

Role of fine needle aspiration cytology in the evaluation of the etiology of lymph adenopathy

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Abstract

Background: Lymphadenopathy is of great clinical significance as underlying diseases may range from a treatable infectious etiology to malignant neoplasms. Fine needle aspiration cytology (FNAC) is a reliable as well as an inexpensive method used to diagnosis of lymphadenopathy of various site.

Aims: 1) To evaluate the usefulness of FNAC as a diagnostic tool in etiological causes of lymphadenopathy

2) To study the cytomorphological features associated with various lymphadenopathies.

Methods: A prospective study was carried out at a department of pathology in a tertiary care hospital for a period of one year. A total 322 cases of the lymph node FNAC were studied and stained by Hematoxylin & Eosin, Giemsa Pap and Ziehl-Neelsen stained smears.

Results: In this series of FNAC cervical lymph nodes were 256 (80%), and axillary lymph nodes were 20 (6.25%). The age of patients ranged from 1 to 70 years. FNAC diagnosis was found to be as follows: tubercular lymphadenitis in 146 cases (45.34%), reactive hyperplasia 58 cases (18.01%), metastatic carcinoma 43 (13.35%), granulomatous lymphadenitis 45 (13.97%), non-specific lymphadenitis 2 (3.72%), acute suppurative lymphadenitis 10 (3.12%) and lymphoma 6 (1.86%).

Conclusion: Fine needle aspiration cytology is a most diagnostic tool in the evaluation of lymphadenopathy for early screening and follow-up and performed in outpatients department.

Introduction

Lymphadenopathy is the most common clinical presentation in outpatient department patients which consists of various etiology factors ranges from inflammatory to a malignant condition.¹ The most common cause of peripheral lymphadenopathy in our setting is an inflammatory reaction to a microbial challenge, followed by lymphomas and malignant metastatic deposits. The common etiological factors for lymphadenopathy tend to be considered as reactive, tuberculous, or malignant metastases. Overall, infective conditions (reactive and tuberculous) are responsible for the majority of lesions. M. tuberculosis is the most common cause of granulomatous lymphadenitis in India.²⁻⁴ Fine needle aspiration cytology (FNAC) is accepted by most patients as a non-invasive method for evaluating lymphadenopathy. Its advantages are rapid turnaround time, low cost, easily provides cells for immunophenotyping and molecular diagnostic tests and less morbidity.⁵ The purpose of the study was to evaluate the usefulness of FNAC as a diagnostic tool in etiological causes of lymphadenopathy and study the cytomorphological features associated with lymphadenopathy.

Materials and Methods

A prospective study was carried out at the Department of Pathology, JJMMC from January 2015 to December 2015 on 322 patients with lymphadenopathy of various sites of the body. Patients age, sex, site, duration were noted and full clinical examination to look out for other node enlargement will be noted. FNAC will be performed after taking consent

and explaining the procedure to the patient. FNAC was done using 5-10 ml disposable syringe with 22-24 gauge needle. Two-three passes were done in all patients and four smears were made for each site of aspiration. Two smears were fixed immediately in isopropyl alcohol and stained with Papanicolaou (Pap) stain and Hematoxylin & Eosin (H&E) and other two were air dried stained with Giemsa stain and where ever tuberculosis was suspected the Ziehl Neelson (ZN) stain was done. All patients presenting to the department with enlarged lymph nodes for FNAC study were included and patients taking treatment for primary or secondary neoplasm in lymph nodes were excluded. Cytomorphological findings like cell population, areas of necrosis and pattern were assessed by examination under low power, high power and oil immersion.

Results

A total of 1800 cases were aspirated in the cytopathology section over a period of one year from January 2015 to December 2015, out of which 322 (17.88%) cases were lymph node FNACs. Out of 322 patients with palpable lymphadenopathy, two cases the FNAC was inconclusive due to unsatisfactory smear preparation. There were 142 (44.37%) female and 178 (55.63%) male patients with age of the patients ranged from 1 to 70 years. The maximum number of cases falling in the range between 21-40 years (220 cases, 68.7%), followed by 40-70 years (80 cases, 25%) and 20 cases (6.3%) in the range of 0-6 years.

The various site wise FNAC was done in cervical 256(80%), axillary 20(6.25%), submandibular

18(5.6%), supraclavicular 14 (4.4%) and inguinal lymph nodes 12 (3.75%).

Among common cytological lesions found in our study was tubercular lymphadenitis 146 cases (45.34%) followed by reactive hyperplasia 58 cases (18.01%), metastatic carcinoma 43(13.35%), granulomatous lymphadenitis 45(13.97%), non-specific lymphadenitis 12(3.72%), acute suppurative lymphadenitis 10(3.12%) and lymphoma 6 (1.86).

Table 1: Cytological diagnosis of lymphadenopathy

Cytologic diagnosis	Number of cases	Percentage %
Tubercular lymphadenitis	146	45.34
Reactive hyperplasia	58	18.01
Granulomatous lymphadenitis	45	13.97
Metastatic carcinoma	43	13.35
Non-specific lymphadenitis	12	3.72
Suppurative lymphadenitis	10	3.12
Hodgkins lymphoma	04	1.2
Non Hodgkins lymphoma	02	0.6
Unsatisfactory	02	0.6
Total	322	

The lymph node aspirates found to be diagnosed as tubercular lymphadenitis based on the presence of epithelioid cell granuloma and caseous necrosis with or without langhan’s giant cells or ZN positivity. Among these, 72 cases were Ziehl- Neelsen staining positive. Further cytomorphologic patterns in tubercular lymphadenitis as follows.

Table 2: Correlation of cytomorphological features in TB lymphadenitis with AFB positivity

Cytomorphological features	No. of cases(%)	AFB positivity
Epithelioid cell granulomas without caseous necrosis	37(25.4)	10(13.9%)
Epithelioid cell granulomas with caseous necrosis	89(60.9)	22(30.6%)
Caseous necrosis without granulomas	20(13.7)	40(55.5%)
Total	146	72

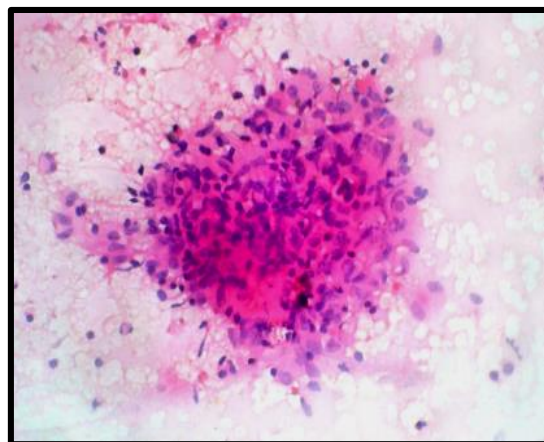


Fig. 1: Smear showing aggregates of epithelioid macrophage in a background of necrosis (H & E 400X)

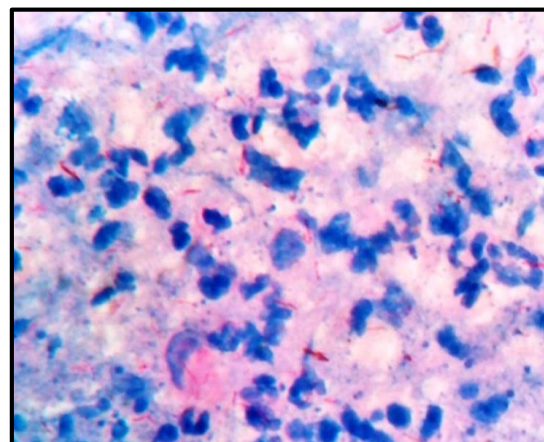


Fig. 2: Smear showing acid fast bacilli in a background of necrosis (ZN staining, 1000x)

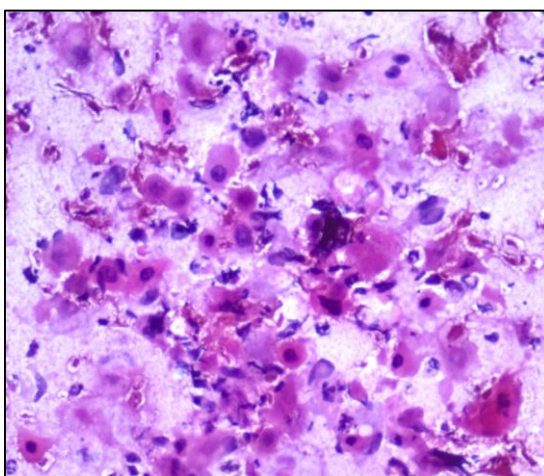


Fig. 3: Smear showing metastatic squamous cell carcinoma deposits in a lymph node ((H & E, 400x)

Granulomatous lymphadenitis was diagnosed based on the presence of epithelioid cell granuloma with or without giant cells and absence of necrosis. Suppurative lymphadenitis cases showed predominantly

polymorphonuclear leukocytes, necrotic debris and other lymphoid cells.

Among the 43 cases of metastasis deposits, squamous cell carcinoma 28 (65%), adenocarcinoma 6 (14%) and poorly differentiated carcinoma 9 (21%). Lymphoma cases were total 6 (2%) of which 4 were Hodgkin's lymphoma and 2 were non-Hodgkin's lymphoma.

Discussion

FNAC is most important diagnostic tool to aid in the diagnosis of lymph node lesions. It is inexpensive, safe and quick and reduces the need for surgical biopsy.⁶ Lymphadenopathy is one of the commonest clinical presentation of various disease process present inside the body. This study was carried out to find out the relative frequencies of various etiology factors presenting as lymphadenopathy in different age groups and cytomorphological changes in the different lesions.

In our study adequate material was obtained in 99.3% which closely correlates with the study by Hemalatha et al (98%)⁷ and Gupta et al (85.2%)⁸. Aspirates were inconclusive in 0.7% cases due to unsatisfactory preparation smears. The causes for unsatisfactory smears were scanty cellular material, or obscuring blood.

Among the age group which was studied range from 1-70 yrs with maximum cases ranged 21-40 yrs which is comparable with those of Shreshtha et al⁹, A. B. Pandav et al¹⁰ and A. K. Kochhar et al¹¹. In our study a male preponderance was noted and similar male preponderance was correlated with Hirachand et al¹² and Shreshtha et al.⁹

Among the region wise FNAC was most common in cervical region (80%) followed by axillary region (6.25%). Similar findings were also observed by A K Kochhar et al¹¹ and Hirachand et al¹². Tuberculous lymphadenitis was the most common lesion and was reported in 146 cases (45.34%) which correlated with the study by Ruchi K et al¹³ (52.3%) and A B Pandav et al¹⁰ (50.53%). In our study TB lymphadenitis cases were associated with systemic symptoms i.e. fever, fatigue, weight loss, night sweats and anorexia. In these cases the matting of lymph nodes is common feature which is characterized by softening and abscess formation.

In our study cytomorphological pattern was Epithelioid cell granulomas with caseous necrosis (60.9%) in present study, which is closely comparable with Goswami et al¹⁴ (50%). AFB positivity was maximum with necrosis without granulomas pattern (55.5%) followed by epithelioid cell granulomas with necrosis pattern (30.06%) which correlated with findings of Goswami et al¹⁴. Most of the cases show AFB positivity 55.5% when cheesy material was aspirated followed by purulent aspirate having AFB positivity 30.6% and less AFB positivity 13.9% was

found with altered blood mixed aspirate which correlate with Goswami et al¹⁴.

The second most common cytological diagnosis was reactive hyperplasia was seen in 58 cases (18.01%). Similar findings were also observed in A K Kochhar et al¹¹. Granulomatous lymphadenitis was seen in 45 cases (13.97%) correlates with studies by Hirachand et al¹² (9.2%). 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 non-suppurative. Suppurative granulomatous disorders include tularemia, cat scratch disease, yersinia etc. Non suppurative granulomatous disorders include tuberculosis, BCG, toxoplasma, lepra bacilli, brucellosis, syphilis.^{15,16}

In our study lymph node aspirates in 43 cases (13.02%) showed metastatic deposits which correlates with the studies by Malukani K (16.6%)¹⁷ & Mandakini M Patel et al (27.06%)¹⁸. The most common age group affected in metastatic tumour, in present study was 41-50 yrs which correlate with other study of A.K. Kochhar et al.¹¹ The most common tumor metastasizing to the neck nodes was the squamous carcinoma (65% of all metastatic lymph nodes) arising commonly in the tongue, alveolus, buccal mucosa, palate and from lung followed by adenocarcinoma (14%), poorly differentiated carcinoma (21%). This high percentage of squamous cell carcinoma has possible explanation that in our region because people have a bad habit of tobacco chewing. Most of the metastatic deposits (65%) were from squamous cell carcinoma which correlated with Hemalatha et al⁷ (60%) and Mandakini M Patel et al¹⁸ (75.5%).

We reported 6 (1.86%) cases of lymphoma which correlated with findings of Abdul Haque Khan et al¹⁹ (2%). 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.

Conclusion

FNAC is a simple, low cost, non-invasive and inexpensive method which can be done in various sites in the body at the same times is an useful diagnostic tool in determining the nature of enlargement of lymph nodes. FNAC helps in etiology of lymph node enlargement as reactive change, infective/inflammatory, lymphoma, metastatic etc. FNAC not only pick up unsuspected metastatic deposits but in most conditions give a clue regarding site of primary. Following the cytodiagnosis, decision regarding the requirement of histological examination can be made and patient can be managed with a curative or palliative approach.

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