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Research Article
Population

A study on evaluation of the role of fine-needle aspiration cytology in the etiology of lymphadenopathy in the rural population attending tertiary care hospital

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Introduction: Lymph nodes are a site for organized collections of lymphoreticular tissue and are pink-gray bean-shaped encapsulated organs. Lymph nodes are among the commonly aspirated organs for diagnostic purposes. 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 diagnose lymphadenopathy of various sites. **Aims**: To evaluate the usefulness of FNAC as a diagnostic tool in the etiological causes of lymphadenopathy and to study the cytomorphological features associated with various lymphadenopathies. **Materials and Methods:** The present prospective study was carried out in the Department of Pathology at Maharajah's Institute of Medical Sciences, Vizianagaram, a Tertiary Care Centre. A total of 210 patients of all age groups underwent FNAC of enlarged lymph nodes during this study period. **Results:** FNAC diagnosis was found to be as follows: tubercular lymphadenitis in 98 cases (46.67%) followed by reactive hyperplasia in 35 cases (16.67%), metastatic carcinoma 29 (13.8%), granulomatous lymphadenitis 27 (12.85%), non-specific lymphadenitis 8 (3.8%), acute suppurative lymphadenitis 7 (3.33%) and lymphoma 4 (1.8). **Conclusion:** FNAC of lymph nodes is an excellent first-line investigation to determine the nature of the lesion. It is quick, safe, minimally invasive, and reliable and is readily accepted by the patient.

Keywords: Fine needle aspiration cytology (FNAC), Lymph node, Lymphadenopathy, Tuberculous lymphadenitis, Malignant neoplasms

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Introduction

Lymph nodes are a site for organized collections of lymphoreticular tissue and are pink-gray bean-shaped encapsulated organs. They are located at anatomically constant points along the course of lymphatic vessels. The common sites of distribution are cervical, axillary, mediastinal, retroperitoneal, iliac, and inguinal regions. Lymphadenopathy is the most common clinical presentation in outpatient department patients which consists of various etiological factors ranging 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 a clinical technique used to obtain cells, tissues, and/or fluid through a thin needle attached with a disposable syringe for the diagnosis of masses [5]. Lymph node aspiration is of great value in diagnosing lymphadenitis, lymphomas, and metastatic carcinoma [6].

Aspiration of lymph nodes for diagnostic purposes was first done by Griey and Gray in 1904, in patients with sleeping sickness [7]. Lymph nodes are among the commonly aspirated organs for diagnostic purposes [8]. In 1927, Dudgeon and Patrick were the first to use FNAC in diagnosing tuberculous lymphadenitis [9]. De May has summarized the advantages of FNAC with the acronym SAFE means Simple, Accurate, Fast, and Economical [10]. The diagnostic yield of FNAC can be improved if it is accompanied by radiological guidance like ultrasonography and computed tomography scan [11].

In 1847, Kun had done the pioneering act of first time reporting the use of aspiration biopsy. Since then fine needle aspiration cytology (FNAC) has been a rapid, simple, safe, reliable minimally invasive, and inexpensive method of establishing the diagnosis of lesions and masses in various sites and organs and is the most convenient bedside diagnostic aid [12,13,14,15,16].

Drawbacks of FNAC also exist like sampling error in the form of improper technique, micrometastasis, benign epithelial inclusions, partial lymph node involvement by lesion, and a very small lymph node where sampling is difficult, also a high incidence of false results [6].

Materials and Methods

Type of study: Prospective study

Place and Duration of Study: This prospective study was carried out in the Department of Pathology at Maharajah's Institute of Medical Sciences, Vizianagaram for a period of one year from March 2017 to March 2018.

Sample size: A total of 210 patients of all age groups underwent FNAC of enlarged lymph nodes during this study period.

Inclusion criteria: All patients presenting with lymph node enlargement were included in the study.

Exclusion criteria: Those patients with aspirated material were either inadequate or smears were unsatisfactory for evaluation and a known case of malignancy were excluded from this study.

Sample collection and method: After obtaining the Ethical Committee Clearance from our institution, Patients age, sex, site, duration were noted and full clinical examination to look out for other node enlargement were noted. FNAC was performed after taking consent and explaining the procedure to the patient. FNAC was done using a 5-10 ml disposable syringe with a 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 the other two were air-dried stained with Giemsa stain and where ever tuberculosis was suspected the Ziehl Nelson (ZN) stain was done. Cytomorphological findings like cell population, areas of necrosis, and pattern were assessed by examination under low power, high power, and oil immersion.

Statistical analysis: Statistical analysis was performed by the SPSS program for Windows, version 17.0 (SPSS, Chicago, Illinois). Categorical variables are presented as absolute numbers and percentages.

Results

A total of 1100 cases were aspirated in the cytopathology section over one year from March 2017 to March 2018, out of which 210 (19.1%) cases were lymph node FNACs. Out of 210 patients with palpable lymphadenopathy, in two cases the FNAC was inconclusive due to unsatisfactory smear preparation. There were 86 (40.95%) female and 124 (59.05%) male patients with the age of the patients ranged from 1 to 80 years. The maximum number of cases falling in the range between 21-40 years (128 cases, 60.95%), followed by 40-80 years (63 cases, 30.01%) and 19 cases (9.04%) in the range of 0-10 years.

Among common cytological lesions found in our study were tubercular lymphadenitis 98 cases (46.67%) followed by reactive hyperplasia 35 cases (16.67%), metastatic carcinoma 29 (13.8%), granulomatous lymphadenitis 27 (12.85%), non-specific lymphadenitis 8 (3.8%), acute suppurative lymphadenitis 7 (3.33%) and lymphoma 4 (1.8).

Table-1: Cytological diagnosis of lymphadenopathy.

Cytologic diagnosis	Number of cases	Percentage
Tubercular lymphadenitis	98	46.67
Reactive hyperplasia	35	16.67
Granulomatous lymphadenitis	29	13.8
Metastatic carcinoma	27	12.85
Non-specific lymphadenitis	8	3.8
Suppurative lymphadenitis	7	3.33
Hodgkins lymphoma	3	1.4
Non Hodgkins lymphoma	1	0.4
Unsatisfactory	2	0.9
Total	210	

The lymph node aspirates were found to be diagnosed as tubercular lymphadenitis based on the presence of epithelioid cell granulomas and caseous necrosis with or without Langhan's giant cells or ZN positivity. Among these, 60 cases were Ziehl-Nelson 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	26 (26.53%)	9 (15%)
Epithelioid cell granulomas with caseous necrosis	58 (59.18%)	14 (23.3%)
Caseous necrosis without granulomas	14 (14.28%)	37 (61.67%)
Total	98	60

Granulomatous lymphadenitis was diagnosed based on the presence of epithelioid cell granuloma with or without giant cells and the absence of necrosis. Suppurative lymphadenitis cases showed predominantly polymorphonuclear leukocytes, necrotic debris, and other lymphoid cells.

Discussion

FNAC forms an important tool to aid in the diagnosis of lymphadenopathy. Lymphadenopathy is one of the commonest clinical presentations of various disease processes presents 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.

Among the age group which was studied range from 1-80 years with maximum cases ranged 21-40 years which is comparable with those of Shreshtha et al [17], A. B. Pandav et al [18], and A. K. Kochhar et al [13]. In our study, a male preponderance was noted and similar male preponderance was correlated with Hirachand et al [19] and Shreshtha et al [17].

Tuberculous lymphadenitis was the most common lesion and was reported in 98 cases (46.67%) which correlated with the study by Ruchi K et al [20] (52.3%) and A B Pandav et al [18] (50.53%).

In our study cytomorphological pattern was Epithelioid cell granulomas with caseous necrosis (59.18%) in the present study, which is closely comparable with Goswami et al [21] (50%). AFB positivity was maximum with necrosis without granulomas pattern (61.67%) followed by epithelioid cell granulomas with necrosis pattern (23.3%) which correlated with findings of Goswami et al. [21].

The second most common cytological diagnosis was reactive hyperplasia was seen in 35 cases (16.67%). Similar findings were also observed in A K Kochhar et al [13]. Granulomatous lymphadenitis was seen in 29 cases (13.8%) correlates with studies by Hirachand et al [19] (9.2%). Granulomatous lymphadenitis can be classified as non-infectious and infectious.

Non-infectious 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 [22].

In our study lymph node aspirates in 27 cases (12.85%) showed metastatic deposits that correlate with the studies by Malukani K (16.6%) [23] & Mandakini M Patel et al (27.06%) [24]. The most common age group affected in a metastatic tumor, in the present study was 41-50 years which correlates with another study of A.K. Kochhar et al [13].

The current study reported 4 (1.8%) cases of lymphoma which correlated with findings of Abdul Haque Khan et al [25] (2%). Though their prevalence is low, they pose a great diagnostic challenge.

Conclusion

FNAC is a simple, low-cost, non-invasive and inexpensive method that can be done in various sites in the body at the same time as a useful diagnostic tool in determining the nature of enlargement of lymph nodes.

FNAC helps in the etiology of lymph node enlargement as reactive change, infective/inflammatory, lymphoma, metastatic, etc.

What does the study add to the existing knowledge

The present study concluded that FNAC in the diagnosis of lymphadenopathy was sensitive, specific, and accurate. In the current study, tuberculous lymphadenitis was recorded as the most common presentation of lymphadenopathy.

This study also highlights the usefulness of FNAC as a viable method of investigation for lymphadenopathy.

Author's contributions

Dr. C. Sitalata: Concept, study design

Dr. K. Kalyan: Manuscript preparation

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