

## Original Research Article

# Correlation of fine needle aspiration cytology lymph node with histopathological diagnosis

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### ABSTRACT

**Background:** Lymphadenopathy is very common presenting symptoms. Fine needle aspiration cytology (FNAC) is used to evaluate the nature of the lesion. Etiology of lymphadenopathy in head and neck region vary from benign reactive hyperplasia to tubercular granulomatous lesion to malignancy. The aim of present study was to evaluate the sensitivity, specificity and predictive value in tuberculosis and metastatic carcinoma.

**Methods:** A total of 80 patients out of 200 patients who underwent FNAC were evaluated by histopathological examination for correlation. Aspiration smears and histopathological slides were evaluated and results were calculated for sensitivity, specificity and predictive value.

**Results:** Reactive lymphadenitis was seen in 40 patients followed by tubercular granulomatous lymphadenitis in 20 patients and malignant lesions in 20 patients. Histology revealed 18 patients of tubercular lymphadenitis, 43 of reactive changes, 12 of metastasis in lymph nodes and 7 of lymphomas. Correlating the findings, we could achieve 100% sensitivity and 96.7% specificity for tubercular lymphadenopathy and for metastatic it was 98.5% and 100% respectively.

**Conclusions:** We have found FNAC a satisfactory tool in the diagnosis of tubercular and malignant lymphadenopathy. FNAC used in conjunction with clinical findings, radiological and laboratory investigations can be a cost effective method for the diagnosis of lymphadenopathy.

**Keywords:** FNAC, Lymphadenopathy, Metastatic carcinoma, Tubercular lymphadenitis

### INTRODUCTION

Fine Needle Aspiration technique was described for the first time by Greig and Gray in 1904. Since the mid-1960's, it has been increasingly used and a high degree of accuracy has been achieved.<sup>1</sup> Lymphadenopathy is one of the commonest presenting symptoms of all age groups attending out door. The etiology can vary from simple inflammatory reactive lesion to a malignant condition.

Therefore lymphadenopathy requires further evaluation. FNAC has been a suitable investigation to rule out malignancies and to confirm reactive or infective pathology.<sup>2,3</sup> The use of fine needle aspiration cytology (FNAC) in the investigation of lymphadenopathy has

become an acceptable and widely practiced minimally invasive technique, which is safe, relatively painless, simple and rapid. FNAC is highly cost effective and accurate as a first line investigative technique. With the recent advances in ultrasound and CT scan technologies, focal lesions can be aspirated using this procedures.<sup>4</sup>

Fine needle aspiration cytology (FNAC) has emerged as an advanced diagnostic tool to differentiate reactive hyperplasia/inflammatory conditions, granulomatous disorders and lymphomas. This diagnostic modality has gained considerable importance in the management of patients with lymphadenopathy over several years. We are reporting histopathological correlation of 200 cases of lymphadenopathy with FNAC.

## METHODS

Aspiration of lymph nodes was done under aseptic precautions using 22-23-gauge needle and 10 ml syringe. Following the aspiration, the adequacy and nature of the aspirated material was assessed and several smears were prepared. Smears were immediately fixed by air drying and in 100% alcohol, followed by four different stains including Giemsa stain, Ziehl-Neelsen stain, Hematoxylin - Eosin stain, and Papanicolaou stain.

Lymph node biopsies were received in 80 patients and the biopsy specimens were subjected to histopathological examination after fixing in 10% formalin. Histopathological examination was done and the results were correlated with the cytological reports to evaluate efficacy of the procedure.

The reactive hyperplasia of lymph node was suspected by observing mixed lymphoid tissue and macrophages with tangible bodies along with absence of Reed Sternberg cells. Granulomatous lesions were recognized cytologically by the observation of aggregates of epithelioid cells with, and without, associated

multinucleated giant cells. An amorphous necrotic background suggestive of caseative necrosis leads to conclude the diagnosis of tuberculosis. If TB was suspected slides were stained with Ziehl-Neelsen method to detect acid fast bacilli (AFB) directly. The eventual diagnosis of granulomatous inflammation by FNAC was confirmed either by surgery and/or by clinical investigations.

The diagnosis of lymphoma was suspected by monotonous lymphoid population with necrosis and mitoses. The cytological diagnosis was correlated with histopathological examination of specimen submitted. Metastatic carcinoma was diagnosed cytologically by presence of dual population composed of malignant epithelial cells and mixed lymphoid tissue.

## RESULTS

A total of 200 patients were included in our study who visited at Gupta clinical laboratory for FNAC of lymph node during Jan 2015 to Dec 2015. Of the 200 patients whose FNAC was done, 80 patients underwent excisional biopsy.

**Table 1: Age and sex distribution of patients for lymph node FNAC.**

Age Groups (years)	Number of patients	Male	Female	Percentage
0-10	15	12	3	7.5%
11-20	24	18	6	12.0%
21-30	30	22	8	15.0%
31-40	47	36	11	23.5%
41-50	36	28	8	18.0%
51-60	26	20	6	13.0%
61-70	12	9	3	6.0%
>70	10	9	1	5.0%
Total	200	154	46	
Percentage		77%	23%	

**Table 2: FNAC and histopathological correlation for lymphadenopathy.**

Histopathological diagnosis	Cytological diagnosis					Total
	Reactive Hyperplasia	Tubercular Lymphadenitis	Metastatic Carcinoma	Non Hodgkin's Lymphoma	Hodgkin's Lymphoma	
Reactive Hyperplasia	40	0	0	0	0	40
Tubercular Lymphadenitis	2	18	0	0	0	20
Metastatic Carcinoma	1	0	12	0	0	13
Non Hodgkin's Lymphoma	0	0	0	5	0	5
Hodgkin's Lymphoma	0	0	0	0	2	2
Total	43	18	12	5	2	120

Out of 80 patients, 50 patients (62.5%) presented with cervical lymph node enlargement, 12 patients (15%)

presented with submandibular swelling, 8 patients (10%) with inguinal lymph node enlargement, 6 patients (7.5%)

with axillary and 4 patients (5%) with Infra auricular lymph node enlargement. The age group of 80 patients

ranged from 2 years to 80 years with a mean of 36 years, of which 64 were males and 16 were females (Table1).

**Table 3: Statistical analysis for tubercular lymphadenitis by FNAC.**

FNAC diagnosis	Histopathological diagnosis		Total	Predictive value
	Positive	Negative		
Positive	18	2	20	(Positive) 90.0%
Negative	0	60	60	(Negative) 100.0%
Total	18	62	80	
Sensitivity/Specificity	100% (sensitivity)	96.7% (specificity)		

Benign lymphadenopathy was the most common presentation of lymphadenopathy of the head and Neck region amounting to 75% (n-60) of all. Among benign lesions, non-specific reactive lymphadenitis was the most common findings of enlarged lymph nodes of the Neck region amounting to 50% (n-40), followed by tubercular granulomatous lymphadenitis amounting to 25% (n-20). Of the 25% (n-20) malignant lesions, 16.25% (n-13) were

metastatic carcinoma and 8.75% (n-7) patients were suspected of lymphoma. Among 7 lymphoma cases, 5 were Non-Hodgkin's Lymphoma and 2 cases were diagnosed as Hodgkin's lymphoma. Of the 80 cases subjected to FNAC and histological diagnosis revealed 18 patients of tubercular lymphadenitis, 43 of reactive changes, 12 of metastasis in lymph nodes and 7 of lymphomas (Table 2).

**Table 4: Statistical analysis for metastasis in lymph node by FNAC.**

FNAC diagnosis	Histopathological diagnosis		Total	Predictive value
	Positive	Negative		
Positive	12	1	13	(Positive) 92.3%
Negative	0	67	67	(Negative) 100.0%
Total	12	68	80	
Sensitivity/Specificity	100% (sensitivity)	98.5% (specificity)		

Table 3 shows the sensitivity, specificity, positive and negative predictive value of FNAC for tubercular granulomatous diagnosis. A definitive diagnosis of tuberculosis was confirmed by AFB positivity in FNAC material and clinical features. Table 4 shows the sensitivity, specificity, positive and negative predictive value of FNAC for metastasis of malignant cells in lymph node.

## DISCUSSION

Lymphadenopathy is an enlargement of lymph node with altered consistency. It is a clinical manifestation of regional or systemic disease and serves as an excellent clue to the underlying disease.

Cervical lymphadenopathy may be the initial finding or may arise later on with other symptoms. In the context of granulomatous disorders, the possible etiology is wide and the use of FNAC with other ancillary tests (microbiological, immunohistochemical, radiological, biochemical and special staining techniques) is useful for

obtaining a definitive diagnosis. Lymphadenopathy often signifies the spectrum of other serious illnesses like lymphoma, acquired immunodeficiency syndrome, or metastatic cancer. FNAC as a first line screening method has been recommended in suspected malignancy.<sup>7,8</sup>

Granuloma may be encountered in both Hodgkin's disease and non-Hodgkin's lymphoma, particularly T-cell lymphoma. Occasionally, lymph nodes containing metastatic carcinoma may also show features of granuloma. It has been suggested to be due to either necrotic material or surface antigen.<sup>9</sup> Previous reports have been described in metastatic nasopharyngeal carcinoma, seminoma and malignant melanoma.<sup>8,9</sup>

A series by Khurana et al highlighted the difficulties encountered in making a definitive diagnosis of malignant neoplasm that mimics, or occurs, in association with granuloma.<sup>10</sup> Granulomatous inflammation found in lymph nodes draining carcinomas is a recognized phenomenon.<sup>10-12</sup> The background cell population needs to be scrutinized if a malignant lymphoma is suspected.

FNAC is the study of cellular samples obtained through a fine needle under negative pressure. The technique is quick, relatively painless and economical. It can provide unequivocal diagnosis in most of the situations.<sup>13</sup> The lesion arising in lymph nodes can be found in patients ranging from an early to advanced age.<sup>14</sup>

The importance of performing an FNAC in patients with cervical lymphadenopathy prior to an excisional biopsy helps to assess the diagnosis of metastatic tumors of the head and neck. Furthermore, direct open biopsy prior to cytology may lead to a significantly higher local treatment failure rate, which in turn may be associated with an adverse effect on survival.<sup>15,16</sup> The accuracy of FNAC in the diagnosis of lymphoma has previously been questioned.<sup>17</sup> The factors that influence the diagnostic specificity and sensitivity of FNAC in the diagnosis of lymphoma include necrosis in involved nodes, the presence of dual pathology, and sclerosis/fibrosis in involved nodes leading to insufficient diagnostic material.<sup>18,19</sup>

Despite its limitations and pitfalls, FNAC appears to be a good first line method for investigating the cervical lymphadenopathy. The well-defined role of FNAC in the investigation of lymphadenopathy has previously been studied.

In the present series, sensitivity of FNAC in the various pathologies of lymph nodes ranged from 90% to 100%. Reactive hyperplasia constituted the largest number followed by tubercular lymphadenitis among benign lesions. Cytological features of the aspirate are important for the diagnosis of tubercular lymph nodes. We could achieve 100% sensitivity and 96.7% specificity for tubercular lymphadenopathy. As was the observation of Rajwanshi, et al.<sup>20</sup> FNAC does pose problems in diagnosing lymphomas, but in our series the sensitivity and specificity with regard to lymphomas was 100%, while that for metastatic it was 98.5% and 100% respectively. These findings are similar to the results of Engzell, et al, Gupta, et al and Ross, et al.<sup>21-23</sup> A diagnostic test is considered satisfactory if its sensitivity and specificity are around 90%.

## CONCLUSION

We have found FNAC a satisfactory tool in the diagnosis of tubercular and malignant lymphadenopathy. The simplicity and rapidity of the procedure make it most suitable for use on outpatient basis even in peripheral hospitals and dispensaries. FNAC used in conjunction with clinical findings, radiological and laboratory investigations can be a cost effective method for the diagnosis of lymphadenopathy.

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