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Research Article

DIAGNOSTIC EFFICACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE EVALUATION OF NEOPLASTIC LYMPH NODE LESIONS

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ABSTRACT

Lymphadenopathy is one of the common conditions encountered in clinical practice. This work was done with the aim of studying the efficacy of FNAC in diagnosis of neoplastic lymph node lesions. This study was carried out on 390 patients with clinically significant lymphadenopathy at Rajarajeswari Medical College and Hospital, Bangalore from may 2013 to may 2015. Histopathological examination of the lymph node biopsy specimens were also done and results were correlated with cytological diagnosis wherever possible. The diagnostic efficacy of FNAC in the present study was as follows: Sensitivity: 66.67%, Specificity: 100%, Positive predictive value: 100%, Negative predictive value: 86.96%.

INTRODUCTION

Lymphadenopathy is one of the most common clinical presentations in patients attending Outpatient Department.[1] When physicians are faced with these patients, the critical tasks are to differentiate benign from malignant lymph nodes, to identify serious medical conditions that require specialist care and to reassure the patients who have benign reactive lymphadenopathy.[2] Fine needle aspiration cytology is a simple, safe, reliable, rapid and inexpensive method of establishing the diagnosis of lesions and masses in various sites and organs and is accepted by most patients as it is a non-invasive method for evaluating lymphadenopathy.[3] Aspirates from lymph nodes are usually highly cellular and their interpretation varies from clear-cut diagnosis to a firm request for histopathology. [3]

MATERIAL AND METHODS

This study was carried out on 396 patients with clinically significant lymphadenopathy, referred to the Department of Pathology, Rajarajeswari Medical College and Hospital, Bangalore, from May 2013 to May 2015. All patients referred to the Department of Pathology for FNAC of lymph nodes in the study period were included in the study. Both superficial and deep group of lymph node FNACs were included. USG/CT scan-guided FNAC were also included in the study. Inadequate and unsatisfactory smears were excluded from the study.

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Each patient was thoroughly examined and data regarding age, sex, associated symptoms, site and description of the lump were documented. An informed consent was taken from the patient prior to the procedure. Aspiration was carried out under aseptic precautions. The smears thus prepared were air dried and/or fixed in 95% ethyl alcohol and stained with Giemsa, Hematoxylin & Eosin (H&E) and/or Papanicolaou stain. AFB staining was done whenever required.

Lymph node biopsy was possible in 58 cases. Lymph nodes were subjected to gross examination and fixed in 10% formalin. Biopsy specimens were routinely processed to obtain paraffin sections, which were stained by H&E. Histopathological study was done separately and then results of cytological and histopathological study were correlated to evaluate efficacy of the procedure.

RESULT

A total of 396 patients presented with lymphadenopathy during the study period, out of which satisfactory cytological smears were obtained in 390 aspirates. Inadequacy was attributed to hemorrhagic smears and scanty cellularity, and these 6 cases were excluded from the study.

The youngest patient in the study was 4 months old and oldest was 85 years old. The most common age group affected, was between 21-30 years of age. Out of 390 cases, 203 (52.05%) were males and 187 (47.95%) were females. The M:F ratio was 1.09.

Out of 390 cases, 309 cases (79.23%) were benign, 78 cases (20%) were malignant and 3 cases (0.77%) were suspicious of malignancy. The distribution of cases was as shown in the table 1.

Table 1 Cytological Diagnosis of Lymph Node Aspirates.

Fnac Diagnosis	NO. OF Cases (n=390)	Percentage
Reactive lymphadenitis	179	45.90
Suppurative lymphadenitis	23	5.90
Necrotizing lymphadenitis	27	6.92
Granulomatous lymphadenitis	50	12.82
Tuberculous lymphadenitis	26	6.67
BCG lymphadenitis	1	0.26
Sinus histiocytosis	1	0.26
Non-specific lymphadenitis	2	0.51
Suspicious of malignancy	3	0.77
Lymphoma	10	2.56
Metastatic deposits	68	17.44

We could diagnose ten cases of lymphomas. One case of lymphoma had a polymorphous population of cells, Hodgkins cells and RS cells and was typed as Hodgkins lymphoma. Two cases had monotonous population of small round, blue cells and were typed as Non-Hodgkin lymphoma. Rest of the Lymphoma cases could not be further typed

The distribution of metastatic deposits by cytological typing was as shown in table 2.

Table 2 Distribution of Metastatic Deposits Based On Cytological Diagnosis.

	No. of cases (n=68)	Percentage
Epithelial malignancy	34	50
Squamous cell carcinoma	21	30.88
Adenocarcinoma	4	5.88
Metastatic salivary gland tumor	2	2.94
Metastatic thyroid carcinoma	2	2.94
Metastatic infiltrating ductal carcinoma	2	2.94
Metastatic prostatic carcinoma	1	1.47
Metastatic yolk sac tumor	1	1.47
Metastatic seminoma	1	1.47

The cases where cytological features were not classical of squamous cell carcinoma or adenocarcinoma were put in the category of epithelial malignancy, which was the most common type of metastatic tumor. Squamous cell carcinoma was the next most common type of metastatic tumor, followed by adenocarcinoma. We could diagnose two cases each of metastatic salivary gland tumor, metastatic thyroid carcinoma and metastatic infiltrating ductal carcinoma. One known case of prostatic adenocarcinoma which had metastatisized to inguinal lymph node was diagnosed. One post-op case yolk sac tumor came with supraclavicular lymphadenopathy one year later. Aspirates showed metastatic tumor cells as well as a epithelioid granuloma. One case of seminoma with supraclavicular lymph node metastasis was diagnosed.

Out of 390 aspirates, lymph node biopsy was received for 58 cases.

Table 3 Cytology: Histopathology Correlation

Cytological diagnosis	Histopathological diagnosis
Reactive lymphadenitis (n=27)	Reactive lymphadenitis -11 cases TB – 7 cases Necrotizing lymphadenitis – 3 cases Lymphoma – 6 cases
Suppurative granulomatous lymphadenitis (n=1)	Cat-scratch disease
Necrotizing lymphadenitis (n=5)	TB – 4 cases Kikuchis disease – 1 case
Granulomatous lymphadenitis (n=10)	Granulomatous lymphadenitis – 4 cases TB - 5 cases Sarcoidosis – 1 case
TB (n=2)	TB – 2 cases
Sinus histiocytosis (n=1)	Sinus histiocytosis
Lymphoma (n=1)	NHL
Metastatic deposits (n=11)	Metastatic deposits – 11 cases

As shown in the table 4, cytologically detected benign lesions remained benign on histopathological study in 40 cases. False negative reports were given in 6 cases. Among 12 malignant cases detected by cytology, all remained malignant and there were no false positive reports.

Table 4 Distribution of True Positive, True Negative, False Positive And False Negative Cases In The Present Study.

Cytological diagnosis	Histopathological diagnosis	
	BENIGN	MALIGNANT
BENIGN	40 (TN)	6(FN)
MALIGNANT	0 (FP)	12 (TP)

As, seen in the table 4 there were no false positive cases in our study. Six false negative cases were encountered in the present study, which were attributed to sampling error, necrosis and cystic changes. The diagnostic efficacy of FNAC in diagnosing neoplastic lesions of lymph nodes in the present study was as shown in the table 5.

Table 5 Diagnostic Indicators

Sensitivity	66.67%
Specificity	100%
Positive predictive value	100%
Negative predictive value	86.96%

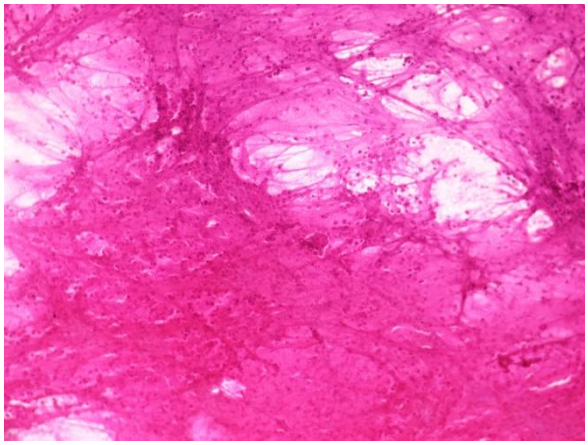

Fig 1 Lymph node aspirate showing neutrophilic infiltrate in suppurative lymphadenitis 10X, H&E STAIN.

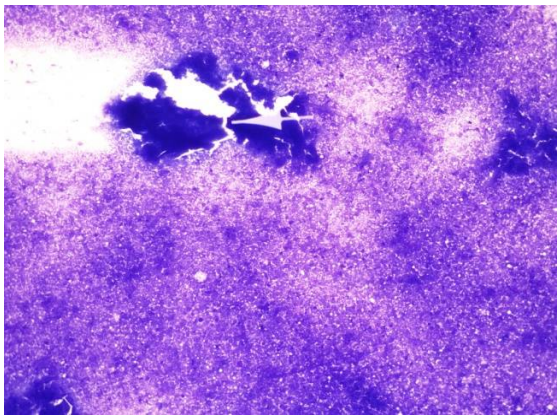

Fig 2 Lymph node aspirate showing extensive necrosis in necrotizing lymphadenitis 10X, GIEMSA STAIN.

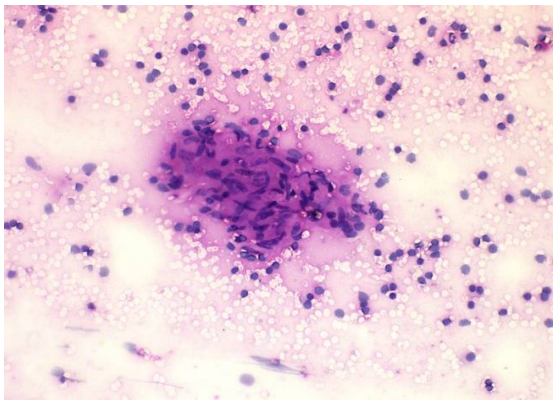

Fig 3 Lymph node aspirates showing epithelioid cell granuloma in granulomatous lymphadenitis 20X, H&E STAIN.

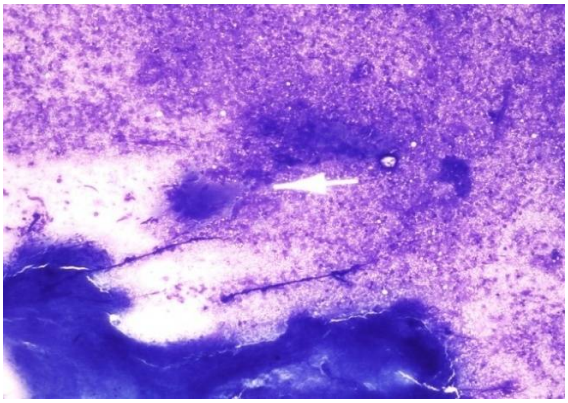

Fig 4 Lymph node aspirate showing epithelioid cell granuloma and extensive necrosis in tuberculous lymphadenitis 20X, GIEMSA STAIN.

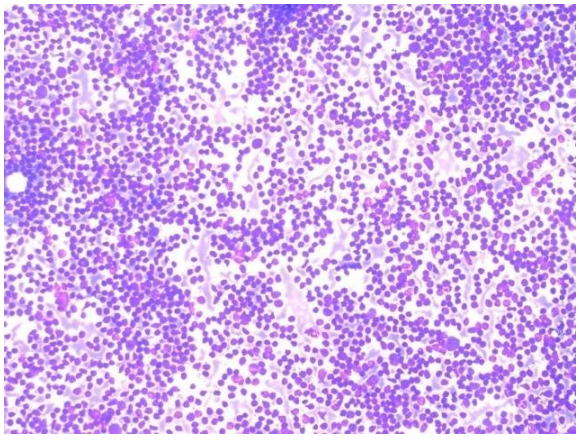

Fig 5 Lymph node aspirate showing monomorphous population of small lymphocytes along with occasional large lymphocytes in case of NHL 20X, GIEMSA STAIN.

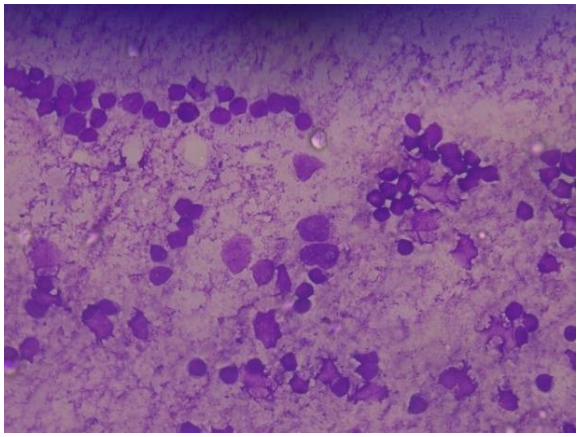

Fig 6 Lymph node aspirate in case of Hodgkin's lymphoma 40X, Giemsa Stain.

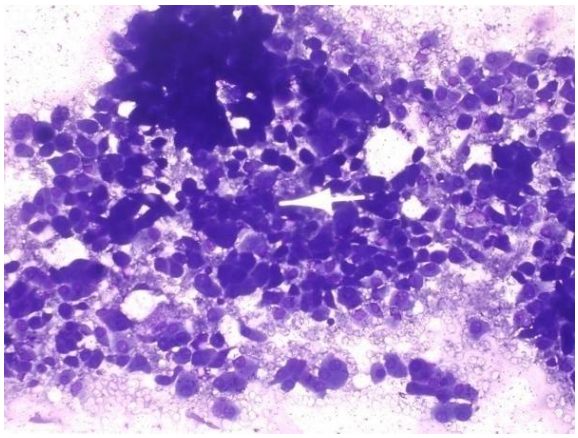

Fig 7 Lymph node aspirates from poorly differentiated epithelial malignancy showing pleomorphic tumor cells with high N:C ratio 20X, Giemsa Stain.

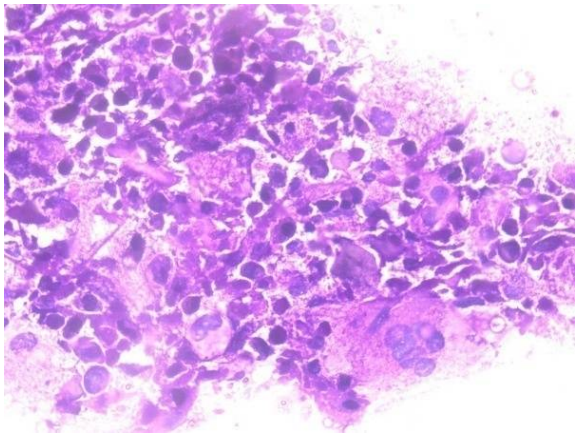

Fig 8 Lymph node aspirates showing large polygonal cells with large pleomorphic nuclei in metastatic squamous cell carcinoma. Background shows foreign body giant cell 20X, Papanicolaou Stain.

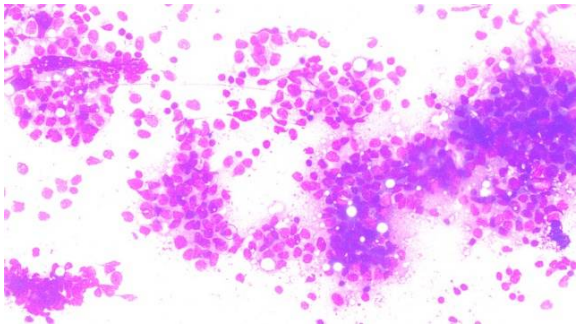

Fig 9 Lymph node aspirate in case of adenocarcinoma 20X, GIEMSA STAIN.

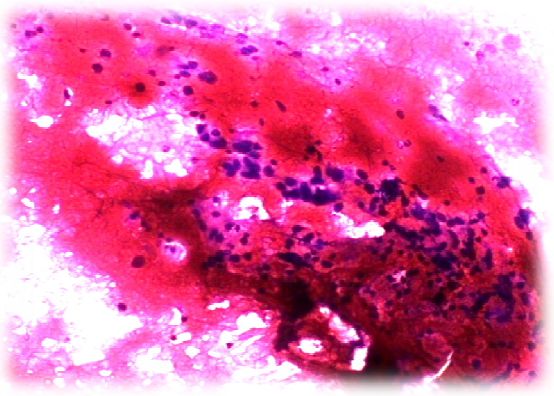

Fig 10 Lymph node aspirate showing large pleomorphic tumor cells in case of metastatic anaplastic thyroid carcinoma 10X, H&E STAIN.

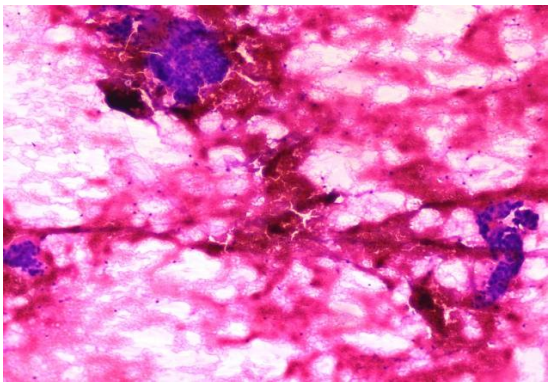

Fig 11 Lymph node aspirate showing large clusters of tumor cells with high N:C ratio in metastatic IDC 10X, H&E STAIN.

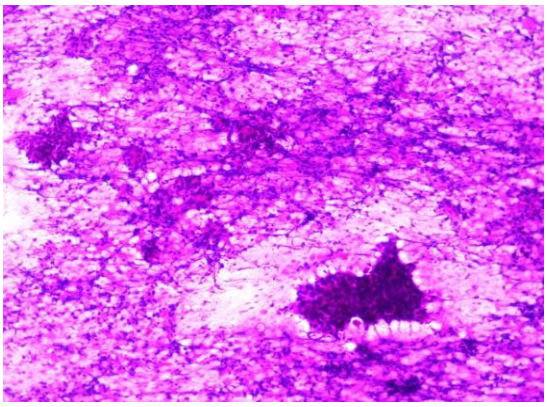

Fig 12 Lymph node aspirate showing large, pleomorphic tumor cells arranged in cohesive clusters and dispersed singly in a case of metastatic adenocarcinoma from prostrate 10X, H&E STAIN

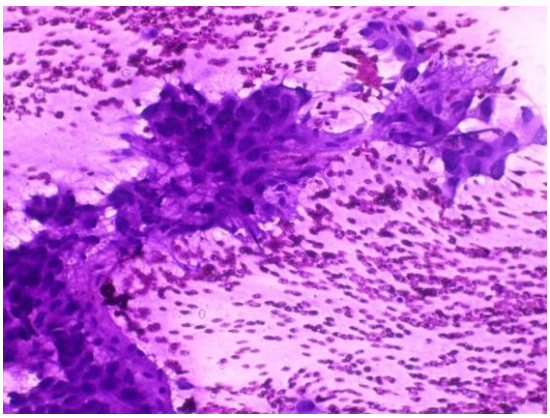

Fig 13 Lymph node aspirate showing large, pleomorphic tumor cells arranged in loose cluster in hemorrhagic and myxoid background in metastatic germ cell tumor 20X, GIEMSA STAIN.

DISCUSSION

Out of total 396 lymph node aspirations in the present study, adequate aspirates were obtained in 390 cases. The ratio of satisfactory to unsatisfactory aspirates in our study was 65 which was close to study by Khajuria *et al* (64.6).[3] Lymph node FNAC has certain limitations and pitfalls which have to be appreciated. The major limitation of aspiration biopsy is inability to interpret some aspirates because of lack of appropriate cellular material.

The most common age group presenting with lymphadenopathy in our study was 21-30 years. Similar observation was made by patel *et al*.[4] Male preponderance was seen in our study which was in concordance with other studies by Patel *et al*., Pandey *et al*. and Hirachand *et al*. [4,5,6]

Benign lesions were more common than malignant lesions in our study. Similar observation was made by other studies like Khajuria *et al*, Patel *et al*, Pandey *et al* and Hirachand *et al*.[3,4,5,6] The predominance of infective conditions in the etiology correlates well with the fact that in our country, the infectious diseases outnumber the malignant ones and also because the malignancies tend to be examined at a later stage in contrast to the western countries where malignancies are reported earlier. [7]

Surgical biopsy examination is the gold standard for lymphoma diagnostics. However, FNAC offers several advantages in that it is quick, inexpensive, and the aspiration procedure has very few complications. It is useful in cases where surgical excision of lymph node is not possible like rapidly progressive disease with immediate need for treatment, no easily accessible lymph nodes, large tumor masses, old age, or a combination of these factors. In patients at high risk for surgical complications, such as those with intra-abdominal, intrathoracic, orbital, thyroid and intrapelvic lymphomas, FNAC may be the only means of diagnosis. [8,9] FNAC is used mainly to assess the staging of primary lymphoid malignancies as well as to recognize the residual and recurrent lymphoid malignancies.[10]

Among the neoplastic lesions, metastatic deposits were more common than primary malignancy of lymph nodes in our present study. Similar observations were made by Patel *et al*, Pandey *et al* and Hirachand *et al*. [4,5,6] Metastatic cancer is a far more common cause of enlarged peripheral lymph nodes than malignant lymphoma, especially in patients older than 50 years. FNA is a reliable method of diagnosing metastatic cancer, a task that is much easier than diagnosing lymphomas.[11]

Sensitivity and specificity of present study was 66.67% and 100% respectively. The results were comparable with other studies by Alwan *et al*, Haque *et al* and Bharathi *et al*. [12,13,14] Diagnostic accuracy depends on sensitivity and specificity of the procedure. Accuracy of fine needle aspiration cytology of lymph nodes is influenced by many factors. Therefore, in negative cytological reports for malignancy in clinically suspected cases, if lymphadenopathy persist fine needle aspiration should either be repeated or lymph node should be excised for histopathological evaluation.

False negative cytological diagnoses may result from sampling error, fibrosis, cystic change, necrosis and misinterpretation of cellular features. False positive diagnoses

are rare and may result from inexperience, radiation effects and misinterpretation of cellular details.

CONCLUSION

With increasing cost of medical facilities any technique which speeds up the process of diagnosis, limits physical and psychological trauma to the patient and saves the expenditure of hospitalization, will be of tremendous value. FNAC is one such procedure. It has been found to be useful diagnostic and supportive investigation in our study. Although it is not a substitute for histopathology diagnosis, as it cannot classify and grade lymphomas, it is very useful in diagnosing the various other causes of lymphadenopathy with fewer traumas to the patient.

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