



SPECTRUM OF LYMPHADENOPATHY ON FINE NEEDLE ASPIRATION CYTOLOGY: A ONE-YEAR STUDY IN A TERTIARY CARE CENTRE IN NORTH-EAST INDIA

Pathology

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ABSTRACT

Introduction: Lymphadenopathy is a common clinical finding with a wide spectrum of underlying causes, ranging from benign reactive changes to infections and malignancies. Fine Needle Aspiration Cytology (FNAC) serves as a simple, rapid, and minimally invasive technique for the preliminary evaluation of lymph node lesions, offering valuable diagnostic information in a cost-effective manner. **Aim:** To analyze the cytological spectrum of peripheral lymphadenopathy diagnosed through FNAC in a tertiary care centre in North-East India and to correlate the findings with demographic and anatomical distribution. **Materials And Methods:** This retrospective study was conducted in the Department of Pathology, Assam Medical College and Hospital, Dibrugarh, over one year (January–December 2024), including 445 patients presenting with palpable and non-palpable peripheral lymphadenopathy. FNAC was performed using 21-gauge needles, and smears were stained with Giemsa and Papanicolaou stains; Ziehl-Neelsen staining was done when tuberculosis was suspected. The cytological diagnoses were classified into reactive, granulomatous, tubercular, suppurative, metastatic, lymphoproliferative, and inconclusive categories. **Results:** Among 445 cases, 378 (84.9%) were non-neoplastic and 76 (17.1%) were neoplastic. Granulomatous lymphadenitis was the most frequent diagnosis (30.8%), followed by reactive hyperplasia (26.5%) and tubercular lymphadenitis (24.7%). Metastatic deposits were the most common neoplastic lesions (11%), followed by lymphomas (3.8%). The most frequently involved lymph node group was cervical (79.8%). Patient ages ranged from 2 to 95 years, with a male-to-female ratio of approximately 1.2:1. **Conclusion:** FNAC is an effective first-line diagnostic tool for evaluating lymphadenopathy. The predominance of granulomatous and tubercular lesions underscores the regional burden of these conditions. The high proportion of metastatic lesions reflects the tertiary referral nature of the institution and highlights the utility of FNAC in early malignancy detection.

KEYWORDS

Lymphadenopathy, Fine Needle Aspiration Cytology, Granulomatous Lymphadenitis, Tuberculosis, Metastasis, Lymphoma

INTRODUCTION

A lymph node may be conceived of as an encapsulated spongy sieve, filtering and modifying the lymphatic fluid between the points of entry and exit. The normal lymph node is bean-shaped, with lymph entering the node through the afferent lymphatics, piercing the convex surface of the capsule, and exiting through the efferent lymphatics in the hilus. The principal component of the lymph node is lymphoid tissue.¹

Lymphadenopathy is a commonly encountered clinical problem which has a multitude of causes. The commonest cause of peripheral lymphadenopathy is a non-specific reactive hyperplasia. In general practice, less than 1% of the patients with peripheral lymphadenopathy have malignant process.² Enlarged lymph nodes are a prime target for fine-needle aspiration (FNA). In adult, lymph nodes greater than 2 cm are an immediate source of concern and unless the cause is evident, the enlarged node should be aspirated.³

FNA is accepted by most patients as a minimally invasive method for evaluating lymphadenopathy. It has advantages compared to surgical excision and preserves lymph node architecture should an excision be necessary.³

Aim:

To analyze the cytological spectrum of peripheral lymphadenopathy diagnosed through FNAC in a tertiary care centre in North-East India and to correlate the findings with demographic and anatomical distribution

MATERIALS AND METHODS:

The retrospective study was done at Department of Pathology, Assam Medical College and Hospital, Dibrugarh, Assam over a period of 1 year from 1st January 2024 to 31st December 2024. A total of 445 cases of peripheral lymphadenopathy (palpable and non-palpable) were included.

In each case, a brief history and physical examination was done and relevant investigation was carried out. The FNAC procedure was performed using a needle attached to 10 ml syringe or 23/24-gauge needle attached to a plunger. The aspirated material was immediately smeared onto slides. Most of the slides were air dried while few slides were immediately immersed in 95% ethanol.

The air-dried smears were stained by Giemsa stain routinely and

alcohol fixed smears were stained by PAP method. Special stains like Ziehl-Nelson stain for acid fast bacilli (AFB) detection were done whenever required.

All the stained smears were evaluated. Diagnosis was based on cytological features and clinic-cytological correlation. The study data was analyzed.

RESULTS:

Table 1: Distribution of FNAC diagnosis of 445 cases of lymphadenopathy

Cause	Male	Female	Number of Cases	Percentage
Reactive	70	48	118	26.5%
Granulomatous	58	79	137	30.8%
Tubercular	70	40	110	24.7%
Metastatic	29	20	49	11%
Suppurative	02	02	04	0.9%
Lymphoma/ Lymphoproliferative Disorder	11	06	17	3.8%
Inconclusive	04	06	10	2.3%

Out of 445 patients with peripheral lymphadenopathy, the ages of the patients were from 02 years to 95 years in which nearly 55 % were males and 45 % were females. Sex distribution is shown in Table 1. 369 were inflammatory and 66 cases were neoplastic, 10 cases were inconclusive.

Among the non-neoplastic lymph node lesions, granulomatous lymphadenitis was the most common followed by reactive lymphadenopathy and then tubercular lymphadenopathy. Among the neoplastic lymph node lesions most common was metastasis and then lymphoma.

Table 2: Distribution of Lymph Node involved

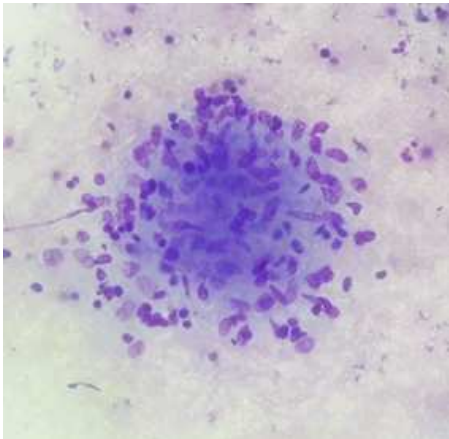
Lymph Node Group involved	Total number of cases
Cervical	355
Axillary	34
Supraclavicular	24
Inguinal	29
Generalised	1
Limbs	2

The most common group of lymph nodes that were involved were cervical lymph nodes, followed by axillary, supraclavicular and then inguinal.

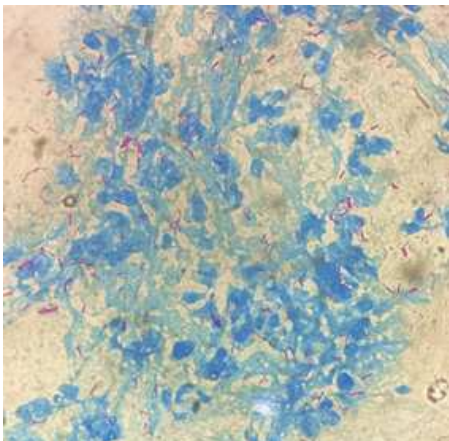
Table 3: Age distribution of lymph node lesions

Cause	0-10	11-20	21-30	31-40	41-50	51-60	>61
Reactive	17	42	27	16	7	8	1
Granulomatous	11	35	46	27	8	7	3
Tubercular	9	28	37	13	15	5	3
Metastatic	0	2	4	7	9	13	14
Suppurative	0	0	1	2	1	0	0
Lymphoma/ Lymphoproliferative Disorder	3	2	1	2	2	4	3
Inconclusive	1	2	2	2	1	1	1

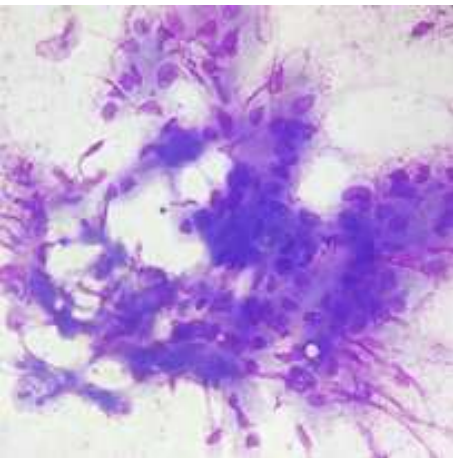
The ages of the patient ranged from 2 years to 95 years



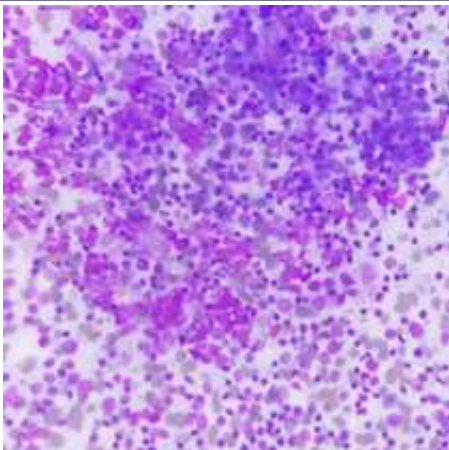
Granulomatous Lymphadenitis



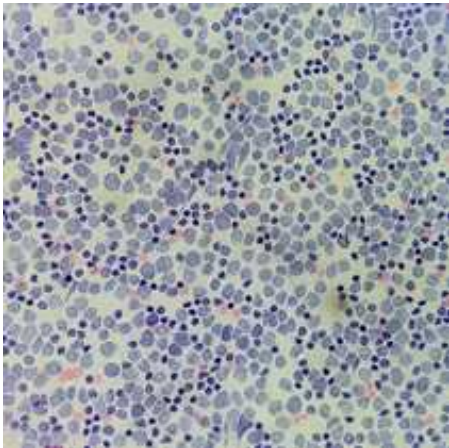
ZN Stain showing AFB positive



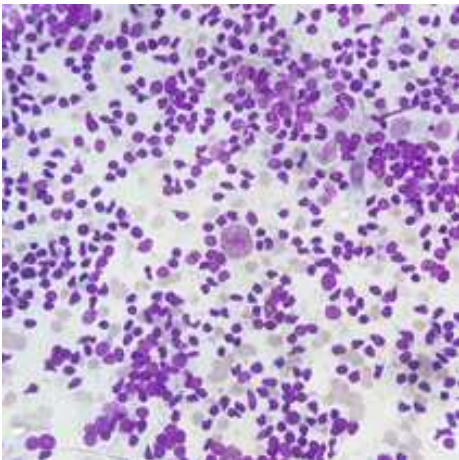
Metastasis of Squamous cell carcinoma in lymph node



FNAC of lymph node showing Lymphoproliferative Disorder



Lymphoproliferative Disorder (PAPSmear)



MGG Stain showing presence of binucleated cell suggestive of Hodgkin Lymphoma

DISCUSSION:

Comparison of the current study with other studies assessing the causes for lymphadenopathy:

Author	Reactive	Granulomatous	Tuberculosis	Lymphoma/Lymphoproliferative Disorder	Metastasis	Suppurative and Necrotizing	Inconclusive	Others
Present Study (n= 445)	118	137	110	17	49	04	10	-
Gayen P et al.4 (n= 50)	23	14	-	01	04	06	01	01
Biradar et al5 (n= 160)	89	06	38	09	07	06	05	-

Patro P et al'6 (n=330)	84	77	106	04	11	12	07	29
Gupta et al'7 (n=128)	44	11	39	02	12	11	09	-

Note: Gayen et al. did not separately report tuberculosis; granulomatous cases presumably include TB.

Reactive lymphadenopathy

Present Study: 26.5% of cases

Range In Literature: 25.5% (Patro et al.) to 55.6% (Biradar et al.)

Interpretation: Our reactive rate aligns closely with Patro et al. (25.5%) and is lower than Biradar (55.6%), possibly reflecting differences in referral patterns.

Granulomatous Inflammation

Present Study: 30.8 %

Range: 3.8 % (Biradar et al.) to 28.0 % (Gayen et al.)

Interpretation: Our granulomatous proportion is at the upper end, suggesting a high local burden of granulomatous disorders.... Biradar's low rate (3.8 %) may reflect geographic or diagnostic criteria variation.

Tuberculosis

Present Study: 24.7%

Range: upto 32.1% (Patro et al.)

Interpretation: TB comprises almost a quarter of our lymphadenopathy work.up, comparable to Patro et al. (32.1%) and Gupta et al. (30.5 %). Our data underscore the continued burden of TB in nodal pathology.

Neoplastic causes (Lymphoma & Metastasis)

Lymphoma: 3.8% (present) vs. 1.2%–5.6% (others)

Metastasis: 11% (present) vs. 3.3%–9.4% (others)

Interpretation: We observe a relatively low lymphoma rate but a higher metastasis rate (11%) compared with most series. This may indicate tertiary care referral of suspected malignancies to our center.

Suppurative & Necrotizing

Present Study: 0.9%

Range: 3.6% (Patro et al.) to 12.0% (Gayen et al.)

Interpretation: Our low rate may reflect early antibiotic use in the community, reducing progression to suppuration, or sampling differences (e.g. fewer abscess.type nodes).

CONCLUSION

The present study's spectrum broadly overlaps with prior reports, with key distinctions:

1. **High granulomatous proportion** (30.8%)—likely local epidemiology.
2. **Significant TB burden** (24.7%)—underscoring public health importance.
3. **Elevated metastasis rate** (11%)—reflecting tertiary referral bias.
4. **Low suppurative/inconclusive rates**—indicative of early intervention and robust sampling.

These differences reflect both regional disease patterns and institutional referral dynamics.

REFERENCES:

1. Koss LG. Koss' diagnostic cytology and its histopathologic bases. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2006.
2. Orell SR, Sterrett GF, Orell SR. Orell and Sterrett's fine needle aspiration cytology. 5th ed. Edinburgh: Churchill Livingstone; 2011. 1 p. (Expertconsult).
3. Cibas ES, Ducatman BS. Cytology: diagnostic principles and clinical correlates. 5. Edition. Philadelphia: Elsevier; 2020. 675 p.
4. Assistant Professor, Department of Pathology, Malda Medical College, Malda, West Bengal, India, Gayen DrP, Ghosh DrS, Assistant Professor, Department of Chest Medicine, Malda Medical College, Malda, West Bengal, India, Naskar DrS, Assistant Professor, Department of Community Medicine, Malda Medical College, Malda, West Bengal, India. Study of fine needle aspiration cytology evaluation of peripheral lymph nodes. Int J Med Res Rev. 2019 Aug 31;7(4):259–65.
5. Biradar S, Masur D. Spectrum of Lymph Node Lesions by Fine Needle Aspiration Cytology: A Retrospective Analysis. Ann Pathol Lab Med. 2017 May 28;4(3):A284–7.
6. Patro DP, Lad DP, Sahu DS. Spectrum of Lesions in Lymph Nodes- A Cytological Study. 2018;(11).
7. Gupta D, Goswami S, More S. Cytological spectrum of lymph node lesions in fine needle aspiration cytology. Int J Res Med Sci. 2023 Mar 23;11(4):1136–40.