



## THE ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF CERVICAL LYMPHADENOPATHY OF VARIOUS CAUSES.

### Pathology

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### ABSTRACT

Lymphadenopathy is of great clinical importance as it may be the first indication of a readily manageable conditions reactive lymphadenitis, lymphoma and metastatic carcinoma. Fine needle aspiration cytology (FNAC) has been established as the initial diagnostic technique of choice but it still has its diagnostic pitfalls and in difficult cases biopsy may be required for confirmation. In this study we have reported the patterns of cytological diagnosis if fine needle aspiration cytology (FNAC) of 2424 clinically diagnosed cases of cervical lymphadenopathy over a period of three years at Jawahar Lal Nehru Medical College, Ajmer (Rajasthan). Histological correlation was available in 400 cases. Of the total of 2194 cases included in the study, we concluded that tuberculosis was the most common benign cause of enlarged neck nodes, while metastatic malignancies comprised majority of the malignant lymphadenopathy cases. This study highlights the usefulness of FNAC as a simple, inexpensive, relatively painless, rapid, repeatable and reliable method of investigation for lymphadenopathy.

### KEYWORDS

Fine needle aspiration Cytology, FNAC, Cervical lymphadenitis, Histopathology.

### Introduction

Lymphadenopathy is one of the most common clinical presentation in patients of all ages attending the out-door department of a hospital. Lymph node aspiration is of abundant value for the initial rapid diagnosis of reactive lymphadenitis, lymphoma and metastatic carcinoma, avoiding excision biopsies where they are not necessary. Fine needle aspiration cytology (FNAC) is a safe, reliable, rapid and inexpensive method of establishing the diagnosis of a lesion and also help in indicating the pattern of further investigations.<sup>(1)</sup> The knowledge of the pattern of lymphadenopathy in a given geographical region is essential for making a confident diagnosis or suspecting a disease. The present randomized study was undertaken to study the aetiopathology of non-neoplastic and neoplastic lesion of enlarged lymph nodes by FNAC along with the study of their morphological histologic patterns in patients later undergoing lymph node biopsy. The findings of fine needle aspiration cytology were compared with histopathology of the case and specificity and sensitivity of the technique were obtained.

### Materials and Methods

This study was conducted at Jawahar Lal Nehru Medical College and Associated group of hospitals, Ajmer (Rajasthan) over a period of three years. It includes a total of 2424 lymph node needle aspirations, out of which 230 cases were excluded due to insufficient clinical data, thus a total of 2194 cases were included in the study. Histopathological correlation was possible in 400 cases.

FNAC of enlarged lymph node was performed after taking standard aseptic precautions. The procedure was performed using 23/24-gauge needle attached to a 10 ml syringe. Multiple sites were aspirated. The aspirated material was smeared onto a minimum of four slides in each case. Half of the slides were immediately immersed in 95% ethanol and remaining were air-dried and then fixed in methanol. The air dried smears were routinely stained by Giemsa stain and alcohol fixed smear stained by hematoxylin and eosin (H&E) stain and papanicolaou (PAP) stain. Special stain like Ziehl-Neelsen (ZN) stain for acid fast bacilli (AFB) and Periodic acid Schiff (PAS) for mucin were done whenever required. The diagnosis was classified according to the morphological patterns observed and correlated clinically. In 400 cases (18.23%) cytology and histopathology were available. Standard guidelines for diagnosis were followed as far as practicable.

### Results

2194 cases included 1167 lymph node aspirates from male subjects and 1027 lymph node aspirates from female subjects.

The corresponding lymph node biopsy was available in 400 cases

which included 176 from male subjects and 224 from female subjects.

The average age for total cases was 29.73 years with a range of 9 months to 93 years, whereas the average age for male subjects was 31.81 years with a range of 1 year to 88 years, (Table 1)

**Table 1: Shows sex-wise distribution of lymph node aspirates.**

SEX	NO. OF CASES	PERCENTAGE	REMARKS
MALE	1167	53.19 %	Male:Female=1.13:1
FEMALE	1027	46.80 %	
TOTAL	2194	100	

On cytological examination diagnosis of acute lymphadenitis was established in 129 cases (5.88%), chronic non-specific reactive lymphadenitis/relative hyperplasia in 430 (19.60%) cases, tubercular lymphadenitis in 833 (37.97%) cases, lymphoma in 62 (2.83%) cases and metastatic deposits in 300 (13.67%) cases. The lymph node aspirates were insufficient/inconclusive in 440 (20.05%) cases. (table 2).

**Table 2: Shows cytological diagnosis in lymph node aspirations of various etiologies.**

Diagnosis	Males	Females	Total	Percentage
Acute lymphadenitis	73	56	129	5.88%
Chronic non-specific lymphadenitis	230	200	430	19.59%
Tuberculosis	339	494	833	37.96%
Lymphoma	40	22	62	2.82%
Metastatic carcinoma	241	59	300	13.67%
Material insufficient	244	196	440	20.05%
<b>Total</b>	<b>1167</b>	<b>1027</b>	<b>2194</b>	<b>100%</b>

Out of 362 malignant cases majority were of metastatic deposits, 300 cases (82.88%), 62 cases (27.12%) were of lymphomas including 20 cases (5.52%) of Hodgkin's lymphoma and 42 cases (11.60%) of Non-Hodgkin's lymphoma. (table 3)

**Table 3: Number of Malignancies diagnosed on FNAC.**

Diagnosis	Males	Females	Total	Percentage	
1. Lymphoma	a) Hodgkin's	15	5	20	5.52%
	b) Non-Hodgkin's	25	17	42	11.60%
2. Metastatic carcinoma	241	59	300	82.88%	
<b>TOTAL</b>	<b>281</b>	<b>81</b>	<b>362</b>	<b>100</b>	

300 cases cytologically diagnosed as metastatic deposits includes 245 cases (81.66%) were diagnosed as squamous cell carcinoma, 34 cases (11.33%) as adenocarcinoma, 10 cases (3.33%) as is undifferentiated carcinoma, 2 cases (0.66%) each as malignant melanoma and small cell anaplastic carcinoma and one case (0.33%) each of muco-epidermoid carcinoma, astrocytoma, anaplastic carcinoma thyroid, renal cell carcinoma, papillary carcinoma, medullary carcinoma thyroid and duct carcinoma breast.

Out of 42 cases of non-hodgkin's lymphoma there were 7 cases of well differentiated small cell type lymphocytic non-hodgkin's lymphoma, 21 cases of large cleaved intermediate cell type non-hodgkin's lymphoma and 14 cases of poorly differentiated non-hodgkin's lymphoma.

20 cases of Hodgkin's lymphoma included 5 cases of lymphocytic predominance hodgkin's disease, 4 cases of mixed cellularity type hodgkin's disease, 1 case of lymphocytic depletion and 10 cases of unclassified hodgkin's disease.

There were 400 cases of fine needle aspiration cytology of lymph node which had their corresponding tissue biopsies available which included 1 cases (0.25%) of acute lymphadenitis, 92 cases (23%) of chronic non-specific lymphadenitis, 250 cases (62.50%) of tubercular lymphadenitis, 10 cases (2.50%) of Hodgkin's lymphoma, 14 cases

(3.50%) of non Hodgkin's lymphoma and 33 cases (8.27%) of metastatic carcinomatous deposits.

The overall accuracy in diagnosing acute lymphadenitis was 100 percent whereas in chronic non-specific lymphadenitis overall accuracy was 96.73% with 3 false positive results (3.27%) and 2 of these cases were diagnosed as Hodgkin's lymphoma, lymphocytic predominance type and 1 case was suspicious for malignancy. The overall accuracy in diagnosing 250 cases of tubercular lymphadenitis was 99.2% with 2 false positive results (0.8%) and histologically diagnosed as metastatic squamous cell carcinoma and suspicious for malignancy in one case each.

The overall accuracy in 10 cases of Hodgkin's lymphoma was 70.0% with 3 false negative results (30%) being diagnosed as chronic nonspecific lymphadenitis, tubercular lymphadenitis and acute lymphadenitis in one case each. The overall accuracy in diagnosing 14 cases of Non-Hodgkin's lymphoma was 78.5% with 3 false negative results (21.42%) and diagnosed as chronic non-specific reactive lymphadenitis in 2 cases and acute lymphadenitis in 1 case. The overall accuracy in diagnosing 33 cases of metastatic carcinomatous deposits was 90.90% with 3 false negative results (9.10%) of which 2 cases were diagnosed as tubercular lymphadenitis and 1 case was diagnosed as chronic non-specific lymphadenitis on histopathology (Table 4).

**Table 4: False negative, False positive and Percentage of accuracy of FNAC in 400 histopathologically proven cases of lymphadenitis.**

Histological diagnosis	Cytological diagnosis									
	Acute lymphadenitis	Chronic nonspecific lymphadenitis	Tubercular lymphadenitis	Hodgkin's lymphoma	Hodgkin's lymphoma	Metastatic malignancy	False negative	False positive	Accuracy (%)	
Acute lymphadenitis	1	1								100%
Chronic nonspecific lymphadenitis	92		89		2		1		3 (3.27%)	96.73%
Tubercular lymphadenitis	250			248			2		2 (0.8%)	99.27%
Hodgkin's lymphoma	10	1	1	1	7			3 (30%)		70.00%
Non-Hodgkin's lymphoma	14	1	2			11		3 (21.42%)		78.57%
Metastatic malignancy	33		1	2			30	3 (9.10%)		90.90%
Total	400	3	93	251	9	11	33	9 (2.25%)	5 (1.25%)	96.50%

The overall sensitivity was 84.21% with specificity of 98.54%. The predictive value of a positive test/accuracy was 90.56% whereas the predictive value of negative test was 97.40%. (Table 5)

**Table 5: Sensitivity, Specificity and overall accuracy of fine needle aspiration cytology diagnosis in 400 histologically proven lymphadenitis cases.**

S. No.	Histological diagnosis	Number of cases	F.N.A.C. diagnosis		Accuracy of F.N.A.C. diagnosis (%)
			Benign	Malignant	
1.	Benign lesions	343	338	5	97.40%
2.	Malignant lesions	57	9	48	90.56%

  

False negative	False positive	Sensitivity (%)	Specificity (%)	Overall accuracy (%)
0/343	5/343	84.21	98.54	96.50%
9/57	0/57			

**Discussion**

Cytology of lymph nodes has become a window for diagnosis of many diseases due to early availability of results, simplicity with minimal trauma and post-procedure complications. FNAC has also been advocated as a useful method in comparison with more expensive surgical excision biopsies, especially in developing countries with limited financial and health care resources. Optimal sampling and expertise when combined, make cytological diagnosis of equal significance as histopathology. In many clinical settings, it is difficult to decide which patient is more likely to have a reactive or neoplastic

lymphadenopathy. Here, knowledge about the pattern of lymphadenopathy is helpful to the clinician for solving the dilemma.

Lymph node lesions can be seen in patients ranging from very early to advanced age. In our study, the youngest patient presenting with lymphadenopathy was a 9 month child and the oldest one was 93 year old, with mean age of 29.73 years. In our study, slight male preponderance was noted with a male to female ratio of 1.13:1 which correlated with studies done by Malhotra AS et al<sup>2</sup> (M:F ratio 1.2:1), Dhingra V et al<sup>3</sup> (M:F ratio 1.30:1) and Hirachand S et al<sup>1</sup> (M:F ratio 1:0.9). In contrast, some other studies showed slight female predominance with male to female ratio of 1:1.2 was seen by Nidhi P et al and Ageep AK.<sup>3,8,9</sup>

Overall, benign disorders (63.43%) were more common than malignant disorders (16.49%) in the present study. This correlates with other studies from India and other developing countries.<sup>12,14</sup> Tubercular lymphadenitis (37.96%) was the most common cause of lymphadenopathy in our study. Gautam B., et al.<sup>5</sup> and Shaikh et al.<sup>10</sup>, in their study on 200 subjects reported TB lymphadenitis (45.4% and 49.5% respectively), to be the most common cause of lymphadenopathy.<sup>8,9,14,16</sup>

In present study out of total 362 cases of malignant lesions, 300 cases were of metastatic deposits (82.88%) and 62 cases (17.12%) were of lymphoma. Squamous cell carcinoma was the most frequent metastatic lesion encountered, followed by adenocarcinoma. Similar figures were seen in some studies.<sup>5,7,11</sup> While few other studies found adenocarcinoma as the most common metastatic malignancy.<sup>17,18</sup>

Lymphomas constituted only 2.82% of lymphadenopathy in this study

out of which 32.26% cases were of Hodgkin's lymphoma and 67.74% cases were of Non-hodgkin's lymphoma. This result was corroborated by other studies.<sup>7,14</sup> In contrast, a study from Egypt found that NHL (32.5%) contributed to most of the cases of lymphadenopathy followed by metastatic tumors (19.7%).<sup>19,20</sup>

With histopathological correlation in 400 cases, over all sensitivity of FNAC was 84.21 % whereas specificity rate was 98.54%. The positive predictive value of 90.56 % ,negative predictive value of 97.40 % and diagnostic accuracy of 96.50 % was achieved in our study which were similar to other studies.<sup>2,4</sup>

### Conclusion

This study highlights the usefulness of FNAC as a simple, inexpensive, relatively painless, rapid, repeatable and reliable method of investigation for lymphadenopathy, especially in outdoor, peripheral hospitals and dispensaries, In current study the most common causes were tuberculosis ,reactive hyperplasia and metastatic malignancies particularly squamous cell carcinoma deposits. FNAC combined with clinical correlation can be used as a first line investigation in work up of lymph node lesion thus reducing the incidence of surgery and there for ,bed occupancy and can also decides the further management.

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