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.

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 carcinoma². 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 hybridization⁹.

Advantages of FNAC in Lymphadenopathy are Easy diagnosis of reactive lymphadenopathy, tuberculosis, metastatic malignancy, initial diagnosis of lymphomas, followed by biopsy for confirmation⁴. FNAC not only confirms the presence of metastatic disease but also gives clues regarding the nature and origin of the primary tumor⁵.

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 disease⁶.

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.

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3. Materials and Methods

The present cytological study of 190 cases with lymph node lesions was conducted in the Department of Pathology of Dr. Vasantrao 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 lesion.

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).

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 |
|-------------------------------|--------------|------------|
| 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-Neilsen 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 | 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%) |
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 al.17, most of the patients 532(52.26%) were in the age group of 0-20 years.

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 al.18 (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 extrapulmonary 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.

| 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 | 83(55.3%) | 67(44.7%) |
| 2 | Shamshad et al (2005) | 864(86.4%) | 136(13.6%) |
| 3 | Hirachand et al (2009) n-130 | 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 | Shamshad et al. (2005) n=328 | 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%) |
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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

1. Skoog L, Hagen TL, Taani E. Lymph Nodes. Grey W, editor. Diagnostic Cytopathology. Hongkong: Churchill Livingstone; 1995. p. 479–526.
2. Gupta AK, Nayar M, Chandra M. Reliability and limitations of fine needle aspiration cytology of lymphadenopathies. Acta Cytol. 1991; 35:777–82.
3. Prasad RR, Narasimhan R, Sankaran V, Veliani A. Fine needle aspiration cytology in the diagnosis of superficial lymphadenopathy: An analysis of 2418 cases. Diagno Cytol. 1993; 15:382–6.
4. Nayak S, Mani R, Anita N, Kavatker, Puranik SC and Holka VV. Fine needle aspiration cytology in lymphadenopathy of HIV positive patients. Diagn Cytopathol. 2003; 29(3):146–8.
5. Patra DK, Nath S, Biswas K, Sarkar R, Jayanta De. Diagnostic evaluation of childhood cervical lymphadenopathy by fine needle aspiration cytology. J Indian Med Assoc. 2007; 105:694–9.
6. Buley ID. Fine needle aspiration of lymph nodes. Journal of Clinical Pathology. 1998; 51:881–5.
7. Bagwan IN, Kane SV, Chinoy RF. Cytologic evaluation of the enlarged neck node: FNAC utility in metastatic neck disease. The Internet Journal of Pathology. 2007; 6(2):13–7.
8. Das DK. Value and limitations of fine needle aspiration cytology in diagnosis and classification of lymphomas: A review. Diagnostic Cytopathology. 1999; 21(4):240–9.
9. Orell SR, Sterrett GF, Whitaker D. Fine needle aspiration cytology, 4th ed. Churchill Livingstone; 2005. p. 9–124.
10. Mc-loughlin MJ, Ho C, Tao L. Percutaneous needle aspiration biopsy. CMA Journal. 1978; 119:1324–9.
11. Mohan H. Harsh Mohan’s textbook of pathology. 4th ed. Jaypee. 2000. p. 902–6.
12. Bancroft JD, Gamble M. Theory and practice of histological techniques. Chapter 9. The Hematoxyllins and Eosin. 6th ed. China: Churchill Livingstone Elsevier; 2008. p. 125–6.
13. Khajuria R, Goswami KC, Singh K, Dubey VK. Pattern of lymphadenopathy on fine needle aspiration cytology in Jammu. JK Science. 2006; 8(3):157–9.
14. Mitra S, Ray S, Mitra PK. Fine needle aspiration cytology of supraclavicular lymph nodes: Our experience over a three-year period. Journal of Cytology. 2011; 28(3):108–10.
15. Khan AH, Hayat AS, Baloch GH. Study on the role of fine needle aspiration cytology in cervical lymphadenopathy. World Applied Sciences Journal. 2011; 12(11):1951–4.
16. Pandit AA, Candes FP, Khubchandani SR. Fine needle aspiration cytology of lymph nodes. J Postgrad Med. 1987; 33(3):134–6.
17. Gupta RK, Naran S, Lalluand S, Fauck R. The diagnostic value of fine needle aspiration cytology in the assessment of palpable supraclavicular lymph nodes: A study of 218 cases. Cytopathology. 2003; 14:201–7.
18. Hiraichand S, Lakhey M, Akhter J, Thapa B. Evaluation of fine needle aspiration cytology of lymph nodes in Kathmandu Medical College, Teaching hospital. Kathmandu University Medical Journal. 2009; 7(2):139–42.
19. Nada A, Amer S, Salman MM, Esam A. FNAC versus histopathology in diagnosing lymphnode Lesions. Eastern Mediterranean Health Journal. 1996; 2(2):1–6.
20. Ahmad S, Akhtar S, Akhtar K, Naseem S, Mansoor T. Study of fine needle aspiration cytology in lymphadenopathy with special reference to acid-fast staining in cases of tuberculosis. JK Sciences. 2005; 7(1):1–4.