FINE NEEDLE ASPIRATION CYTOLOGY IN LYMPH NODES WITH SPECIAL REFERENCE TO TUBERCULOUS LYMPHADENOPATHY

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ABSTRACT

BACKGROUND

FNAC provides an alternative to excision biopsy for lymph nodes and is an easy procedure for collection of material for cytomorphological and bacteriological examination.

Aims and Objectives- To analyse the utility and diagnostic importance of FNAC in lymph node disease. To assess the cytomorphological features and incidence of various lymph nodes diseases on FNAC. To study the cytomorphological pattern of tuberculous lymphadenitis in the population in and around SIMS. To correlate the acid fast bacilli [AFB] positivity with cytomorphological patterns.

MATERIALS AND METHODS

The study was a descriptive cross-sectional study carried out from July 2016 to June 2017 in Department of Pathology, Saraswathi Institute of Medical Sciences, Anwarpur, Pilkhuwa, Hapur, U. P. The inclusion criteria included patients with clinical presentation of lymph node enlargement with non-specific complaints. All patients were of age group 20 - 60 years. Consent to participate in the test was taken. Fine needle aspiration cytology (FNAC) was performed on enrolled patients by the pathologist. The following staining methods were used: May-Grunwald-Giemsa Staining, Papanicolaou Staining and Ziehl-Neelsen Staining.

RESULTS

In this study a total number of 100 cases of lymphadenopathy were studied, out of which 95% were benign and 5% were malignant. In our study, most common lesion on cytology was found to be tuberculous lymphadenitis (40%). In the present study, the lesions were seen in all age group ranging from 20 years with a mean age of 35.64 years. Maximum cases were seen between 20 - 30 years. Out of 100 cases, 46% were male and 54% were female with significant female preponderance; 23:27 (M: F) sex ratio was observed. In our study, cervical lymph nodes (70%) were frequently involved. Tuberculous lymphadenitis was seen in 15 out of 40 (55.6%). Correlation between AFB positivity with cytomorphological patterns was seen in 36 out of 40 cases.

CONCLUSION

FNAC can be performed as an outpatient department procedure. The procedure is safe, well accepted by patients, very cost effective and requires minimum instrumentation in comparison to excision biopsy.

KEY WORDS

FNAC, Lymph Nodes, Tuberculous.

HOW TO CITE THIS ARTICLE: Singh MJ, Solanki S, Puri SS, et al. Fine needle aspiration cytology in lymph nodes with special reference to tuberculous lymphadenopathy. J. Evolution Med. Dent. Sci. 2018;7(20):2437-2441, DOI: 10.14260/jemds/2018/548

BACKGROUND

Fine needle aspiration cytology (FNAC) is a safe, cost effective and conclusive procedure.¹ Lymph nodes are an integral component of the immune system and are a common presentation in the clinical practice. Cervical lymphadenopathy is a common clinical finding and may be sign of an indolent inflammation, infection or a malignant disorder, depending upon many factors including the geographical condition and socio-economical setup.²⁻⁴ In our country, infective (tubercular) lymphadenopathy is quite common.

Although, histopathology is considered as gold standard criteria for lymph node sampling, but FNAC has potential benefits over the other diagnostic modalities like simplicity, minimal trauma and minimal complication and easy availability of results that have made it a frequently practiced investigation in the initial diagnosis and follow-up of primary lymph node malignancies and in following patients with other malignancies and identifying metastasis or recurrence.⁴⁻⁶

FNAC provides an alternative to excision biopsy for lymph nodes and is an easy procedure for collection of material for cytomorphological and bacteriological examination.⁷

Tuberculosis (TB) is an infectious disease caused by various strains of mycobacteria, usually *Mycobacterium Tuberculosis* in humans. It is an airborne disease and most commonly affect lungs where it is called Pulmonary Tuberculosis. One-third of the world's population is currently infected, and more than 1.5 million people die each year due to tuberculosis. Among these, about 15 - 20% of cases are

'Financial or Other Competing Interest': None.
Submission 24-02-2018, Peer Review 26-04-2018,
Acceptance 02-05-2018, Published 14-05-2018.

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DOI: 10.14260/jemds/2018/548

reported as having only extrapulmonary involvement where the infection occurs in other parts of the body.⁸

In previous years a number of studies had been conducted on different aspects of Tuberculosis in western part of Uttar Pradesh, but no such study has been carried out in SIMS Hospital which mainly covers a rural based population. This study was conducted to describe the cytomorphological features and percentage of various lymph nodes diseases on FNAC and to assess correlation between FNAC and ZN staining in diagnosis of tuberculous lymphadenitis.

Objectives

- To assess the cytomorphological features and incidence of various lymph nodes diseases on FNAC.
- To study the cytomorphological pattern of Tuberculous lymphadenitis in the population in and around SIMS.
- To correlate the acid fast bacilli [AFB] positivity with cytomorphological patterns.

MATERIALS AND METHODS

Study Design

The study was a descriptive study.

Study Period

The study period was from July 2016 to June 2017.

Study Place

Department of Pathology, Saraswathi Institute of Medical Sciences, Anwarpur, Pilkhuwa, Hapur, U. P.

Inclusion Criteria

Patient with clinical presentation of lymph node enlargement with non-specific complaints. All patients of age group 20 - 60 years, clinically suspected cases of tubercular lymphadenitis. Cases with representative and adequate cellularity. Consent to participate in the test.

Exclusion Criteria

- Patient not willing to participate in the study.
- Swelling other than lymph node origin.
- Swelling size less than 5 cm.
- Patient undergoing treatment for any other chronic disease.

Sample Size

Patients fulfilling all inclusion and exclusion criteria was enrolled in the study. A written informed consent was obtained from all subjects before their enrolment in the study.

Method of Collection of Data

Aspiration of the lymph node was done after eliciting detailed history of the patient, i.e. age, sex, site and duration of involvement, any other investigations performed, thorough clinical examination.

Study Tools

Procedure and Methodology.

The study was performed after approval by hospital ethical committee. Hundred patients were included in the study. Patients with clinical presentation were reviewed.

Patient's presentation such as the size, location and character of adenopathy along with any associated physical findings were assessed. Erythema, tenderness, warmth and fluctuance suggests lymphadenitis and node that is fixed (non-moveable), matted together. Fine needle aspiration cytology (FNAC) was performed on enrolled patients by the Pathologist. Aspiration of enlarged lymph node was performed on enrolled patients by the Pathologist. Aspiration of enlarged lymph node was performed free hand using a 23-G needle mounted on a Cameco handle. The swellings were made prominent. They were cleaned with 70% isopropyl alcohol. Aspirated material after preparing smears on the glass slides are fixed in 95% ethyl alcohol for staining.

The following Staining Methods were used

1. May-Grunwald-Giemsa Staining.
2. Papanicolaou Staining.
3. Ziehl-Neelsen Staining.

Statistical Analysis

All data was collected and verified. Collected data was subjected to SPSS (version 20) for analysis. Data was expressed as frequencies for all the parameter; Chi-square test was performed to visualise the difference. P value of 0.05 was considered significant.

RESULTS

Gender	Number	Percent
Female	54	54
Male	46	46

Table 1. Gender-Wise Distribution

Out of total 100 cases, 46 were male patients and remaining 54 were females.

	Unilateral		Bilateral
	Right	Left	
Frequency	48	45	7
Percent	48.0	45.0	7.0

Table 2. Site Distribution

Most of the lymphadenopathy cases were unilateral and out of which 48% were from right side and 45% were from left side and remaining 7% were bilateral.

Location	Frequency	Percent
Abdominal wall	1	1.0
Axilla	5	5.0
Breast	1	1.0
Cervical	70	70.0
Chest wall	1	1.0
Inguinal	1	1.0
Mandible	1	1.0
Neck	3	3.0
Submandibular region	9	9.0
Submental	8	8.0

Table 3. Location of Affected Lymph Nodes

In this cervical lymphadenopathy was most commonly involved lymph nodes followed by submandibular lymph nodes.

Aspirate	Frequency	Percent
Bloody	45	45.0
Cheesy	25	25.0
Pus like	30	30.0

Table 4. Colour of Aspirate

Blood mixed aspirates were most commonly seen in 45% of total cases followed by pus-like material in 30% of cases.

Cytological Diagnosis	Incidence
Generalised lymphadenopathy	33
Tuberculous lymphadenopathy	40
Hodgkin's lymphoma	1
Reactive hyperplasia	13
Non-specific	8
Carcinoma	5

Table 5. Incidence of Lymph Node Diseases

Age	Frequency	Percent
20-30	41	41.0
31-40	27	27.0
41-50	18	18.0
>50	14	14.0

Table 6. Age-Wise Distribution

Mean age is 35.64 years. Out of 100 cases, 41 cases were in the age group of 20 - 30 yrs.

	Age (in Years)				Total	Chi-Square value	P value
	20-30	31-40	41-50	>50			
CA	0	1	2	2	5	27.7	0.023
GL	14	10	5	4	33		
HL	0	0	1	0	1		
NS	3	3	1	1	8		
RH	9	1	2	1	13		
TL	15	12	7	6	40		
Total	41	27	18	14	100		

Table 7. Association of Cytological Diagnosis with Age

It would be observed that the incidence of tuberculous lymphadenitis have increased in age group of 20 - 30 followed by 31 - 40 years of age group. $P < 0.05$, i.e. statistically significant association between age and diagnosis.

Cytomorphological Pattern	Number (%)
Epithelioid granuloma with caseous necrosis	6 (%)
Epithelioid granuloma without necrosis	5 (%)
Necrosis only without granuloma	17 (%)
Polymorphs with necrosis	12 (%)

Table 8. Cytomorphological Pattern Frequency in Tuberculous Lymphadenitis

Most common cytomorphological pattern was necrosis only without granulomas in 17% of cases and polymorphs with necrosis in 12% of cases.

	AFB Positive	AFB Negative	Total	Chi-Square Value	P value
Epithelioid granuloma with caseous necrosis	6	0	6	6.01	0.111
Epithelioid granuloma without necrosis	5	0	5		
Necrosis only without granuloma	13	4	17		
Polymorphs with necrosis	12	0	12		

Table 9. Correlation of AFB Positivity with Cytomorphological Patterns of Tuberculous Lymphadenitis

FNAC of lymph node shows 100% positivity in smears revealing polymorphs with necrosis, epithelioid granuloma with necrosis and epithelioid granulomas without necrosis, while the lowest was seen in necrosis only without epithelioid granuloma (76.4%). However, it was statistically insignificant.

DISCUSSION

Fine needle aspiration cytology of lymph node has become an integral part of initial diagnosis and management of patients with lymphadenopathy due to early availability of result, simplicity and minimal trauma with less complication.⁹ FNAC has also been advocated as a useful method in comparison to more expensive surgical excision biopsies in developing countries with limited financial and health care resources.¹⁰ It almost offers an accurate diagnosis for reactive lymphoid hyperplasia, infectious disease, granulomatous lymphadenitis and metastatic malignancy. Thus, it can avoid the need for excisional biopsy in most cases and allow rapid onset of therapy.¹¹

In this study a total number of 100 cases of lymphadenopathy were studied, out of which 95% were benign and 5% were malignant. Ahmad et al 2005¹² showed benign causes contributed to 86.4% of lymphadenopathies. Studies from other developing countries like Pakistan (Fatima et al 2011,¹³ Khan et al 2011) also reported 92% and 73.2% benign lymphadenopathies.

In our study, most common lesion on cytology was found to be tuberculous lymphadenitis (40%). The result was comparable to study done by Khajuria R et al¹⁴ in 2006, whereas Mohanty et al,¹⁵ Kochhar K et al¹⁶ and Adhikari P et al¹⁷ did the same study and found reactive hyperplasia to be the most common.

We noted slightly lower incidence of 40% of tuberculosis cases. There are wide variations in the prevalence of TB lymphadenitis, which may be due to variation in geographical prevalence of TB, age and immunological status of patients selected. Sarda et al¹⁸ reported 80% of enlarged nodes to be tuberculous in origin. Similar high incidence was reported by Jha et al¹⁹ (63%), Mahajan et al²⁰ (54%), Dandapat et al²¹ (41.5%), Castro et al²² (46%), Ahmad et al¹² (38%) and Tilak et al²³ (38.8%). In the present study, the lesions were seen in all age groups ranging from 20 years with a mean age of 35.64 years. Maximum cases were seen between 20 - 30 years similar to study done by Dukare SR et al²⁴ and

Chandanwale S et al,²⁵ where Sharma P et al²⁶ reported maximum no. of cases during 11 - 20 years.

Tuberculous lymphadenitis peak age incidence was seen during 2nd decade. 15 cases out of 40 (55.6%) cases of tuberculosis lymphadenitis were recorded. Similar findings were seen in study done by Khajuria R et al.¹⁴

The most common age group which presented with lymphadenopathy was between 20 - 30 years of age followed by 31 - 40 years, 41 - 50 years and more than 50 years; majority of patients were in the second to fourth decades of life in studies by Paliwal et al,²⁷ Ergete and Bekele et al,²⁸ Purohit et al,²⁹ Dandapat et al,²¹ Ahmad et al¹² and Hemlata et al.³⁰

Out of 100 cases, 46% were males and 54% were females with significant female preponderance; 23:27 (M: F) sex ratio was observed in our study. This may be because of malnutrition and overall low living standards among females in this area. Female preponderance has also been observed by Fatima et al,¹³ Paliwal et al,²⁷ Ergete and Bekele et al,²⁸ Purohit et al,²⁹ Chand et al³¹ and Pamra et al.³² Male predominance was noticed by Ahmad et al¹² and Rajsekaran et al.³³

In our study, cervical lymph nodes (70%) were frequently involved followed by 9% Submandibular, 8% Submental, 3% Neck, 1% Inguinal, 1% Mandible and 1% Chest wall and 1% Breast and 1% Abdominal wall. This was in concordance with Bezabih et al³⁴ who observed cervical involvement in 74.2% of cases. Khajuria R et al¹⁴ also found cervical lymph node to be most commonly involved. Hirachand et al³⁵ showed 74.6% involvement of cervical lymph nodes by various lesions. Many others (Pandit et al³⁶ 1987; Ahmad et al¹² 2005; Nidhi et al, 2011) also found cervical region to be the most common site of involvement.

Most common cytological pattern seen was necrosis only without granulomas in 17% of cases and polymorphs with necrosis in 12% of cases. While in a study by Gupta et al,³⁷ epithelioid clusters with or without Langhans giant cells with necrosis was most commonly observed cytological pattern in 50.35% cases. ZN staining for acid fast bacilli was seen in 90% cases, Ergete and Bekele et al²⁸ reported 71.7%, Chand et al³¹ reported 44.54%, Bezabih et al³⁴ reported 59.5%, Dasgupta et al³⁸ reported 45.6% AFB positivity in their studies. On the other hand, a low positivity rate of AFB positivity of (19.6% cases) on ZN staining was reported by Agarwal et al in their study.

High AFB positivity noted in our study may be because of extensive screening done as in addition to one ZN stained smear in each case, we got ZN staining done on second smear or decolourised smear where cytology suggested tuberculosis, especially when necrosis was present.

According to gross nature of aspirate, blood mixed aspirates were noted in 45% followed by purulent/ pus material in 30% and caseous/ cheesy material in 25% cases in current study, whereas Hemalatha et al³⁰ observed blood mixed aspirates in 87.3% and purulent-to-cheesy material in 12.7% cases.

CONCLUSION

In conclusion, it was found that female predominance was observed in our study. Commonest lymph node involved was cervical followed by submandibular. Most common lesion on cytology was found to be tuberculous lymphadenitis (40%)

followed by generalised lymphadenopathy (33%), reactive hyperplasia (13%), non-specific (8%) metastatic carcinoma (5%) and Hodgkin's lymphoma (1%). In gender-wise classification, tuberculous lymphadenitis was 27 in females and 13 in males. It can be concluded that FNAC can be performed as outpatient department procedure, it is cost effective and requires minimum instrumentation in comparison to excision biopsy. Using FNAC diagnostic accuracy is high in tuberculous lymphadenopathy. Therefore, even in most remote areas, FNAC can be used for diagnosing tuberculous lymphadenopathy. Coupling FNAC with ZN staining increases the diagnostic accuracy. Diagnostic accuracy can be further increased by submitting some material obtained by FNA for culture.

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