

**Original Article****Cytological Evaluation of Fine Needle Aspiration Cytology in Lymph Node Lesions**

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Phone No- 9403084389. Email: [pathology@mitmimer.com](mailto:pathology@mitmimer.com)**ABSTRACT**

*Lymphadenopathy is an abnormal increase in size and /or altered consistency of lymph nodes. Tuberculosis is the commonest cause of lymphadenopathy in developing countries like India and should be considered in every case of granulomatous lymphadenopathy unless proved otherwise. The use of FNAC in the diagnosis of lymphadenopathy has become an acceptable and widely practiced minimally invasive technique which is simple, safe, rapid, relatively pain free & highly cost effective as well as accurate. The present study has been taken up to study the utility of FNAC in the lesions of lymph nodes and to study the different cytomorphological patterns associated with various lymphadenopathies in H and E stained smears. The diagnosis were compared with available histopathology, thus verifying the accuracy of FNAC in detecting lymph node lesions.*

**Key Words:** FNAC, Lymphadenopathy.**INTRODUCTION**

Lymphadenopathy is an abnormal increase in size and /or altered consistency of lymph nodes. It is a clinical manifestation of regional or systemic disease and serves as an excellent clue to the underlying disease.<sup>1</sup> The commonest cause of lymphadenopathy is non-specific reactive hyperplasia in which underlying etiology is frequently found. Tuberculosis is the commonest cause of lymphadenopathy in developing countries like India and should be considered in

every case of granulomatous lymphadenopathy unless proved otherwise.<sup>2</sup>

Lymph node cytology was found to be useful tool for segregating lymphadenopathy causes for further evaluation and for identification of opportunistic infections, neoplastic and non-neoplastic lesions.<sup>3</sup> Although surgical excision of peripheral node is relatively simple, vicinity to other anatomical structures sometimes may cause problems. The procedure does require anesthesia, strict sterility and theatre time and it may leave a

scar. FNAC offers the alternative of immediate and preliminary diagnostic test.<sup>2</sup>

The use of FNAC in the diagnosis of lymphadenopathy has become an acceptable and widely practiced minimally invasive technique which is simple, safe, rapid, relatively pain free & highly cost effective as well as accurate. Furthermore aspirated sample can be utilized for additional studies such as immunomarker and histochemical studies<sup>3</sup>

The present study has been taken up to study the utility of FNAC in the lesions of lymph nodes and to study the different cytomorphological patterns associated with various lymphadenopathies in H and E stained smears. The diagnosis were compared with available histopathology, thus verifying the accuracy of FNAC in detecting lymph node lesions.

#### AIMS AND OBJECTIVES

1. To study different cytomorphological patterns associated with various lymphadenopathies
2. To evaluate the diagnostic value of FNAC in palpable lymphadenopathy
3. To study the frequency of various neoplastic versus non-neoplastic lesions of lymph nodes
4. To correlate cytological diagnosis with available histological diagnosis

#### MATERIALS AND METHODS

This was the prospective study carried out in the Department of Pathology from November 2014 to August 2016. All the patients coming to rural tertiary care hospital with lymphadenopathy were included in the present study.

Detailed history was taken and complete clinical examination of patient was carried out including general, systemic and local examination with reference to lymph node lesions. Relevant past, family history was taken.

Procedure and importance of FNAC was explained to the patient. Written informed consent was taken. FNAC was performed under all aseptic

precautions as OPD procedure with the help of 23 gauge needle and disposable 5ml/10ml syringes. Smears were prepared, fixed in 95% ethyl alcohol and then stained with H&E stains. FNAC smears were carefully studied and categorized into non-neoplastic and neoplastic lesions.

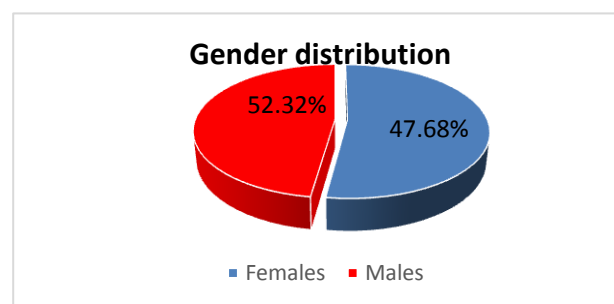
Out of 151 cases, excisional biopsy was available in 82 cases. All the specimens were fixed in 10% formalin. Detailed gross examination was done and sections were taken which were stained by H & E. Cytological diagnosis was correlated with available histological diagnosis.

#### RESULTS

The present study included 151 patients with lymphadenopathy who attended surgery out-patients department at a tertiary care hospital. Fine Needle aspiration cytology (FNAC) was done in these cases. Excisional biopsy was available in 82 cases (54.30%). Finally, these cases were analyzed and cyto-histological correlation was done.

**Table No.1:** Age wise distribution of lymph node lesions

Age in years	No. of patients	Percentages
1-10	13	8.61
11-20	32	21.20
21-30	32	21.20
31-40	25	16.56
41-50	17	11.26
51-60	8	5.29
61-70	14	9.27
71-80	8	5.29
81-90	2	1.32
Total	151	100



**Figure no. 1** showing gender distribution of lymph node lesions

Out of 151 cases 79 (52.32%) were females and 72(47.68%) were males. The female to male ratio was 1.09:1

In all types of lesions cervical group was the most common group involved in almost 91(60.26%) of cases followed by axillary group which was involved in 30 cases (19.87%).Most of the lymph nodes were firm in consistency (86.75%). Matting was present in 21.19% of cases. Out of 151 aspirates, 126 (83.45%) aspirates were hemorrhagic followed by cheesy and purulent aspirates.

**Table No.2 :** The basic distribution of lymph node lesions

Type of lesions	No. of patients	Percentages
Non-neoplastic	113	74.83
Neoplastic	24	15.90
Inadequate	14	9.27
Total	151	100

Out of these 151 cases, in lymph nodes non-neoplastic lesions were more common than neoplastic lesions constituting 74.83% of total cases. 24 cases (15.90%) were of neoplastic in nature. Inadequate smears constituting about 14(9.27%) of the total cases.

**Table no.3:** Distribution of non-neoplastic lesions of lymph node on cytology

S.No.	Type of lesions	No.	%
1	Tuberculous lymphadenitis	50	44.25
2	Reactive lymphadenitis	48	42.48
3	Granulomatous lymphadenitis	9	7.97
4	Acute suppurative lymphadenitis	6	5.30
5	Total	113	100

Out of these 113 cases, 50 cases (44.25%) were diagnosed as tuberculous lymphadenitis, 48 cases (42.48%) as reactive lymphadenitis, 9 (7.97%) cases were granulomatous lymphadenitis and 6 cases(5.30%) were of acute suppurative lymphadenitis.

**Table no.4:** Distribution of neoplastic lesions of lymph node on cytology

Type of neoplastic lesions	No. of patients	Percentage
Metastases	22	91.66
Hodgkin lymphoma	1	4.17
Non-Hodgkin lymphoma	1	4.17
Total	24	100

Among the neoplastic lesions metastasis had maximum number of cases 22 followed by Hodgkin lymphoma in 1 case and Non-Hodgkin lymphoma in 1 case.

Among the metastatic lesions squamous cell deposits were common, seen in 14 cases (63.63%). Next common metastatic deposits was ductal cell carcinoma seen in 6 cases (27.27%), followed by adenocarcinoma (1 case) and malignant melanoma (1 case).

Out of 151 cases, excisional biopsy was available in 82 (54.30%) cases. Out of 82 cases, 30 cases were of tuberculous lymphadenitis (36.5%), 31 cases were of reactive lymphadenitis (37.8%). Among the neoplastic lesions, metastasis was the most common constituting 12.1%.

Out of 151 cases of FNAC, cytohistological correlation could be done in 82 cases. The cytological diagnosis was correlating with histopathological diagnosis in 79 cases (96.3%) and inconsistent in 03 cases in the present study. In cytology reactive lymphadenitis was present in 33 cases out of which two cases were inconsistent. One was found to be of metastatic deposits and other was of Non-Hodgkin's lymphoma on histopathology. On FNAC, there were 8 cases of granulomatous lymphadenitis out of which one was found to be Hodgkin's lymphoma on histopathology. Total 9 cases of metastases were confirmed on histopathology. One case each of Hodgkin and Non-Hodgkin lymphoma were consistent on histopathology.

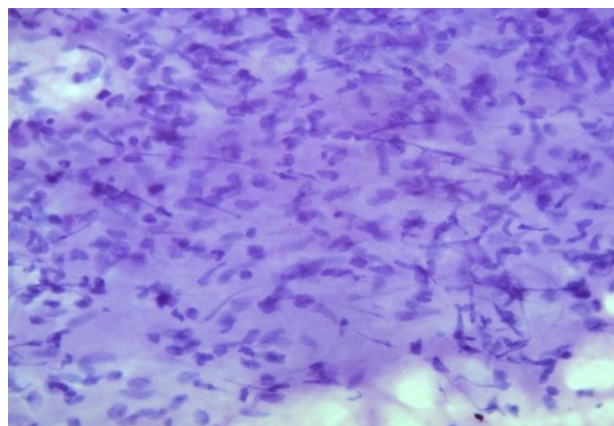
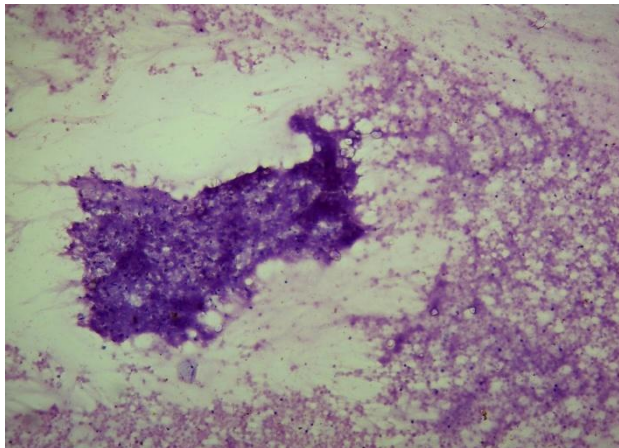
**Table no.5:** FNAC and Histopathology results according to the status of malignancy

FNAC	Histopathology		TOTAL
	BENIGN	MALIGNANT	
BENIGN	68	3	71
MALIGNANT	0	11	11
TOTAL	68	14	82

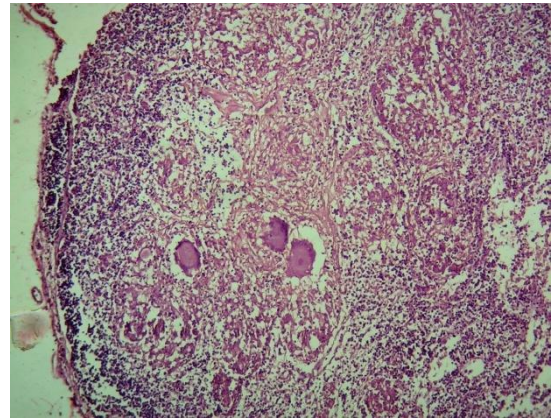
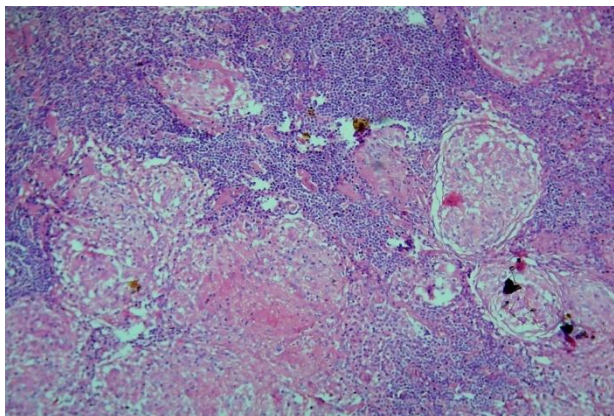


Comparing FNAC results with histopathological diagnoses revealed that 68 cases were diagnosed both by FNAC and Histopathology as benign and 11 cases as malignant lesions. There were 3 false negative cases in the present study.

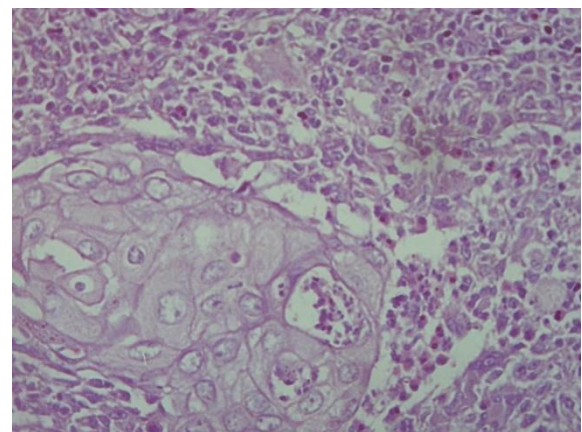
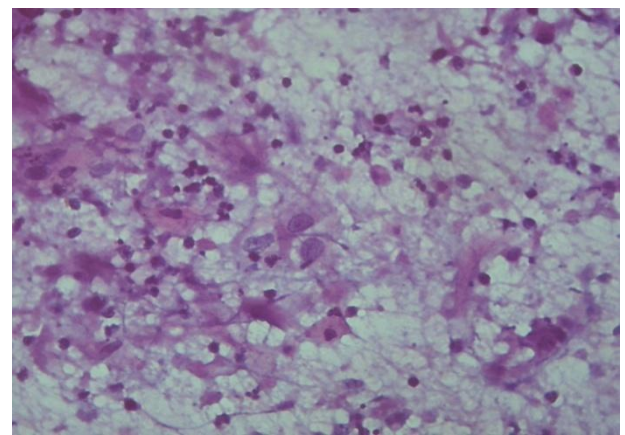
FNAC had a sensitivity of 78.57% and a specificity of 100%. Positive and Negative predictive value were 100% and 95.77% respectively and diagnostic accuracy was 96.47%.



**Fig no. 2** FNAC smears of Tuberculous Lymphadenitis showing caseation & epithelioid cells(H & E10 X)

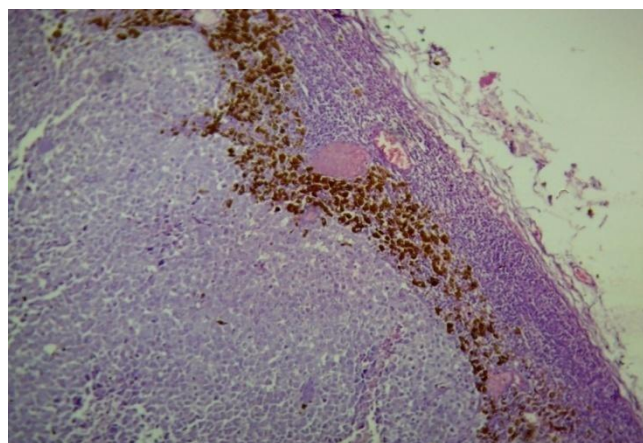
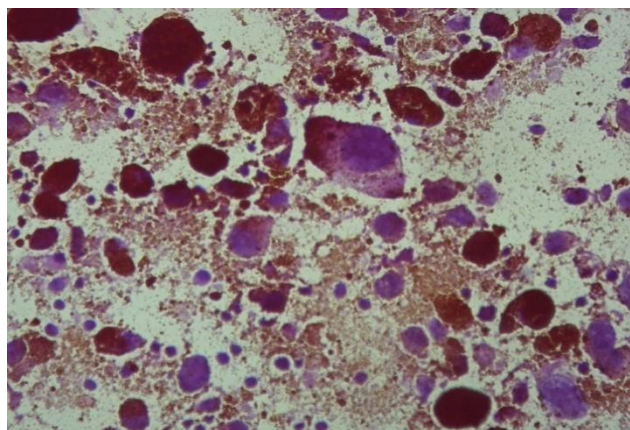


**Fig no 3** Histopathology of Tuberculous Lymphadenitis showing caseation and epithelioid granulomawith Langhan’s giant cell ( H & E 10X)



**Fig no. 4** FNAC smear & histopathology of metastatic deposits of Squamous cell Carcinoma to lymph node.( H & E 40X)





**Fig no.5** FNAC smear & histopathology of metastatic deposits of malignant melanoma to lymph node H & E 40X)

**DISCUSSION**

FNAC is an important diagnostic tool for diagnosing benign as well as malignant lesions. It

**Table no.6** Distributions of different lesions in various studies

Studies	TBL	RL	Metastases	HL	NHL
Shafiulla et al(1993) <sup>5</sup>	69%	17.8%	2.9%	3.1%	3.4
Jha BC et al(2001) <sup>12</sup>	63.8%	9.6%	20.79%	-	--
Jindal N.et al(2002) <sup>13</sup>	48.4%	22.5%	13.3%	15.8%	-
Arora B. et al(1990) <sup>14</sup>	62%	17%	6%	4%	11%
Present study (2016)	44.2%	42.4%	13.24%	1.32%	1.32%

In the present study, bulk of diseases were of tuberculous etiology and of reactive nature. In the present study, tuberculosis accounted for (50/151) 44.2% of cases.

Among the neoplastic lesions, secondaries accounted for (20/151) 13.24% of cases and Hodgkin lymphoma and Non-Hodgkin lymphoma each comprised 1.32% (2 cases) of cases. Similar observations were made by Jha B.C.et al<sup>12</sup> Jindal N et al<sup>13</sup>, & Arora B et al<sup>14</sup>.

is safe, simple and inexpensive definite diagnostic procedure to render a prompt diagnosis, especially in lymph node aspirates, where biopsies are not done commonly<sup>4</sup>

In the present study, out of 151 cases, maximum cases were recorded between the age group of 11 years to 40 years which is comparable with the study done by Shafiulla et al(1993)<sup>5</sup> & Nitin Chawla et al(2012)<sup>6</sup> where maximum cases were recorded in the age group of 11-30 years.

Out of 151 patients, 72(47.68%) were males and 79 (52.31%) were females. The sex ratio in the present study was 1:1.09 (M:F), there is slight female preponderance. This is in comparison with the studies done by Bedi R.S.et al(1987)<sup>7</sup> & Dworski et al(1989)<sup>8</sup> where the M:F ratio was 1:1.7& 1:1.38 respectively.

In the present study out of 151 cases of lymphadenopathy, 113 cases (74.83%) were of non-neoplastic in nature and 24 (15.90%) cases were of neoplastic in nature. Non-diagnostic smears (14 cases) constituted 9.27 % of the total cases. These findings correlate well with the results reported by Naeem Ahmed et al(2009)<sup>9</sup>, Abdul et al(2007)<sup>10</sup>, & Rakshan et al(2009)<sup>11</sup> with predominance of benign lesions.

In the present study, reactive lymphadenitis is the next common cause of lymphadenopathy accounting for 42.4% of the total 151 cases (48 cases). Out of 48 cases of reactive lymphadenitis, excisional biopsy was available in 31 cases. Out of 31 cases, 29 cases had histological confirmation. 1 case was reported as metastatic deposits and other as Non-Hodgkin lymphoma on histopathology. In the case which showed metastasis from SCC on histopathology, only subcapsular sinus showed presence of tumor

deposits and the rest of the lymph node showed reactive change. As the lymph node was showing very few islands of metastatic deposits and rest of the lymph node showing reactive change, while doing FNAC the needle must have entered the area of reactive change and the diagnosis of metastatic deposits was missed.

The other case of reactive lymphadenitis was diagnosed as NHL. This patient had cervical lymphadenopathy which on cytology showed necrosis and reactive lymphocytes. This lymph node was excised and on histopathology showed partly effaced architecture with few viable lymphoid follicles and areas of extensive necrosis. After 3 months, the swelling recurred and excisional biopsy was performed. On histopathology, it was diagnosed as round cell tumor which was confirmed as diffuse large B cell lymphoma (DLBCL) on immunohistochemistry as it was found to be positive for immunomarkers LCA, CD20, CD3 and MIB-1 (70-80%)

The present study has accuracy of 93.54% for diagnosing reactive lymphadenitis on FNAC which is comparable with other studies. In the study done by Gupta A.K. (1990)<sup>15</sup> accuracy was reported as 76.90% on FNAC.

In the present study, we had 4 cases of lymphomas out of which 2 were of Hodgkin and 2 were of Non-Hodgkin lymphoma. There were 02 false negative cases of lymphoma in the present study. Out of two cases of Non-Hodgkin lymphoma, one was confirmed and other reported as reactive

lymphadenitis on FNAC. Out of two cases of Hodgkin lymphoma, one was confirmed and other was reported as granulomatous lymphadenitis. Both cases of Hodgkin lymphoma were of mixed cellularity type. The diagnostic accuracy of FNAC for lymphomas was 50% in the present study. The study done by Das D.K. (1991)<sup>16</sup> & Kline T. S. (1978)<sup>17</sup> reported accuracy of 90 % & 60% respectively.

In the present study, diagnostic accuracy for metastatic carcinoma to lymph nodes was 90.90%. Out of 22 cases of metastatic deposits, excisional biopsy was available in 10 cases out of which one was missed on cytology. The study done by Narang R.(1990)<sup>18</sup> reported 60-89% of accuracy for metastatic carcinoma. There were 22 cases (14.5% of total cases) of metastatic deposits in present study, of which 14 cases (63.63%), belonged to squamous cell carcinoma, invasive ductal cell carcinoma in 6 cases, adenocarcinoma in 1 case and 1 case of malignant melanoma. Out of 14 cases of metastases of squamous cell carcinoma, primary was established in 8 cases, out of which 6 cases were of metastases from oral cavity, one case was of CA larynx, other was of CA lung. Out of 22 cases of metastatic deposits on FNAC, it was possible to establish primary in 68.18% of cases. This was because of limited resources available in the hospital. In the study done by OsamaG et al(1999)<sup>19</sup> primary was known in 86.7% of cases.

**Table no.7 Comparison of the results of the present study with other similar studies**

Study	Sensitivity (%)	Specificity (%)	Accuracy (%)	N
Shamshad Ahmed et al (2005) <sup>20</sup>	94.6	98.5	97.6	115
Naeem Ahmed et al (2009) <sup>9</sup>	95.8	100	93	50
Rakshan et al (2009) <sup>11</sup>	75.8	96.6	88	151
Present study(2016)	78.57	100	96.77	151

In our study FNAC had a sensitivity of 78.57% and a specificity of 100%. Positive predictive value of this method was 100% and negative predictive value was 95.77%. This is in comparison with other similar studies as shown in table no. 7

Thus FNAC is safe, reliable, rapid and economic procedure. It is an excellent diagnostic tool. A

negative result on FNAC does not rule out the diagnosis of tuberculous lymphadenitis, malignancies and if clinical suspicion is strong, lymph node biopsy for histopathological examination should be done.

**SUMMARY AND CONCLUSION**

The present study was aimed to evaluate the cytological diagnosis of lymph node lesions and also to correlate the cytological diagnosis with available histopathological diagnosis and thus to evaluate accuracy of fine needle aspiration cytology in diagnosis of lymph node lesions.

In the present study maximum number of cases were in the age group of 11-40 years.

There were 79 females and 72 males with a female to male ratio was 1.09:1.

Out of these 151 cases of lymph node lesions, non-neoplastic lesions (74.83%) were more common than neoplastic lesions (15.90%).

Out of these 113 non neoplastic cases, 50 cases (44.25%) were diagnosed as tuberculous lymphadenitis, 48 cases (42.48%) as reactive lymphadenitis, 9 cases (7.97%) were granulomatous lymphadenitis and 6 cases (5.30%) were of acute suppurative lymphadenitis

Among the neoplastic lesions metastasis had maximum number of cases 20 followed by Hodgkin lymphoma in 2 cases and Non-Hodgkin lymphoma also in 2 cases.

In the present study, FNAC had a sensitivity of 78.57% and a specificity of 100%. Positive and Negative predictive value were 100% and 95.77% respectively and diagnostic accuracy was 96.34%.

Finally it was concluded that, Fine needle aspiration cytology is easy, reliable, repeatable and simple diagnostic test and less time consuming outpatient procedure which can be used as an initial diagnostic tool for lymphadenopathies but the limitations of the procedure should be kept in mind. If FNAC is negative it does not rule out the disease and should be followed by open biopsy for histopathological confirmation.

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**Sources of support if any:** No

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