

**ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE EVALUATION OF THE SPECTRUM OF LYMPH NODE LESIONS.****DR. PAVITHRA. P\*<sup>1</sup> AND DR. GEETHA. J. P<sup>2</sup>**<sup>1</sup>*Assistant Professor, Department of Pathology, Sree Siddhartha Medical College, Tumkur.*<sup>2</sup>*Associate Professor, Department of Pathology, Sree Siddhartha Medical College, Tumkur.***ABSTRACT**

Fine needle aspiration cytology (FNAC) is a reliable and an inexpensive method for diagnosis of palpable masses at various sites. FNAC was performed on 319 patients with palpable lymphadenopathy over a period of three years. Ziehl Neelson staining was done wherever required. Clinicocytological correlation was done. FNAC diagnosis was found to be as follows: tubercular lymphadenitis in 135 cases (42.31%) followed by metastatic carcinoma in 64 (20.06%), reactive hyperplasia in 56 (17.55%), granulomatous lymphadenitis in 37 (11.59%), suppurative granulomatous in 10 (3.13%), suppurative lymphadenitis in 6 (1.88%) and lymphoma in 5 (1.56%). Aspirates were inadequate in 6 (1.88%) cases. FNAC is a useful and reliable tool in diagnosing non neoplastic and neoplastic lesions of lymph nodes and helps in making a wise decision in further management of patients as reactive and tubercular lymphadenitis can be treated conservatively while surgery might be required for malignant cases.

**KEYWORDS:** FNAC, lymphadenitis, tubercular, Ziehl Neelson**DR. PAVITHRA. P**Assistant Professor, Department of Pathology,  
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## INTRODUCTION

Lymph nodes are a part of the peripheral immune system located along the course of the lymphatics. They act as a mirror of the underlying disease process. Lymphadenopathy is one of the commonest clinical presentations of patients attending the outpatient department. The etiology varies from an inflammatory process to a malignant condition.<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.<sup>2</sup> 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, whereas evaluation of granulomas is a complex problem in developed countries.<sup>2</sup> Fine needle aspiration cytology (FNAC) is a reliable, simple, safe, rapid and inexpensive method of establishing the diagnosis of lesions and masses at various sites and organs.<sup>3</sup> FNAC has been used extensively for the diagnosis of primary and secondary lymphadenopathy. The present study was undertaken to determine the role of FNAC in the evaluation of cytomorphological features of various lymph node lesions.

## MATERIALS AND METHODS

A prospective study of 319 cases of lymphadenopathy presenting to the Department of Pathology for a period of three years from January 2011 to December 2013 was taken up for our study. After obtaining ethical committee clearance from our institution and informed consent from the patients, FNAC was performed using a 22-24 gauge needle and 10ml syringe. Two of the prepared smears were fixed in alcohol and stained with Haematoxylin and Eosin (H&E) and Papanicolaou stain. Two smears were air dried, one was stained with Leishman stain and the other kept unstained to be used for Ziehl Neelson (ZN) staining whenever a cytological diagnosis of granulomatous disease was made and also in cases with abundant necrosis and suppuration. In cases where fluid was aspirated, the fluid was centrifuged and smears were made from the

sediment followed by the above staining methods. Diagnosis was based on clinicocytological correlation and cytomorphological features. The criteria for the lymph node aspirates to be diagnosed as tubercular lymphadenitis included the presence of epithelioid cell granuloma and caseous necrosis with or without langhan's giant cells or ZN positivity. Granulomatous lymphadenitis was diagnosed in the presence of epithelioid cell granuloma with or without giant cells and with absence of necrosis.<sup>4</sup>

## RESULTS

A total of 1237 cases were obtained in the cytopathology section over a period of three years from January 2011 to December 2013, out of which 319 (25.78%) cases were lymph node FNACs. Out of 319 cases, FNAC was inconclusive in 6 (1.88%) cases due to unsatisfactory smears. Table 1 shows the cytologic diagnosis in 319 patients with lymphadenopathy. Most common lesion found in our study was tubercular lymphadenitis in 135 cases (42.31%) followed by metastatic carcinoma in 64 (20.06%), reactive hyperplasia in 56 cases (17.55%), granulomatous lymphadenitis in 37 (11.59%), suppurative granulomatous in 10 (3.13%), suppurative lymphadenitis in 6 (1.88%) and lymphoma in 5 (1.56%). The age and sex distribution of the patients with lymphadenopathy is shown in table 2. Age of the patients ranged from 2- 85 years. The youngest patient was diagnosed as tubercular lymphadenitis and the oldest patient was diagnosed as having metastatic deposits in the lymph node from a squamous cell carcinoma. Majority (74.3%) of the patients were in the age group of 11-50 years with a peak (97 patients) in the age group 21-30 years. Only 22 patients were aged less than 10 years and one aged above 80 years. Metastatic deposits were more common in the elderly age group (> 6<sup>th</sup> decade). Tuberculous and granulomatous lymphadenopathies were more common in the 3<sup>rd</sup> to 4<sup>th</sup> decade. There were 146 male and 173 female patients with a male to female (M:F) of 1:1.18. Table 3 shows the lymph node groups involved in various

types of lymphadenopathy. It has been found that the most common lymph nodes involved in various types of lymphadenopathy were the cervical group. Out of 319 cases, 272 patients presented with cervical lymphadenopathy. Tubercular lymphadenitis was the most common finding in our study. ZN stain was done in all the cases and was positive in 62 cases (45.92%). Granuloma with necrosis was seen in 119 cases (88.15%). Necrosis alone

was seen in 16 cases (11.85%) and all of these were positive for acid fast bacilli on ZN stain. The distribution of the various subtypes of metastatic tumours on FNAC has been indicated in table 4. Majority (56.25%) were from a squamous cell carcinoma followed by poorly differentiated carcinoma. Metastatic deposits are also common in the cervical group.

**Table 1**  
**Cytologic diagnosis of 319 cases of lymphadenopathy**

Cytologic diagnosis	Number of cases	Percentage %
Tuberculous Lymphadenitis (TB)	135	42.31
Reactive hyperplasia	56	17.55
Granulomatous lymphadenitis	37	11.59
Metastatic carcinoma (Mets)	64	20.06
Hodgkins lymphoma (HL)	2	0.63
Non Hodgkins lymphoma (NHL)	3	0.94
Suppurative (S)	6	1.88
Suppurative granulomatous (SG)	10	3.13
Unsatisfactory	6	1.88
Total	319	

**Table 2**  
**Age and sex distribution of patients of lymphadenopathy**

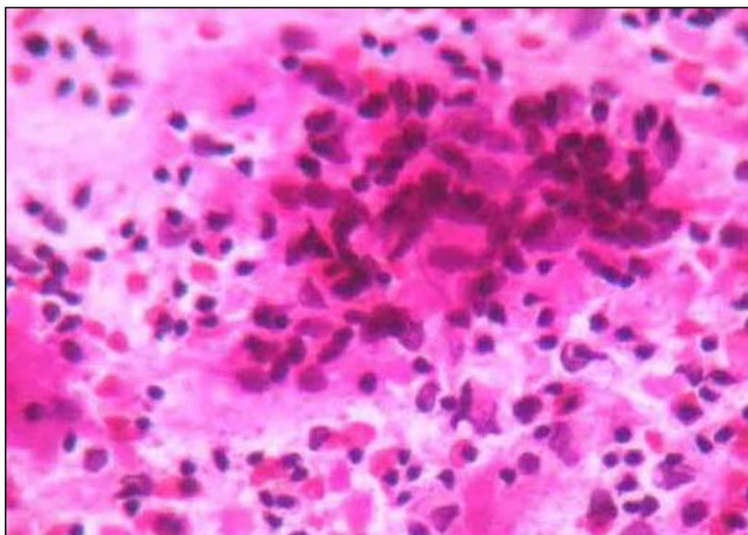
Age	Reactive		TB		Granulomatous		HL		NHL		Mets		S		SG		Unsatisfactory
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
0-10	5	3	4	5	2	1	0	0	0	0	0	0	0	0	1	0	0
11-20	6	10	18	12	2	3	0	0	0	0	0	1	0	1	1	0	2
21-30	5	8	25	36	4	7	0	0	0	0	1	0	1	2	3	2	3
31-40	4	2	6	13	2	6	0	0	0	0	3	6	1	0	1	2	0
41-50	5	3	4	6	2	5	0	0	2	0	4	5	0	1	0	0	1
51-60	0	2	2	2	1	1	1	0	0	0	11	6	0	0	0	0	0
61-70	2	0	2	0	0	1	1	0	0	1	13	5	0	0	0	0	0
71-80	1	0	0	0	0	0	0	0	0	0	7	1	0	0	0	0	0
81-90	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Total	28	28	61	74	13	24	2	0	2	1	40	24	2	4	6	4	6

**Table 3**  
**Lymph node group involved in various types of lymphadenopathy**

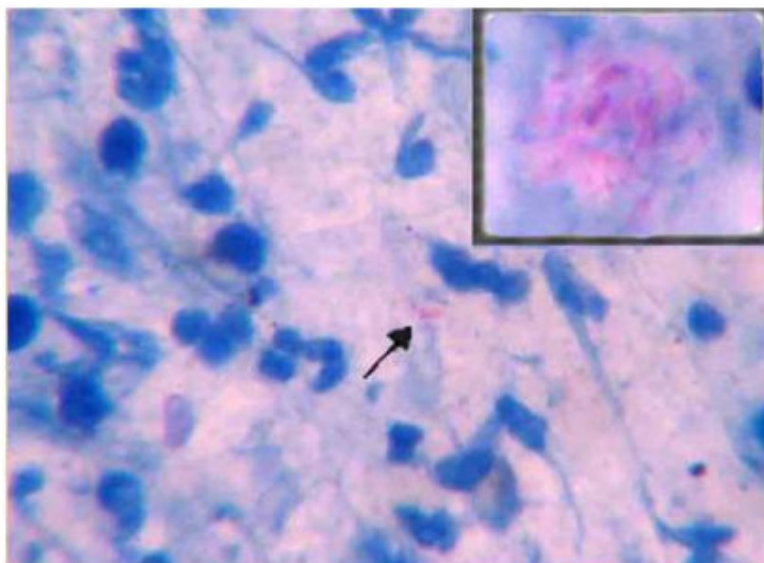
Site	Reactive	TB	Granulomatous	HL	NHL	Mets	S	SG	Unsatisfactory
Cervical	46	120	26	2	0	60	6	7	5
Axillary	1	8	4	0	1	2	0	1	0
Inguinal	8	2	4	0	1	1	0	1	1
Generalised	1	4	3	0	1	1	0	1	0
Mesenteric	0	1	0	0	0	0	0	0	0
Total	56	135	37	2	3	64	6	10	6

**Table 4**  
***Distribution of different subtypes of metastatic tumors***

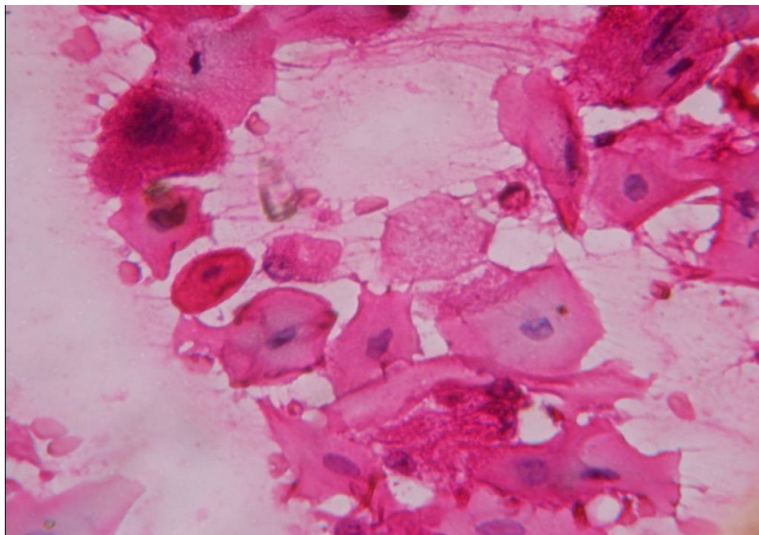
Cytological diagnosis	Number of cases	Percentage (%)
Squamous cell carcinoma	36	56.25
Adenocarcinoma	6	9.37
Papillary carcinoma thyroid	3	4.68
Malignant melanoma	1	1.56
Nasopharyngeal carcinoma	2	3.12
Poorly differentiated carcinoma	16	25
Total	64	



**Figure 1**  
***Smear showing aggregates of epithelioid macrophages in a background of necrosis. (H&E, 400x)***



**Figure 2**  
***Smear showing acid fast bacilli in a background of suppurative inflammation and necrosis. Inset showing acid fast bacilli. (Ziehl Neelsen staining, 1000x)***



**Figure 3**  
**Smear showing metastatic deposits of squamous cell carcinoma in a lymph node. (H & E, 400x)**

## DISCUSSION

Aspiration of lymph nodes for diagnostic purposes was first done by Griey and Gray in 1904, in patients with sleeping sickness.<sup>5</sup> The experiment of FNA developed gradually, until 1921, when Guthrie tried to correlate FNA results with various disease processes.<sup>6</sup> Today, FNAC is a part of the initial management of patients presenting with any palpable mass as it is a simple, safe, cost effective and time saving procedure.<sup>4</sup> Adequate material was obtained in 98.1% which correlated with the study by Hemalatha et al (98%)<sup>7</sup> and Gupta et al (85.2%)<sup>8</sup>. Aspirates were inconclusive in 1.88% cases due to unsatisfactory smears. The causes for unsatisfactory smears were scant cellular yield or obscuring blood. Aspirates were benign in 78.36% cases, metastatic deposits were found in 20% and lymphomas in 1.56%. Similar findings were obtained by other authors.<sup>9,10,11</sup> In our study, the majority of the patients were in the age group 21-30 years. This correlated with the study by Shirish Chandanwale et al where maximum number of cases were seen in the age group 21-40 years.<sup>12</sup> Cervical lymph nodes were the most common group of lymph nodes involved, which was similar to that observed by Hirachand S et al<sup>4</sup>, Ruchi Khajuria et al<sup>2</sup> and Shirish Chandanwale et al<sup>12</sup>. Tuberculous lymphadenitis was the most common lesion and was reported in 135 cases

(42.31%). This correlated with the study by Ruchi Khajuria et al (52.3%)<sup>2</sup>. In our study it was seen more frequently in the 2<sup>nd</sup> and 3<sup>rd</sup> decade of life with a female preponderance (M: F= 0.82:1). Cervical lymph nodes were most commonly involved (85%) followed by axillary group (6.25%). Similar observations were made in the study by Ruchi Khajuria et al.<sup>2</sup> ZN staining for acid fast bacilli was positive in 45.92% cases in our study. Ng et al reported positivity in 41.6% cases<sup>13</sup> and Ahmed et al in 46%<sup>14</sup>. In our study, necrosis alone was seen in 16 cases and all of these (100%) were positive for acid fast bacilli. Das et al also observed that foci of necrosis was associated with marked proliferation of tubercle bacilli and infiltration of polymorphs whereas lymphocytes, epithelioid cells and multinucleated giant cells are likely to have some role in limiting the proliferation of AFB.<sup>15,16</sup> When multiplication of bacilli in a lymph node is not under control, the lymph node becomes necrotic and turns into an abscess. Therefore it is expected that the FNA from a tuberculous abscess contains more AFBs than early tuberculous lymph nodes.<sup>17</sup> It appears that the chances of finding AFB is greater when pus or caseous material is aspirated, while the aspiration of caseous material is almost always indicative of tuberculosis and merits an active search for

AFB.<sup>18</sup> The characteristic necrotic background comprising of eosinophilic granular material containing nuclear debris was described as 'tubercular diathesis'. Those cases lacking the typical finding and showing scattered epithelioid cells with or without granuloma or only necrotic material with neutrophilic infiltration, were diagnosed as tuberculous lymphadenitis when this tubercular diathesis was found cytologically, even though AFB were absent in these smears.<sup>19</sup> The conventional diagnostic measure of excisional biopsy is potentially hazardous as it may spread the disease and give rise to sinus formation. In early cases of tuberculous lymphadenopathy there is no evidence that excisional biopsy plus chemotherapy is superior to chemotherapy alone.<sup>17</sup> In developing countries where mycobacterial infection is prevalent and resources for medical care are limited FNAC provides a simple, efficient and cost effective alternative to diagnose tuberculous lymphadenopathy.<sup>17</sup>

Granulomatous lymphadenitis was seen in 37 cases (11.59%). This correlated with studies by Hirachand et al (9.2%).<sup>4</sup> Majority of the patients were aged less than 40 years. Similar age distribution was found by Hemalatha et al<sup>7</sup> and Ng et al<sup>13</sup>. Granulomatous lymphadenitis can be classified as noninfectious and infectious. Noninfectious causes include sarcoidosis and sarcoid like reaction. Infectious causes can be classified as suppurative and nonsuppurative. Suppurative granulomatous disorders include tularemia, cat scratch disease, yersinia etc. Non suppurative granulomatous disorders include tuberculosis, BCG, toxoplasma, lepra bacilli, brucellosis, syphilis.<sup>20,12</sup> In a region where tuberculous infection is common and other granulomatous diseases are rare, the presence of a granulomatous feature in FNAC is highly suggestive of tuberculosis. The literature on the use of FNAC to diagnose tuberculous cervical lesions is mainly from the developing countries where mycobacterial infections are prevalent.<sup>17</sup> Reactive lymphadenopathy was seen in 56 (17.55%) cases. This is similar to the study by Abdul Haque Khan et al (28%)<sup>21</sup> and Javed et al (16.66%)<sup>22</sup>. Detailed clinical history and other relevant investigations were done to find the etiologies of reactive lymphadenitis. This is the third most common

condition in our study probably because most of the patients presenting with lymphadenopathy were given a course of antibiotics and if it still persisted, then FNAC was performed. Lymph node aspirates in 64 cases (20%) showed metastatic deposits. This is in correlation with the studies by Mandakini M Patel et al<sup>23</sup> and Ghartimagar D et al<sup>24</sup> where metastatic deposits were seen in 27.06% and 18% cases. Most of the metastatic deposits (56.25%) were from squamous cell carcinoma and our findings correlated with the studies by Hemalatha et al (60%)<sup>7</sup> and Mandakini M Patel et al (75.5%)<sup>23</sup>. The high incidence of squamous cell carcinomas in our study can be attributed to the high incidence of tobacco chewing and head and neck cancers in our region. Lymphomas constituted only 1.56% cases in our study. This was in accordance with the study by Abdul Haque Khan et al (2%).<sup>21</sup> Though their prevalence is low, they pose a great diagnostic challenge. Age of the patient, polymorphous population of cells and atypical cells should raise a suspicion of Hodgkins Lymphoma. Inadequate samples and fibrosed nodes in advanced disease may be the cause of lack of Reed Sternberg cells.<sup>2</sup> Entities that can be diagnosed definitely on FNAC include high grade lymphomas like small non cleaved lymphoma, lymphoblastic lymphoma, immunoblastic lymphomas, Hodgkins lymphoma, Diffuse large B cell lymphoma and myeloblastic and lymphoblastic leukemia/ lymphoma.<sup>25</sup>

## CONCLUSION

FNAC of lymph nodes is an excellent first line method for investigating the nature of the lesions. It is a useful tool in diagnosing both non neoplastic and neoplastic lesions. Ziehl Neelson stain done in cases with granulomas, necrosis or suppuration is highly valuable for routine diagnosing of tuberculosis. It is an economical and convenient alternative to open biopsy of lymph nodes. The study strongly indicated that the tuberculosis is the most common cause of cervical lymphadenopathy. Also, the benign lesions should be interpreted in the context of clinical findings and if clinical malignancy is highly suspected, further evaluation is justified.



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