



Contents lists available at BioMedSciDirect Publications

## International Journal of Biological & Medical Research

Journal homepage: [www.biomedscidirect.com](http://www.biomedscidirect.com)



### Original article

# Role of fine needle aspiration cytology in evaluation of patients with superficial lymphadenopathy

Dr. Sumit Giri\*, Dr. Karandeep Singh

\*Assistant Professor, Department of Pathology, S.G.T. Medical College, Hospital and Research Institute, Budhera, Gurgaon, Haryana, India.  
Associate Professor, Department of Pathology, Maharaja Agrasen Medical College, Agroha, Hisar, Haryana, India.

#### ARTICLE INFO

##### Keywords:

Superficial Lymphadenopathy  
FNAC  
Histopathology.

#### ABSTRACT

Background: FNAC is to be considered a simple, quick, cost-effective and minimally traumatic procedure for the diagnosis of superficial lymphadenopathy. Aim: To evaluate the role of FNAC in patients with superficial lymphadenopathy and to correlate the cytology findings with histopathology. Materials and Methods: A total of 370 patients who presented with superficial lymphadenopathy at FNAC clinic, University Medical Centre and Government Wenlock Hospital from January 2004 to December 2004 were studied. Results: Majority of the cases were reactive lymphadenitis 128 cases (34.59%) followed by tuberculous lymphadenitis 91 cases (24.59%) and suppurative lymphadenitis 15 cases (4.05%). Squamous cell carcinoma was most common metastatic carcinoma 81 cases (21.89%), mostly from the upper aerodigestive tract, Hodgkin's lymphoma was diagnosed in 4 (1.08%) and Non-Hodgkin's in 6 cases (1.62%), 45 cases (12.16%) were labeled inadequate as 34 cases (9.18%) showed only blood and 11 cases (2.97%) no opinion could be given because of low cellularity. Tissue examination was available for subsequent histocytological correlation in 53 cases (14.32%). The accuracy of cytodiagnosis was 90.56% with a sensitivity of 90.32%, specificity 90.90%, false negative rate of 0.54% and false positive rate of 0.81%. Conclusion: FNAC is a reliable first line diagnostic tool and has an important place in cytopathology as there is progressive decline in the number of biopsies performed of enlarged nodes after the FNAC diagnosis has been given.

© Copyright 2010 BioMedSciDirect Publications IJBMR -ISSN: 0976:6685. All rights reserved.

### 1. Introduction

Lymphadenopathy as a primary presenting sign is seen by physicians and surgeons alike with remarkable regularity. The advantages of the procedure are now clear and it has proven to be an easy, quick, reliable and cost-effective diagnostic tool for lymphadenopathies. FNAC avoids the physical and psychological trauma occasionally encountered after an open surgical biopsy, is convenient for the patient and physician alike, is a useful outpatient procedure, is relatively painless and provides a good correlation between cytology and histopathology. The aim of this study was to evaluate the role of FNAC in patients with superficial lymphadenopathy and to correlate the findings with tissue biopsy.

### 2. Materials and methods

This was a retrospective study carried out on patients who presented with superficial lymphadenopathy at FNAC Clinic, University Medical Centre and Government Wenlock Hospital, Mangalore over a period of 1 year (January 2004 to December 2004). Out of the total 1611 cases, 370 cases (22.96%) were of superficial lymphadenopathy. Three hundred seventy patients of all age group and sexes who underwent FNAC were evaluated and the findings were correlated with histopathological diagnosis available in 53 cases. The FNAC slides were stained by MGG, Pap and AFB stains and histopathology slides by Haematoxylin and Eosin (HE). Unsatisfactory slides were excluded from the study. Pre-operative FNAC results were compared with final histological diagnosis in 53 patients. The sensitivity, specificity, accuracy, false positive rate (FPR) and the false negative rate (FNR) for detection of various lesions were calculated.

\* Corresponding Author : Dr. Sumit Giri

\*Assistant Professor, Department of Pathology,  
S.G.T. Medical College,  
Hospital and Research Institute,  
Budhera, Gurgaon, Haryana, India.

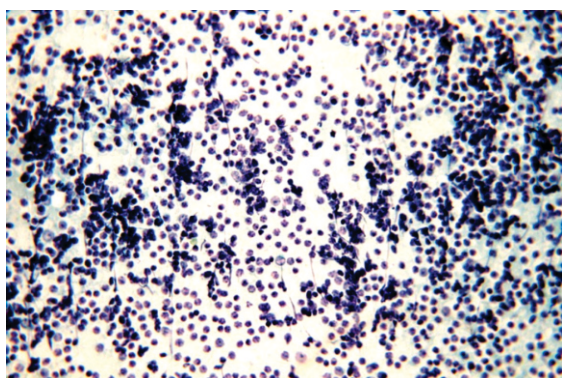
### 3. Results

FNAC were performed on 370 patients with superficial lymphadenopathy which included 221 males (59.72%) and 149 females (40.27%) with male to female ratio of 1.48: 1. In the study by Betsill it was 1:1 while Steel found lymphadenopathy twice as common in males as compared to females [1,2]. The youngest patient in the study was 3 years old and the oldest was 96 years old. The common site of lymph node aspiration was cervical. The FNAC revealed results as given in Table 1.

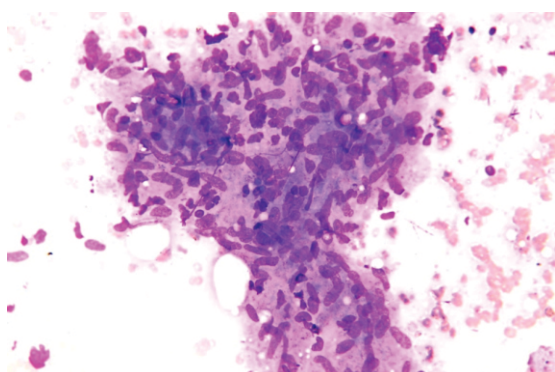
The most common diagnosis was reactive lymphadenitis (Fig. 1) followed by tuberculous (Fig. 2) and suppurative lymphadenitis (Fig 3). Among the malignant lesions, the commonest diagnosis was metastatic squamous cell carcinoma (Fig. 4 a & b), mostly from upper aero-digestive tract. Hodgkin's lymphoma and Non-Hodgkin's lymphoma was detected in 4 and 6 cases respectively (Fig. 5 a & b).

The histopathological diagnosis was available in 53 patients out of 370 patients. The comparison between FNAC findings and histopathological findings is shown in Table 2. The sensitivity, specificity, false positive rate, false negative rate and diagnostic accuracy of FNAC for detection of malignant lesions is calculated and shown in Table 3.

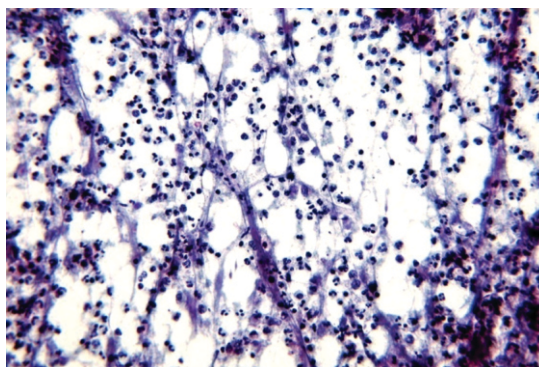
**Fig.1: Non-specific reactive hyperplasia (Late phase) showing predominant population of small mature lymphocytes (Pap X400).**



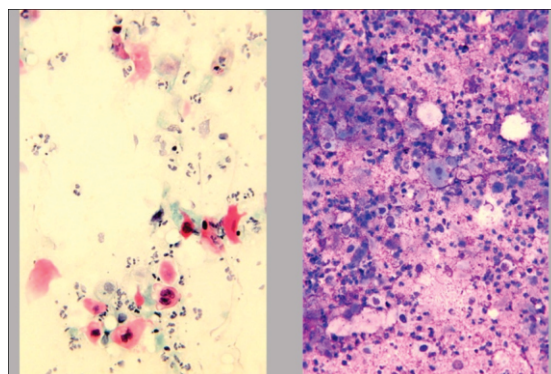
**Fig. 2: Tuberculous lymphadenitis showing well-formed epithelioid cell granuloma (MGG X1000).**



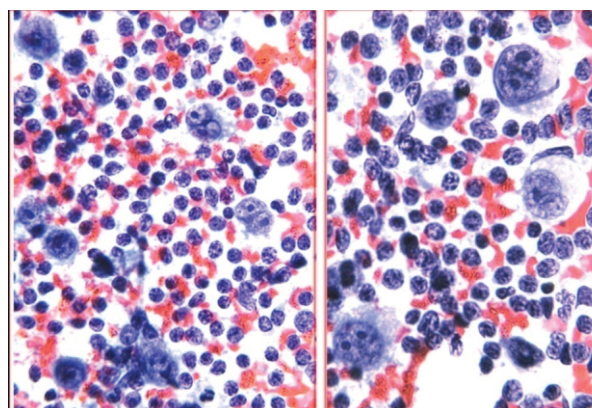
**Fig.3: Suppurative lymphadenitis showing plenty of neutrophils (Pap X400).**



**Fig.4: ( a) Metastatic squamous cell carcinoma, malignant cells showing orangeophilic cytoplasm, angulated borders with pleomorphic and hyperchromatic nuclei (Pap X400). (b) same case showing malignant squamous cells with sky blue cytoplasm (MGG X400).**



**Fig. 5: (a) Hodgkin's lymphoma. To show Reed-Sternberg cells (Pap X 400) (b) Same case. (Pap X 1000)**



**Table 1. Cytological diagnoses of 370 cases**

CYTOLOGICAL DIAGNOSIS	NUMBER OF CASES
Reactive lymphadenitis	128 (34.59%)
Tuberculous lymphadenitis	91 (24.59%)
Suppurative lymphadenitis	15 (4.05%)
Metastasis	81 (21.89%)
Hodgkin's lymphoma	4 (1.08%)
Non-Hodgkin's lymphoma	6 (1.62%)
Inadequate	45 (12.16%)
TOTAL	370 (100%)

**Table 2: Results of 53 patients of FNAC with histopathological correlation**

FNAC RESULTS	TRUE POSITIVE WITH HISTOPATHOLOGY	FALSE POSITIVE WITH HIS TOPATHOLOGY	TOTAL
Reactive lymphadenitis	2	4	6
Tuberculous lymphadenitis	16	1	17
Metastasis	23	1	24
Hodgkin's Lymphoma	03	1	04
Non-Hodgkin's Lymphoma	02	0	02
Total	46	7	53

**Table 3: Statistical Analysis for detection of lymph nodes lesions**

Sensitivity	90.32%
Specificity	90.90%
False Negative Rate	0.54%
False Positive Rate	0.81%
Accuracy	90.56%

#### 4. Discussion

Lymph nodes being components of the peripheral or secondary lymphoid organs, are an important part of the immune system. In both adults and children, lymphadenopathy can be the result of a myriad of causes and represents a common clinical problem, the consequences of which range from negligible to very serious and fatal [3].

In children, even mild infection can result in massive local lymphadenopathy. Accordingly, medical treatment and a period of observation usually precede the request for FNA. In contrast, adults and elderly patients often react to infection with only slight to modest lymph node enlargement. Therefore, distinct lymphadenopathy in these cases will arouse suspicion of malignancy and justify immediate needle biopsy [4].

The primary purpose of FNA biopsy of abnormal peripheral lymph nodes is to decide whether surgical excision for histological examination is indicated. Although surgical excision of a palpable peripheral node is relatively simple, it requires anaesthesia, strict sterility, theatre time and leaves a scar. Therefore previously patients were usually watched for some time unless the clinical suspicion of malignancy was strong. But nowadays, FNA of the enlarged nodes has become the first line of action, not only to guide the clinician in further management but also to give the patients an immediate diagnosis and reassure them.

In the present study the most common site of lymph node aspiration was cervical (52.7%). This was in agreement with the studies of Steel and Schafernak in which cervical lymph node FNACs constituted 51.36% and 47%, respectively [2,5]. More than 90% of the aspirates in this study were performed by the pathologists themselves. This has a definite advantage in that it gives us an opportunity to examine the patients as well as get a "feel" of the enlarged node/nodes.

Majority of the cases in our study were diagnosed as late phase of non-specific reactive hyperplasia of the lymph node. The histopathological correlation was available in 6 cases, 4 cases proved to be false negative by biopsy. Of these 4 false negative cases, 2 were diagnosed histologically as metastatic carcinomas, one as Kikuchi's lymphadenitis and the other as tuberculosis. The discrepancy could be due to non-representative sampling or because another node was biopsied and not the aspirated one or due to partial effacement of nodal architecture by the disease process.

Though mycobacterial infections have become uncommon clinical events in developed countries, it still remains a rampant cause of enlarged nodes in our country with a resurgence recorded now due to the AIDS epidemic. The role of FNAC in the diagnosis of tuberculosis cannot be over emphasized. The tuberculous smears have a polymorphous picture, as does reactive lymph node hyperplasia. The distinguishing features are presence of epithelioid cell granulomas, caseous necrosis and typical Langhan's giant cell. Cases showing epithelioid granulomas with necrosis in the cytologic specimen present no diagnostic difficulty. Moreover, the frequency of AFB positivity is higher in this group. In smears with epithelioid granuloma and without necrosis, AFB positivity may not be seen. In such cases other causes of granulomatous lymphadenitis such as sarcoidosis must be considered in the differential diagnosis.

In the appropriate clinical setting with the characteristic cytologic features as described above, the gold standard for the decisive diagnosis of tuberculosis rests with the demonstration of AFB or by culture. Culture for AFB can be used routinely or at least in cases negative by AFB stain because it yields a higher rate of AFB positivity [6]. The results of the present study were comparable with the study of Paul et al. [7]. Metastatic lesions in the lymph nodes aspirates studied included secondaries from squamous cell carcinoma, adenocarcinoma, poorly differentiated carcinoma, infiltrating ductal carcinoma breast.



Micrometastasis, either in the subcapsular sinus or as scattered single cells, are unlikely to be sampled even by repeated aspirations and can sometimes be missed also by histological examination of an excised node. They are an important cause of false negative cytological reports. In the present study, 81 cases were cytologically diagnosed to have nodal metastasis. A majority of our patients were in the 41 to 50 years age group. Males (68) were more often affected than females (13). The cervical nodes were commonly involved by metastatic disease. The primaries were invariably in the upper aerodigestive tract. This is in accordance with the study of Betsill, where 66 out of 117 cases (56.4%) of metastatic squamous cell carcinoma were from the head and neck region[1]. Similarly, Manohar found 38 out of 57 cases (66.7%) to have metastatic squamous cell carcinoma of which 20 (52.6%) of the primaries were from the head and neck region [8].

In our series, there were four cases of Hodgkin's lymphoma and 6 cases of Non-Hodgkin's lymphoma. Histopathology confirmed Hodgkin's disease in 3 cases. The fourth case showed Kikuchi's disease. This was considered to be an interpretation error on review. Histopathological correlation available in 3 cases confirmed the cytological diagnoses. They proved to be lymphoblastic type, follicular type and diffuse, large cell type of Non-Hodgkin's lymphoma by biopsy. The result of present study was in accordance with the work of Gupta [9].

In our study, the sensitivity and specificity was 90.32% and 90.90% respectively which shows that it is a good and reliable test in evaluating superficial lymphadenopathy and the diagnostic accuracy was 90.56% which is comparable with other studies.

## 5. Conclusion

The advantages of fine needle aspiration in the evaluation of enlarged nodes appear well established. As an adjunctive modality of diagnosis, this technique is convenient, reliable and relatively painless. It is simple, cost-effective, safe and allows immediate diagnosis when the patient is first examined. It helps with proper planning for imaging procedure and other tests. It is a useful method for following patients with a known malignancy and may assist in the guidance of therapy as well as the ready identification of metastasis or recurrence. It provides material for special studies such as cytochemistry, ultrastructural examination, immunopathology or culture. The procedure is useful in conjunction with radiologic techniques such as computerised tomography and ultrasonography. It can be performed by a clinician, radiologist or pathologist as an outpatient procedure, in a physician's office or in the operating room. Along with its other advantages, it brings a new dimension of co-operation between the cytopathologist, the radiologist and other medical specialists in this era of emphasis on ambulatory care.

## 6. Acknowledgement

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this

manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

## 7. References

- [1] Betsill WL, Hajdu SI. Percutaneous aspiration biopsy of lymph nodes. *Am J Clin Pathol* 1980; 73: 471-479.
- [2] Steel BL, Schwartz MR, Ramzy I. Fine needle aspiration biopsy in the diagnosis of lymphadenopathy in 1,103 patients: role, limitations and analysis of diagnostic pitfalls. *Acta Cytol* 1995; 39: 76-81.
- [3] Geisinger KR, Stanley MW, Raab SS, Silverman JF, Abati A. ed. *Modern Cytopathology*, Churchill Livingstone, Pennsylvania 2004: 643-688.
- [4] Grieg ED, Gray AC. Lymphatic glands in sleeping sickness. *Br Med J* 1904; 1: 1252. (Cited in 3).
- [5] Schafernak KT, Kluskens LF, Ariga R, Reddy VB, Gattuso P. Fine needle aspiration of superficial and deep seated lymph nodes on patients with and without a history of malignancy: a review of 439 cases. *Diagn Cytopathol* 2003; 29: 315-319.
- [6] Das DK. *Lymph node In: Bibbo M (ed). Comprehensive cytopathology 2nd edition. W.B. Saunders Company, Philadelphia 1997; 703-729.*
- [7] Paul PC, Goswami BK, Chakrabarti S, Giri A, Pramanik R. Fine needle aspiration cytology of lymph nodes: an institutional study of 1,448 cases over a 5-year period. *J Cytol* 2004; 21: 187-190.
- [8] Manohar C. Fine needle aspiration of lymph nodes. A cytological study with histopathological correlation (Dissertation). Kasturba Medical College, Mangalore, Karnataka, University of Mangalore; 1991.
- [9] Gupta AK, Nayar M, Chandra M. Reliability and limitations of fine needle aspiration cytology of lymphadenopathies: an analysis of 1,261 cases. *Acta Cytol* 1991; 35: 777-783.
- [10] Aljafari AS, Kalil EAG, Elsiddig KE et al. Diagnosis of tuberculous lymphadenitis by FNAC, microbiological methods and PCR: a comparative study. *Cytopathol* 2004; 15: 44-48.
- [11] Arora B, Arora DR. Fine needle aspiration cytology in the diagnosis of tuberculous lymphadenitis. *Indian J Med Res (A)* 1990; 91: 189-192. (cited in 16).
- [12] Bhattacharya S, Raghuvver CV, Adhikari P. FNAC diagnosis of tuberculosis: an eight years study at Mangalore. *Indian J Med Sciences* 1998; 52: 498-506.
- [13] Cardoza PL. The cytologic diagnosis of Lymph node puncture. *Acta Cytol* 1964; 8: 194-205.
- [14] Carter TR, Feldman PS, Innes DJ, Frierson HE, Frigly AF. The role of fine needle aspiration cytology in the diagnosis of lymphoma. *Acta Cytol* 1988; 32: 848-853.
- [15] Chatard JA, Guthrie CG. Human Trypanosomiasis: report of a case observed in Baltimore. *Am J Trop Dis Prevent Med* 1914; 1: 493-503. (Cited in Betsill)
- [16] Das DK. Tuberculous lymphadenitis: correlation of cellular components and necrosis in lymph node aspirate with AFB positivity and bacillary count. *Indian J Pathol Microbiol* 1990; 33: 1-10. (cited in 16).
- [17] Frable WJ. Fine needle aspiration biopsy: a review. *Hum Pathol* 1983; 14: 9-28. (Cited in 15).
- [18] Glant MD. Cytopathology of lymph nodes in non-specific reactive hyperplasia: prognostication and differential diagnoses. *Am J Clin Pathol* 1997; 108: 31-56.
- [19] Kini SR. Lymph node. In: Kini SR ed. *Colour atlas of differential diagnosis in exfoliative and aspiration cytopathology 1st edition. William and Wilkins, Baltimore 1999; 277-291.*
- [20] Lee RE, Valaitis J, Kalis O, Sophian A, Schultz E. Lymph node examination by fine needle aspiration in patients with known or suspected malignancy. *Acta Cytol* 1987; 31: 563-572.
- [21] Martin HE, Ellis EB. Aspiration biopsy. *Ann Surg* 1930; 62: 169-181. (Cited in 3)

- [22] Nasuti JF, Yu G, Boudousquie A, Gupta P. Diagnostic value of lymph node fine needle aspiration cytology: an institutional experience of 387 cases observed over a 5-year period. *Cytopathol* 2000; 11: 18-31.
- [23] O'Dowd GJ, Frable WJ, Behm FG. Fine needle aspiration cytology of benign lymph node hyperplasias: diagnostic significance of lymphohistiocytic aggregates. *Acta Cytol* 1985; 29: 554-558.
- [24] Orell SR, Heerde PV. Lymph nodes. In: Orell SR, Sterrett GF, Walters MN, Whitaker D. *Manual and atlas of fine needle aspiration cytology*. 3rd ed. Churchill Livingstone, London 1999: 74-108.
- [25] Pai MR. Fine needle aspiration biopsy study as an aid in the diagnosis of lymph node lesions (Dissertation). Mangalore, Karnataka, University of Mangalore; 1986.
- [26] Patra AK. Diagnosis of lymphadenopathy by fine needle aspiration cytology. *Indian J Pathol Microbiol* 1983; 26: 273-278. (cited in 16).
- [27] Prasad RRA, Narasimhan R, Sankaran V, Veliath AJ. Fine needle aspiration cytology in the diagnosis of superficial lymphadenopathy: an analysis of 2,418 cases. *Diagn Cytopathol* 1996; 15: 382-386. (cited in 25).
- [28] Shenoy R, Kapadi SN, Kini H et al. Fine needle aspiration diagnosis in HIV-related lymphadenopathy in Mangalore, India. *Acta Cytol* 2002; 48: 35-39.
- [29] Skoog L, Tani E. Lymph nodes. In: Gray W, Mackee GT. *Diagnostic cytopathology*. 2nd ed. Churchill Livingstone, London 2002: 501-534.
- [30] Stani J. Cytologic diagnosis of reactive lymphadenopathy in fine needle aspiration biopsy specimens. *Acta Cytol* 1987; 31: 8-13.
- [31] Swisher B. Microorganism. In: Bancroft JD, Gamble M (ed). *Theories and practice of histological techniques* 5th edition. Churchill Livingstone, London 2002: 325-344.
- [32] Wakely PE. Aspiration and touch preparation Cytopathology of lymph nodes. In: *Atlas of difficult diagnoses in Cytopathology* ed. Aflurison BF, Silverman JF ed., W.B. Saunders Co. Philadelphia, 1998: 401-428.
- [33] Ward GR. *Bedside Hematology* Philadelphia. W.B. Saunders 1914. (Cited in 3).