

Cytological Profile of Lymphadenopathies at Tertiary Health Care Institute

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Abstract

Background: Lymph node aspiration is of great value for diagnosis of lymphadenitis, lymphomas and metastatic carcinoma. FNAC is a simple, minimally invasive investigative procedure, producing speedy result and is inexpensive with low complication rate. **Objectives:** To study and classify various lymphadenitis using FNAC. **Results and Conclusion:** Majority of study participants [186(97.89%)] had localized lymphadenopathy and 4(2.11%) had generalized lymphadenopathy. Most common site involved was cervical lymph nodes. 147 (77.64%) lesions were non-neoplastic while 43 (22.36%) were neoplastic; most of them being metastatic. Tubercular lymphadenitis was diagnosed on cytology in 45 cases.

Keywords: FNAC, Lymphadenitis, Neoplastic, Non-Neoplastic, Tubercular Lymphadenitis

1. Introduction

Enlarged lymph nodes were the first organs to be diagnosed by Fine Needle Aspiration Cytology (FNAC); they are one of the most frequently sampled tissues¹. Lymph nodes are the most common target organs where FNAC is performed, because of their wide distribution and easy accessibility. Lymph node aspiration is of great value for diagnosis of lymphadenitis, lymphomas and metastatic carcinoma^{2,3}. FNAC is a simple, minimally invasive investigative procedure, producing speedy result and is inexpensive with low complication rate⁴. The material obtained from FNA can be used for diverse group of special techniques like cytochemistry, bacteriological culture, immunocytochemistry, ultra structural studies and molecular hybridization⁵.

Advantages of FNAC in Lymphadenopathy are Easy diagnosis of reactive lymphadenopathy, tuberculosis, metastatic malignancy, initial diagnosis of lymphomas, followed by biopsy for confirmation⁶. FNAC not only confirms the presence of metastatic disease but also gives clues regarding the nature and origin of the primary tumor⁷.

Although the role of FNAC is initial diagnosis, sub-classification and management of patients with lymphomas may be controversial; it helps in detection of residual disease, recurrences and progression of low-grade lymphoma and helps in staging the disease⁸.

Limitations of FNAC are minimal or severe hemorrhage can occur following FNAC of lesions in close proximity to large blood vessels, in vascular lesions, in lesions of vascular organs and in patients having bleeding diathesis, pneumothorax following intra-thoracic FNACs, tumour implantation. Due to relative absence of tissue architecture patterns in FNAC, smears and the small amount of tissue material, specific diagnostic conclusions cannot always be reached⁹⁻¹¹.

2. Aims and Objectives

- To study the lymphadenopathies in various diseases by FNAC.
- To categorize the various lymphadenopathies into neoplastic and non-neoplastic lesions.
- To study the pattern of tuberculous lymphadenitis by FNAC.

3. Materials and Methods

The present cytological study of 190 cases with lymph node lesions was conducted in the Department of Pathology of Dr. Vasant Rao Pawar Medical College, Hospital and Research Centre, Nashik from August 2013 to December 2015.

Patients of all ages and both sexes undergoing FNAC for clinically diagnosed lymphadenopathy irrespective of the cause and site of lymphadenopathy were included in the study. Uncooperative patients, not willing for FNAC and cases of lymphadenopathies where adequate aspirate are not obtained even after repeated aspiration were excluded from the study. The present study was explained of the procedure to ensure his co-operation and a written consent was obtained from the patient.

After general, systemic and local examination of site, location, relation of swelling to other structures, size, shape, border, consistency, evidence of pulsation, local temperature and appearance of skin over site of puncture was observed and noted. FNAC was done. A tangential tract was used in cases of superficial dermal lesions. In cases of deeper lesions, the needle was inserted in a vertical direction with the plunger of syringe in resting position as it is less painful and allows better appreciation of depth of lesion⁹.

If fluid was obtained in the aspirate, it was centrifuged, supernatant was discarded and the smears were prepared from the sediment. The smears were prepared in such a way that they occupied 70-80 % area of the slide and indicates that optimal amount of material had been deposited on the slide. In this way 5-6 smears were prepared and whole procedure was carried out as quickly as possible to avoid drying artifact.

Prepared smears were wet fixed and air dried. Wet fixation was done by putting smears in a bottle or coplin jar containing 90% ethanol while air dried smears were obtained by allowing it to dry in air for few minutes. Wet fixed smears were stained with haematoxylin and eosin stain in all cases. Air dried smears were stained with Acid fast stain (ZiehlNeelsen's method)¹².

The smears were studied under 4x, 10x, 40x and results was recorded as follows - Interpretation: The cytology smears were classified in two categories.

- Non-neoplastic.
- Neoplastic.
- Non-neoplastic –reactive lymphadenitis, granulomatous lymphadenitis, suppurative lymphadenitis, tubercular lymphadenitis.
- Neoplastic - Included metastatic carcinoma, lymphoma.

4. Results

In the present study, fine-needle aspiration cytology of various lymph node lesions were carried out in 193 cases and evaluated. Among the 193 cases, the aspirate was satisfactory in 190 cases, and three cases had inadequate material and were thus unsatisfactory for evaluation. So, fine-needle aspiration cytology of 190 patients were finally considered in the study.

Figure 1 show the age and sex distribution of study participants.

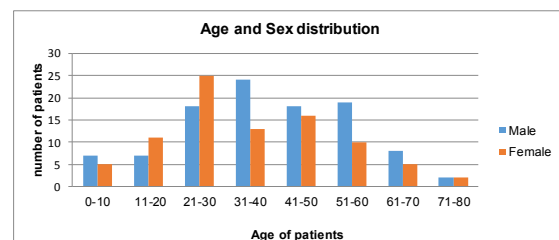


Figure 1. Age and sex distribution of study participants.

Out of 190 cases, 103(54.21%) were males and 87(45.79%) were females.

Majority of study participants [186(97.89%)] had localized lymphadenopathy and 4(2.11%) had generalized lymphadenopathy. The cervical region being the commonest site in 107(56.32%) patients, followed by supraclavicular in 29(15.26%), axillary in 15(7.89%) and submandibular in 15(7.89%) patients. Patients with inguinal site were 14(7.37%), submental 2(1.05%) and others 4(2.11%).

Table 1. Cytological diagnoses of lymph node aspirations

Disease	No. of cases Percentage	
	Cases	
1 Non-neoplastic lesions	147	77.36
Reactive lymphadenitis	65	34.21
Tubercular lymphadenitis	45	23.68
Granulomatous lymphadenitis	34	17.89
Suppurative lymphadenitis	3	1.58
2 Neoplastic lesions	43	22.64
Metastatic lesions	38	20
Non-Hodgkin's lymphoma	4	2.11
Hodgkin's lymphoma	1	0.53

Table 1 shows the categorization of lymph node lesions as neoplastic and non-neoplastic.

4.1 Tubercular Lymphadenitis

The aspirates from lymph nodes were diagnosed as tubercular lymphadenitis based on the presence of epithelioid cell granulomas and caseous necrosis with or without Langhan's giant cells in a background of lymphoid cells. Tubercular lymphadenitis was diagnosed on cytology in 45 cases, the youngest patient was 6 years old and the oldest was 62 years. Among these, 24 cases showed acid fast bacilli on Ziehl-Neelsen staining. Table 2 shows the cell patterns in aspiration of tuberculous lymphadenitis based on the presence of epithelioid cell granuloma, giant cells and caseation necrosis and the results of AFB staining in these lesions.

4.2 HIV and Tuberculosis

Among 190 cases, HIV status was known in 85 cases, out of which 5 cases were reactive. All the HIV positive patients presented with enlarged lymph nodes. On

examination, 2 cases had generalized lymphadenopathy and rest of them had localized lymphadenopathy.

As shown in Table 3, majority of the metastatic neoplasms were squamous cell carcinoma in 27(71.05%) cases.

5. Discussion

During the present study 193 cases were referred for FNAC of lymph nodes. Lymph node aspiration was done at all ages. Among these aspirates, 190 cases were satisfactory and 3 cases were unsatisfactory due to inadequate material.

The ratio of satisfactory to unsatisfactory aspirates was 63.3:1 in the present study, similar to that of Ruchi et al¹³(64.6:1), where as in the study by Sumit et al¹⁴, it was 10.94:1 and in the study by Abdul et al¹⁵, it was 50:1.

In the present study, 80(42.10%) patients were in the

Table 2. Pattern of tuberculous lymphadenitis

Type	Total no. of patients	AFB+ve	Percentage
Epithelioid cell granuloma without necrosis	5	1	20%
Type2 Epithelioid cell granuloma with necrosis	24	11	45.83%
Type3 Necrotic material with or without occasional epithelioid cells in singles.	16	12	75%
Total	45	24	53.33%

Table 3. Cytological diagnosis of metastatic neoplasms

Cytological diagnosis	No. of patients	Percentage
Metastatic squamous cell carcinoma	27	71.05%
Metastatic adenocarcinoma	3	7.89%
Metastatic infiltrating duct carcinoma	3	7.89%
Metastatic poorly differentiated carcinoma Carcinoma	3	7.89%
Metastatic papillary carcinoma thyroid	1	2.64%
Metastatic undifferentiated carcinoma	1	2.64%
Total	38	100%

Table 4. Comparison of site of enlarged lymph nodes.

Site	Hirachand et al (2009) N=130	Present study N= 190
Cervical	66(50.76%)	107(56.32%)
Axillary	20(15.38%)	15(7.89%)
Submandibular	18(13.85%)	15(7.89%)
Supraclavicular	14(10.77%)	29(15.26%)
Inguinal	12(9.23%)	14(7.37%)
Generalised	-	4(2.11%)
Submental	-	2(1.05%)
Others	-	4(2.11%)

Table 5. Distribution of non-neoplastic and neoplastic lesions

Sr. No	Study	Non-neoplastic Lesions	Neoplastic lesions
1	Nada A et al (1996) n-150 ¹⁹	83(55.3%)	67(44.7%)
2	Shamshadetal (2005) ²⁰	864(86.4%)	136(13.6%)
3	Hirachandetal (2009)n-130 ¹⁸	106(81.7%)	24(18.3%)
4	Present study (n-190)	147(77.36%)	43(22.64%)

Table 6. Comparison of cytological picture of tuberculous lymphadenitis

Type	Cytologic picture	Shamshadetal (2005) n-328 ²⁰	Present study n-45
Type1	Granuloma without necrosis	95(28.9%)	5 (11.11%)
Type2	Granuloma with necrosis	150 (45.8%)	24 (53.33%)
Type3	Necrosis± epithelioid cells in singles	83 (25.3%)	16 (35.56%)

age group of 21-40 years. Similar to the observation of Pandit AA, et al.,¹⁶ 146(51.05%), whereas in the study of Gupta et al¹⁷, most of the patients 532(52.26%) were in the age group of 0-20years.

In the present study, 103(54.21%) were males and 87(45.79%) were females. Similar observations are seen in the study of Hirachand et al¹⁸ (male 68% and females 62%).

Table 4 shows that the sitewise distribution of lymphadenopathy lesions was similar with findings from the study by Hirachand et al.¹⁸ with cervical region as the commonest site.

As shown in Table 5, the proportions of neoplastic and non-neoplastic lesions in the present study were comparable with other studies; non-neoplastic being the majority of lymphadenopathies.

5.1 Tuberculous Lymphadenitis

Tuberculous lymphadenitis is the most common extra-pulmonary form of tuberculosis. In the present study, most common cytologic picture seen was epithelioid cell granuloma with necrosis 24(53.33%) cases, followed by necrosis with or without epithelioid cells in singles 16(35.56%). These findings are in congruence with those from study of Shamshad et al. (Table 6).

6. Conclusion and Recommendations

Fine Needle Aspiration Cytology (FNAC) is one of the most commonly used initial diagnostic techniques for lymphadenopathies. FNAC provides a reliable, safe, rapid and economical method of investigating lymph node

enlargement, the accuracy of which approaches that of other diagnostic procedures.

Before the advent of FNAC, the diagnosis of lymphadenopathy was done after surgical excision followed by histopathological examination. With the introduction of FNAC all the peripheral nodes that are easily accessible can be accessed through a needle to arrive at a probable diagnosis.

Most of lymphadenopathies are due to non-neoplastic conditions. Lymph node cytology is useful for segregating lymphadenopathy cases that need further evaluation and is a valuable tool for diagnosis of neoplastic and non-neoplastic lesions. It may replace unnecessary surgical procedures in many cases.

FNAC diagnosis will help the clinician to confirm or exclude the clinical differential diagnosis made at first visit of the patient to the OPD. Speedy cytological diagnosis made helps the clinician to further plan the treatment.

Fine -Needle Aspiration (FNA) cytology is simple, economical, highly accurate tool in the diagnosis of tuberculosis lesions. It is also ideal for sample collection for ancillary studies such as Ziehl-Neelsen (Z-N) stain for acid - fast bacilli (AFB), as well as culture, radiometric and molecular biologic studies of Mycobacterium tuberculosis.

In each case of suspected tuberculosis, FNA smear should be stained by Z-N method which is a simple, fast and cheap method and early diagnosis can be made, so that treatment can be initiated early.

FNAC is a primary, easy and effective diagnostic modality for HIV lymphadenopathy patients. It helps in identifying majority of the reactive and neoplastic lesions and opportunistic infections and guide for the subsequent management of the patients.

For the diagnosis of lymphoma, it can suggest a preliminary diagnosis, which can be followed by histopathology and immunohistochemistry for confirmation.

FNAC may be the only tool in the diagnosis of metastatic lesions in the lymph nodes and can help to detect occult primary malignancies.

Fine needle cytology is readily repeatable and as a preliminary investigation can reduce the hospitalization period and avoid overcrowding in hospitals.

7. References

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