Prakash, A. (2017). Spectrum of pathologies on FNAC evaluation of peripheral lymph nodes at a tertiary care center in hyderabad: a retrospective study. *Int J Adv Med*, 4(4), 27-33.
- 11) Reddy, S., Kushtagi, A. V., Reddey, H., & Husain, K. W. (2023). Morphological patterns of FNAC of lymph nodes. *Indian Journal of Pathology and Oncology*, 5(2), 269-272.
- 12) Gupta, A. K., Nayar, M., & Chandra, M. (1991). Reliability and limitations of fine needle aspiration cytology of lymphadenopathies. An analysis of 1,261 cases. *Acta cytologica*, 35(6), 777-783.
- 13) Sharma, S. K., & Mohan, A. (2004). Extrapulmonary tuberculosis. *Indian Journal of Medical Research*, 120(4), 316.
- 14) Uma, P (2015). Lymph Node Lesions in Underserved Population of Andhra Pradesh: A Prospective Study. *Int J Sci Stud*, 3(7), 172-175.
- 15) Qadri, S. K., Hamdani, N. H., Shah, P, Lone, M. I., & Baba, K. M. (2012). Profile of lymphadenopathy in Kashmir valley: a cytological study. *Asian Pacific Journal of Cancer Prevention*, 13(8), 3621-3625.
- 16) Chamyal, P. C., & Sabarigirish, K. (1997). Clinico-pathological correlation study of cervical lymph node masses. *Indian Journal of Otolaryngology and Head & Neck Surgery*, 49, 402-405.
- 17) Willard-Mack, C. L. (2006). Normal structure, function, and histology of lymph nodes. *Toxicologic pathology*, 34(5), 409-424.
- 18) Shrivastav, A., Shah, H. A., Agarwal, N. M., Santwani, P. M., & Srivastava, G. (2014). Evaluation of peripheral lymphadenopathy by fine needle aspiration cytology: A three year study at tertiary center. *Journal of Dr. NTR University of Health Sciences*, 3(2), 86-91.
- 19) Mohanty, R., & Wilkinson, A. (2013). Utility of fine needle aspiration cytology of lymph nodes. *IOSR J Dent Med Sci*, 8(5), 13-18.
- 20) Pandey, P, Dixit, A., & Mahajan, N. C. (2013). The diagnostic value of FNAC in assessment of superficial palpable lymph nodes: a study of 395 cases. *Al Ameen J Med Sci*, 6(4), 320-7.
- 21) Gayathri, M. N., Chaurasia, S., Bharathi, M., & Shashidhar, H. B. (2015). Pattern of lymphadenopathy in fine needle aspiration cytology: a retrospective study. *Int J Res Med Sci*, 3(6), 1416-9.
- 22) Kumar, H., Chandanwale, S. S., Gore, C. R., Buch, A. C., Satav, V. H., & Pagaro, P. M. (2013). Role of fine needle aspiration cytology in assessment of cervical lymphadenopathy. *Medical Journal of Dr. DY Patil University*, 6(4), 400-404.
- 23) Alam, K., Khan, A., Siddiqui, F., Jain, A., Haider, N., & Maheshwari, V. (2010). Fine needle aspiration cytology (FNAC), a handy tool for metastatic lymphadenopathy. *Int J Pathol*, 10(2), 1-7.
- 24) Bagwan, I. N., Kane, S. V., & Chinoy, R. F. (2007). Cytologic evaluation of the enlarged neck node: FNAC utility in metastatic neck disease. *Int J Pathol*, 6(2), 1-7.
- 25) Konar, K., Ghosh, S., Ghosh, T., Bhattacharya, S., & Sanyal, S. (2008). Pitfalls in the cytodagnosis of metastatic squamous cell carcinoma in the head and neck: A retrospective study. *Journal of Cytology*, 25(4), 119-122.
- 26) Sinha SK, Basu K, Bhattacharya A, Banerjee U, Banerjee D. Aspiration cytodagnosis of metastatic lesions with special reference to primary sites. *J Cytol* 2003;20:16-8.
- 27) Adhikari, P, Sinha, B. K., & Baskota, D. K. (2011). Comparison of fine needle aspiration cytology and histopathology in diagnosing cervical lymphadenopathies. *The Australasian medical journal*, 4(2), 97.
- 28) Gini, S., & Singh, K. (2012). Role of fine needle aspiration cytology in evaluation of patients with superficial lymphadenopathy. *Int J Biol Med Res*, 3(4), 2475-9.