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Cytomorphological Study of Lymph Node Lesions in a Tertiary Care Centre

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ABSTRACT:

Introduction: One of the most frequent clinical manifestations of patients visiting the outpatient department is lymphadenopathy. The intensity of the response and the triggering event both affect the pattern and degree of morphological alterations. An essential step in making a diagnosis of various lymph node lesions is “fine needle aspiration cytology (FNAC)”. It is a widely accepted, accurate, sensitive, and specific test used in an outpatient setting.

Materials and Methods: An observational study was carried out at the Department of Pathology of a tertiary care hospital in North India from July 2019 to February 2020. A total of 100 lymphadenopathy cases were taken. Smears were stained with Giemsa and categorized according to the cytomorphological pattern. “Ziehl-Neelsen (ZN) stain was done in clinically suspicious cases of tuberculosis”. “Data regarding brief history, site, age, and cytomorphologic features were collected and analyzed”.

Results: Out of 100 cases of lymph node aspirations, 70 cases showed features of Tubercular Lymphadenitis followed by Reactive Lymphadenitis, 29 cases while 1 malignancy. Tuberculosis was prevalent in all age groups.

Conclusion: Lymph node FNAC is a simple, cost-effective investigation with great importance in view of high prevalence of tuberculosis in our country, where an atypical presentation of tuberculosis can be screened. Purulent aspirate smears which do not show

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typical features of tuberculosis can be dismissed as acute suppurative lymphadenitis in the absence of ZN staining. AFB Positivity in such cases confirms the diagnosis and helps in better patient management.

Keywords: Lymphadenopathy, FNAC, TB, tuberculosis.

INTRODUCTION:

Lymphadenopathy is one of the most common clinical manifestations of patients visiting the outpatient department. The inciting stimuli and the response's level of intensity both affect the pattern and degree of morphological alterations. Nowadays, fine needle aspiration cytology (FNAC) is a critical procedure in making a diagnosis of many organ and lymph node diseases. It is an outpatient technique that is quick, easy, trustworthy, minimally invasive, and economical. 1 In order to make a conclusive diagnosis in the case of granulomatous disorders, it is beneficial to combine FNAC with additional tests (microbiological, radiological, immune-histochemical, biochemical, and specific staining techniques). Lymphadenopathy often denotes the spectrum of other serious illnesses like lymphoma, metastatic cancer, or acquired immunodeficiency syndrome. Ease of access to enlarged cervical lymph nodes for FNAC makes this procedure of immense importance in diagnosing lymph node disorders. Cell morphology reflects the biological behavior of the tissue and host as well as the genetic and molecular biology of cells themselves. General biological activity is reflected best in the cellular structures of the nucleus. Functional activity is reflected mainly in the morphology of the cytoplasm. For the purpose of diagnostic cytopathology, cells can be categorized into different morphological groups. The degree of cellularity is a crucial criterion in the differential diagnosis of a benign or malignant tumor.[2]

There are several parameters for the assessment of the individual cells, such as cell size, shape, N/C ratio, nuclear size, shape and distribution of chromatin, and nucleolar number, shape, and size. In conjunction with Immuno-phenotyping and molecular studies, FNAC has gained acceptance in many centers as an initial diagnostic tool. The simplicity and timeliness of the procedure make it most appropriate and convenient for use in peripheral hospitals and dispensaries in an outpatient setting.[3]

Normative lymph node cytological findings: A mixture of lymphocytes, plasma cells, macrophages, and granulocytes make up the majority of aspirates from a healthy lymph node. In smears that have been air dried, mature lymphocytes are about 8 micrometres in size. A pale blue border of cytoplasm surrounds their compact nucleus, which has coarse chromatin. The chromatin in the nucleus of plasma cells is structured in a chart-wheel-like pattern, which gives plasma cells their distinctive shape. The extensive cytoplasm frequently exhibits a less pronounced basophilic staining in the para nuclear region. B cells with a diameter of about 10 micrometres known as centrocytes have a scant, basophilic cytoplasm that is stained weekly. The nucleus can be split and has a delicate, crooked pattern of chromatin. Compared to centrocytes, centroblasts are bigger and feature distinctive circular nuclei, often with

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numerous marginal nucleoli. With a diameter of 20–30 micrometres, immunoblasts are the biggest lymphoid cells. The nucleus of them is spherical. usually eccentrically positioned with one to three extremely basophilic nucleoli that are conspicuous. Macrophages can have nuclei that range in shape from round to oval, have uniformly distributed chromatin, and have discrete nucleoli. They can have a size of up to 45 micrometres.[4]

AIMS AND OBJECTIVES:

1. To study the different cytomorphological patterns of FNAC associated with lymph nodes.
2. To study the etiological factors of lymphadenopathy.
3. To analyze the diagnostic importance and utility of FNAC in lymph node diseases

METHODOLOGY:

This observational study was conducted at a tertiary care hospital in Ghaziabad, Uttar Pradesh. This study was done from July 2019 to February 2020 after taking ethical clearance from the institution. The study was conducted on the cases from opd and admitted patients requiring FNAC. Study participants were subjected to standard fnac procedure.

A total of 100 patients presented for lymph node FNAC in the hospital. FNAC of the lymph node was performed with full aseptic precautions after taking consent. The procedure was performed using a 22 or 23-gauge needle with an average of two passes, and a minimum of 4-5 slides were prepared. Slides were stained by Giemsa stain, and one slide was reserved for Zeil Neelson (ZN) stain or any special stain if required (Fig1). The aspiration smears were examined to reach a probable diagnosis. ZN staining was done to look for acid-fast bacilli in all cases where granulomatous disease or necrosis was observed in the cytology. A detailed history, clinical examination, and investigation faculty were documented as per proforma. Data were recorded in Microsoft Excel, and appropriate statistical methods were applied.

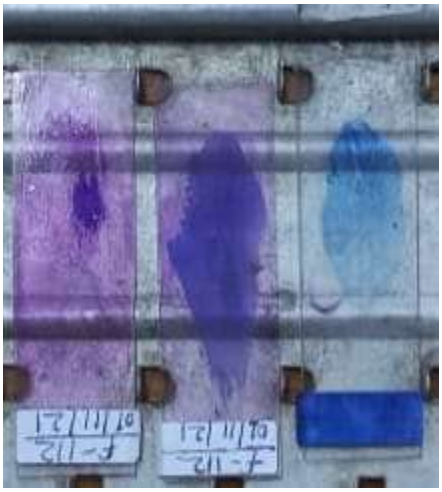

Fig. 1: Giemsa stained and ZN stained smears

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INCLUSION CRITERIA

Persons giving consent for FNAC

EXCLUSION CRITERIA

Persons not giving consent for FNAC

RESULTS:

In this study, the commonest age group was between 17 to31 years (45%), followed by 1 to 16 years (34%), with the mean age being 23.12 years and median age being 20 years, as shown in Table 1. 59% of the cases were females and 41% were males with female to male ratio being 1.44:1.

Table: 1: Age groups and Number of Patients with Lymphadenopathy

Age (years)	Number of Patients
<= 1	1
>1 - 16	34
17 - 31	45
32 - 46	10
47-61	6
>62	4
TOTAL	100

The cytological findings included reactive lymphadenitis (Fig 2), granulomatous lymphadenitis (Fig 3), necrotizing lymphadenitis, suppurative lymphadenitis, granulomatous necrotizing lymphadenitis, and metastatic squamous cell carcinoma (Table 2). The most common finding was granulomatous lymphadenitis (36%), followed by reactive lymphadenitis (27%).

Table 2: Cytological diagnosis of the Lymph node FNAC

Final Impression	No of cases (N)	Percentage (N%)
Metastatic squamous cell carcinoma	1	1.0
Suppurative lymphadenitis	11	11.0
Necrotizing lymphadenitis	13	13.0
Granulomatous lymphadenitis	36	36.0
Granulomatous necrotizing lymphadenitis	12	12.0
Reactive lymphadenitis	27	27.0
Total	100	100

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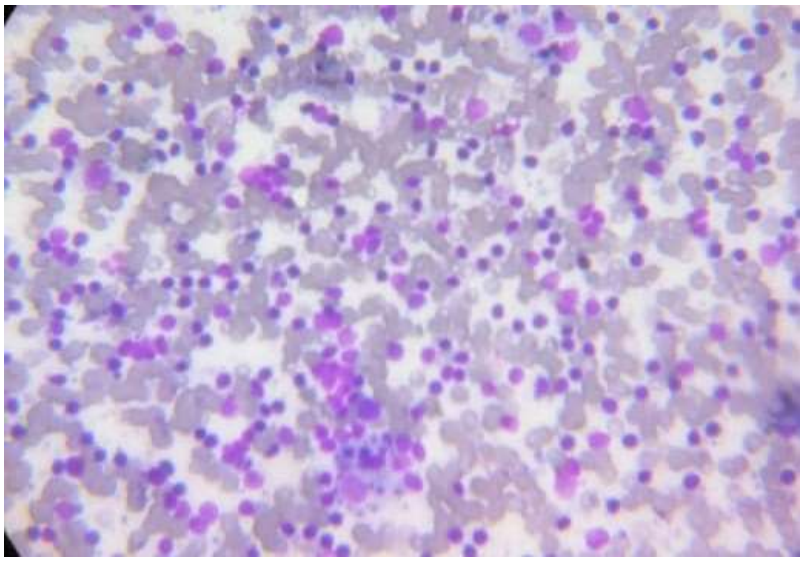

Fig. 2: Reactive lymphadenitis showing polymorphous population of lymphoid series, lymphoglandular bodies and tingible body macrophages. Giemsa 40X.

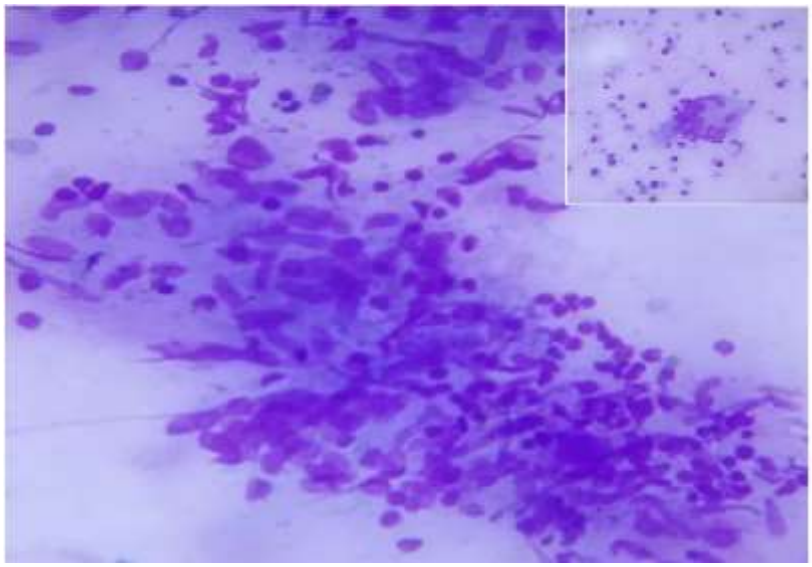

Fig. 3: Formation of granuloma in a lymph node aspirate. Inset: Langhans type of giant cell with horse shoe arrangement of nuclei. Giemsa 100X.

The most common site from where aspiration was done was the right cervical lymph node (38%), followed by the left cervical lymph node (32%). The most common size of lymph nodes aspirated ranged from approximately 3 cm to 4 cm. In this study, most cases were from the surgery department (40%), followed by paediatrics (17%).

AFB staining (Fig 4) was done in 72 suspected cases, out of which 26 (36.11%) of the cases were found to be positive for acid-fast bacilli, while 46 (63.89%) of the cases were reported as negative for the acid-fast bacilli (Table 3). Fig. 5 shows a pie chart representing AFB

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positivity of the total cases. While AFB staining was not done in 28 cases as they were either reactive lymphadenitis or metastatic lymphadenitis.

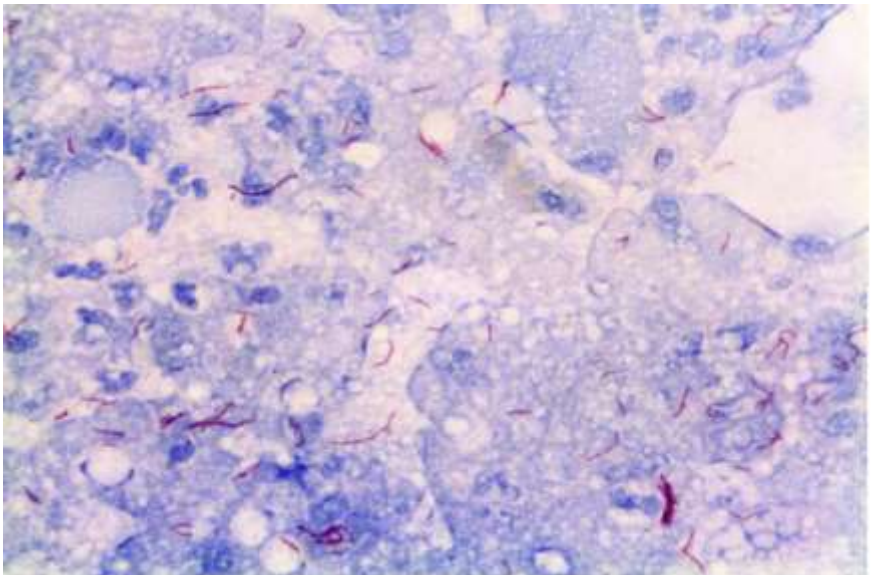

Fig 4: ZN Staining done for AFB. AFB Positive- Grade 4+

Table 3: AFB positivity Rate of the total suspected cases

AFB Positivity Results	Number of cases(N)	Percentage of Infected Individuals (N%)
Negative	46	63.89
Positive	26	36.11
Total	72	100.0

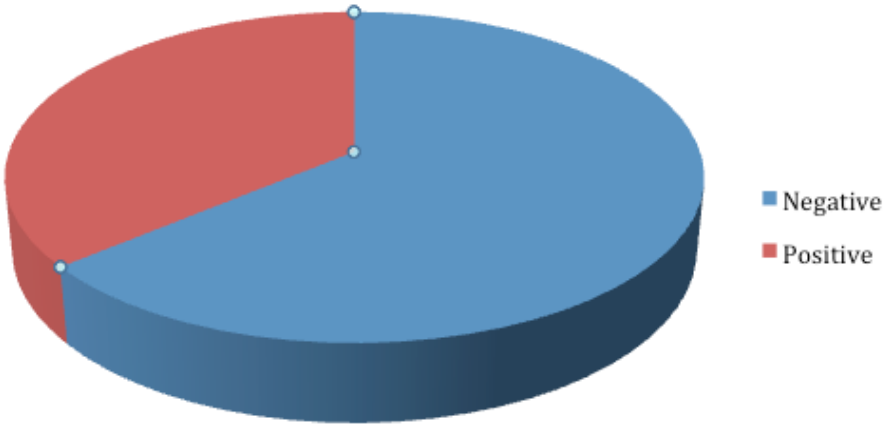

Fig 5: Pie chart representing AFB positivity of the total cases

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Granulomatous necrotizing lymphadenitis showed the highest AFB positivity with 41.67%, followed by granulomatous lymphadenitis with 38.89% and necrotizing lymphadenitis with 38.46%, as shown in table 4.

Table 4: Percentage of AFB positivity in all suspicious cases

Final Impression	**No. Of Cases (N)**	**AFB Positive (X)**	**AFB Negative**	**Percentage Positive (X/N*100) (%)**
Suppurative lymphadenitis	11	2	9	18.18
Necrotising lymphadenitis	13	5	8	38.46
Granulomatous lymphadenitis	36	14	22	38.89
Granulomatous necrotising lymphadenitis	12	5	7	41.67
Total	72	26	46	

DISCUSSION:

Fine needle aspiration cytology (FNAC) offers a rapid preliminary diagnosis of various disease conditions of lymph nodes and other organs. This is also an excellent teaching tool, which is becoming broader with advances in technology such as USG, MRI, and CT. With the help of either imaging techniques or palpation, virtually any organ can be sampled. It has reduced the number of excisional biopsies of nodes. The cytomorphological studies of smears obtained from aspirates can be offered as an alternative, easy, well-tolerated accurate, and less time-consuming, that can be done on a patient basis. It is a unique path that might lead to the identification of the underlying condition. Lymphadenopathy can arise from benign or malignant causes. However, proper aspiration technique and slide preparation are required, along with good knowledge of surgical pathology is required for reliable results. FNAC and other ancillary tests (microbiological, immunohistochemical, radiological, biochemical, and special staining techniques) are useful for obtaining a definitive diagnosis.[5] The principal indication for FNAC is persistent lymphadenopathy to establish causes of lymphadenopathy, which could not be reliably diagnosed on clinical grounds. Though Metastatic cancer is the most common target of lymph node aspiration, frequently the majority of benign disorders have been accurately identified using FNAC as a tool. Applications of immunocytochemistry allow the identification of a broad spectrum of lymphomas.[6]

Particularly in poor nations with limited financial and healthcare resources, FNAC, when supplemented with clinical experience, makes it a viable method of great significance. The cervical region was the most common site of lymphadenopathy in the current study (86%),

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followed by the axillary (10%) and inguinal (3%). In other investigations, the cervical region was also identified as the most often involved area. According to their size and presentation site, Reddy et al. investigated the lymph nodes.[7] They came to the conclusion that any size greater than 1.5 cm in the inguinal region, 1 cm in the cervical and axillary region lymph node, and more than 0.5 cm at any other site should be regarded as significant. Despite the fact that the size and location of the lymphadenopathy's presentation in the current study precluded any meaningful conclusion.

Granulomatous necrotizing lymphadenitis showed the highest AFB positivity with 41.67%, followed by granulomatous lymphadenitis with 38.89%.

The fine needle aspiration method was initially employed by Dudgeon and Patrick in 1927, then by Tempka, Kubiczek, and Mahanta et al. to diagnose tubercular lymphadenitis. Tubercular lymphadenitis was the most frequent cause of lymphadenopathy in our clinical context, accounting for 70.0% of all lymph node aspirates. This might be because tuberculosis is so common in India and the population under study has a poor socioeconomic position. With earlier Indian investigations, this study was consistent. The proportion was greater than in western research, which may be related to the exceptionally low occurrence of tuberculous illnesses in wealthy nations.[8]

Rajashekaran et al. has shown that no group was exempted from tubercular lymphadenitis. This may be attributed to the development of cell-mediated immunity against tubercle antigens in elderly patients not suffering from any comorbid diseases such as diabetes mellitus or malnutrition. Our study reiterated these findings.[9]

Granulomatous lymphadenitis can be seen in tuberculosis, atypical mycobacterium, brucellosis, fungal infection, sarcoidosis, lymphoma, foreign-body reactions, and tumor metastasis. Over the last decade, the number of new tuberculosis cases has seen an increasing trend, primarily due to increased HIV infection. The incidence of tuberculosis is more in young children, elderly adults, and in immunocompromised states such as HIV infection.

Three patterns of tubercular lymphadenitis have been described by Das et al., depending on the cellular components as they present as a spectrum in natural history and progression of tubercular lymphadenitis.[10]

1. Epithelioid granuloma without necrosis with a considerable number of lymphocytes.
2. Epithelioid granuloma with necrosis with appreciable giant cells.
3. Necrosis without epithelioid granuloma with neutrophilic infiltrate and high AFB load.

CONCLUSION:

Cytomorphological study of lymph nodes has become a highly utilized diagnostic tool due to the quick availability of results with minimally invasive technique and has few complications. It is cost-effective and accurate as the first-line investigation for diagnosis of

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lymphadenopathy, especially in peripheral centers. As a clinical manifestation, lymph node enlargement gives a clue that may lead to the diagnosis of the underlying disease, which can be either benign or malignant. The findings of this study included reactive conditions, granulomatous changes, necrotizing lesions, suppurative lesions, and malignancy. In the present study, granulomatous lymphadenitis was the most common lesion, while reactive lymphadenitis was the second most common cause of lymphadenopathy. ZN staining was done in all the suspected cases. The highest AFB positivity rate was seen in granulomatous necrotizing lymphadenitis.

The cervical group of lymph nodes were the most frequently affected lymph nodes in most of the lesions, followed by the axillary group of lymph nodes. In the present study, supraclavicular lymph nodes are the least affected group of lymph nodes. This technique helps in the diagnosis of benign and malignant lesions. It helps in confirming whether the metastatic diseases are present or not and also tells about the point of origin of primaries in most of the cases.

FNAC and clinical correlation might be used as a 1st line diagnostic tool in examining lymph node diseases. This simple, cost-effective procedure can suitably guide the next step in the treatment based on the etiology.

Conflict of Interest: None

Source of Grant: None

Acknowledgment: None

REFERENCES:

1. Pavithra P, Geetha JP. Role of fine needle aspiration cytology in the evaluation of the spectrum of lymph node lesions. Int J Pharm Bio Sci 2014;5:377-84.
2. Mohanty R, Wilkinson A. Utility of fine needle aspiration cytology of lymph nodes. IOSR-JDMS. 2013;8(5):13-8
3. Amit KN, Kirti N, Jha J, Sudhir K. Role of fine needle aspiration cytology in assessment of cervical lymphadenopathy in variable age groups: a retrospective study. Int J Med Res Health Sci. 2016;5(11):306-10
4. Gupta ML, Singh K. Correlation of fine needle aspiration cytology lymph node with histopathological diagnosis. Int J Res Med Sci. 2016;4:4719-23.
5. Sharma R.I, Dharaiya C.M. Study of fine needle aspiration cytology of lymphadenopathy in tertiary care centre of Ahmedabad, Gujarat.Trop J Path Micro 2018;4(3):258-264.doi:10. 17511/jopm.2018.i3.04.
6. Janagam C, Atla B. Role of FNAC in the diagnosis of cervical lymphadenopathy. Int J Res Med Sci 2017;5:5237-41.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, S Iss 2, 2022

7. Reddy MP, Moorchung N Chaudhary, A. Clinico-Pathological profile of pediatric lymphadenopathy. Indian J. Pediatrics. 2002; 69(12): 1047-51.

8. Rosa Marilin. Fine needle aspiration biopsy: A historical overview. Diagnostic Cytopathology 2008; 36(11): 773-775.

9. Rajashekaran S, Gunasekaran M, Jeyaganesh D, Bhanumathi V. Tubercular cervical lymphadenitis in AFB positive and negative patients. Indian J Tuberc. 2001; 48:201–4.

10. Das DK. Fine-needle aspiration cytology: Its origin, development, and present status with special reference to a developing country, India. Diagnostic Cytopathology 2003; 28:345-351.