

A cytological study on peripheral lymphadenopathy in a tertiary care center with special reference to tuberculous lymphadenitis



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ABSTRACT

Background: Fine-needle aspiration cytology (FNAC) is the most common, cost-effective, and time-efficient cytological diagnostic procedure and is used routinely in cases of swelling or lymph node enlargement at accessible sites. FNAC plays an important role in diagnosing benign and malignant lesions of peripheral lymphadenopathy cases and also provides a valuable screening test. **Aims and Objectives:** In this study, we aimed to evaluate various cytomorphological manifestations of lymphadenopathies and the suggestive cases of tuberculous lymphadenitis were divided based on their cytomorphological patterns. **Materials and Methods:** The current prospective study was conducted in the Department of Pathology, SSMC, Rewa, M.P. A total of 150 cases of peripheral lymphadenopathy were subjected to FNAC and were categorized based on their cytological findings. The cases which showed features suggestive of tuberculous lymphadenitis were further categorized into four distinct cytological patterns (I to IV). **Results:** Out of 150 cases of peripheral lymphadenopathies, the most common lesion diagnosed cytologically was reactive lymphadenitis (41.3%) followed by tuberculous lymphadenitis in 38.7% cases. The different patterns of tuberculous lymphadenitis on microscopy were divided into four categories from I to IV with pattern I being the most frequently seen (53.5%). **Conclusion:** Our study highlighted the various morphological patterns of lymphadenopathy and the most common lesion diagnosed was reactive lymphadenitis. The present study found that FNAC is an effective screening tool for diagnosing benign and malignant lymphadenopathies and also to study the cytomorphological patterns in cases of tuberculous lymphadenitis. It reduces the need for surgical intervention and for the early diagnosis and management of patients with peripheral lymphadenopathy.

Key words: Fine-needle aspiration cytology; Peripheral lymphadenopathy; Tuberculous lymphadenitis

INTRODUCTION

Extrapulmonary tuberculosis (EPTB) manifests itself most commonly as lymphadenitis. One of the most common causes of lymphadenitis in poor countries is tuberculous lymphadenitis.¹ The percentage of patients with EPTB in tertiary care centers in India varies between 30% and 50%.² Fine-needle aspiration cytology (FNAC), biopsy, staining for acid-fast bacilli, and

polymerase chain reaction are some of the diagnostic procedures used to diagnose tuberculosis.¹ FNAC is the most common, cost-effective, and time-efficient cytological diagnostic procedure, and it is used routinely in cases of swelling or lymph node enlargement at accessible sites. It has a high sensitivity and specificity for the diagnosis of tuberculous lymphadenitis and has been recommended as a standard diagnostic procedure in suspected tuberculous patients.³ In countries like

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India, tuberculosis remains as one of the leading causes of morbidity and mortality.

Aims and objectives

FNAC can diagnose and differentiate between the benign and malignant causes of peripheral lymphadenopathies. In addition to cytological preparations, it is useful in the diagnosis of inflammatory, infectious, and degenerative diseases, as the sample can be utilized for microbiological and biochemical examination.⁴ In our society, however, the appearance of epithelioid cell granuloma is seen as evidence of tuberculous lymphadenitis due to the high burden of tuberculosis and limited resources.⁵ In light of this, we set out to study the cytological features of lymphadenopathies and to brief about the cytological findings of tuberculous lymphadenitis.

MATERIALS AND METHODS

The present study was conducted in cytopathology section of the Department of Pathology in Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital Rewa (MP), from January 1, 2020, to December 31, 2020 after obtaining clearance from the Institutional Ethical Committee. The study included patients attending cytology laboratory with a requisition for FNAC by the requesting clinician were studied. After obtaining informed consent from the patient, FNAC of the lymph nodes was performed following thorough clinical examination. In local examination – site, size of the swelling, number of swellings, fixity to the underlying soft tissues, consistency, tenderness, skin over the swelling for any erythema, sinus tract, draining of pus, and scar were noted whichever was applicable to the particular case. A pre-designed pro forma was used to record the details of the patients. Lymph nodes <1 cm and deep seated were excluded from the study. FNAC was performed under aseptic precautions using 22-24G needles attached to 10c.c syringes. One to two passes were given and the aspirated material was smeared onto glass slides. The aspirate was divided into two parts. One part was smeared into a slide and immediately fixed in 95% isopropyl alcohol for routine Hematoxylin and Eosin (H&E) staining, and Papanicolaou (Pap) staining. Second part was smeared onto another slide, air-dried, and stained by Giemsa stain. Microscopic examination was done and the cases were divided into benign and malignant lesions and the cytological diagnosis was made. The cases of tuberculous lymphadenitis were further divided into four patterns based on microscopic features as follows:⁶

- Pattern I – Epithelioid granuloma with necrosis
- Pattern II – Epithelioid granuloma without necrosis
- Pattern III – Caseous necrosis only
- Pattern IV – Only reactive cells with necrosis.

RESULTS

Lymphadenopathy findings

During the study period from January 1, 2020, to December 31, 2020, a total of 150 patients with peripheral lymphadenopathy were studied, and FNAC was performed. All the cases were divided based on the age-groups with an interval of 10 years. The majority of the cases were between 21 and 30 years constituting about 24.67% (37/150) cases and the least common age group was 61–70 years with 7.33% (11/150) cases (Figure 1). The majority of patients were males constituting 60% (90/150) cases, while the remaining 40% (60/150) cases were females. The male-female ratio is 1.5:1 (Figure 2).

The most common presentation was cervical lymphadenopathy constituting 75.4% (113/150) cases and the least common group was generalized lymphadenopathy with 0.7% (1/150) case (Figure 3). The most common type of lymph node seen was single with 68 % (102/150) cases followed by multiple with 23.33% (35/150) cases and multiple matted was the least with 8.67% (13/150) cases.

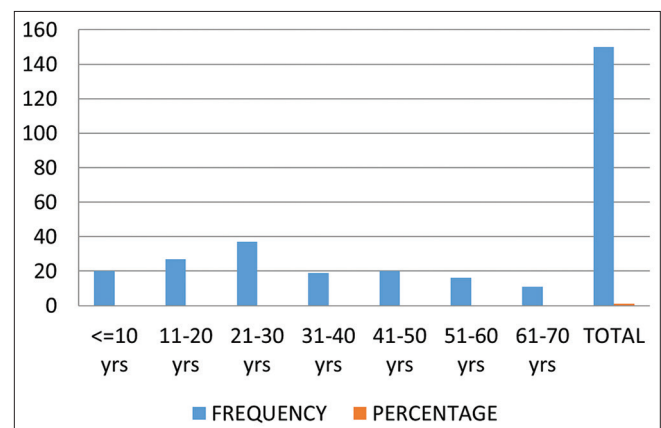


Figure 1: Age distribution of cases

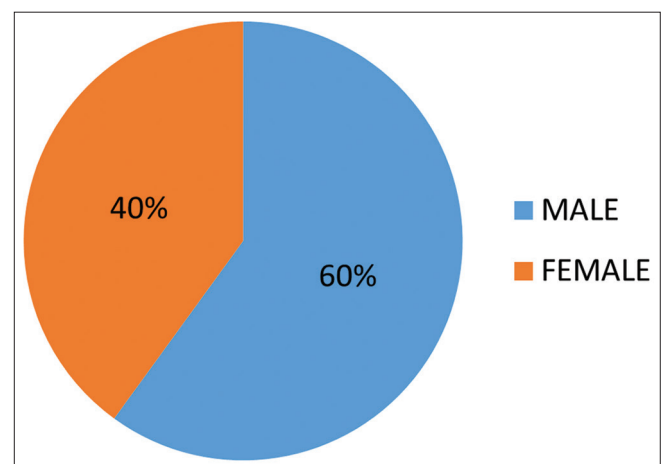


Figure 2: Gender distribution among lymphadenopathy cases

Among the different lesions on microscopy, 136 (90.7%) of cases were categorized as benign and the rest of the 14 (9.3%) cases were categorized as malignant lesions. The most common diagnosis in this study was reactive lymphadenitis (Figure 4) comprising 41.3% (62/150) cases and the second most common impression was tuberculous lymphadenitis comprising 38.7% (58/150) cases followed by acute suppurative lymphadenitis constituting 10.7% (16/150) cases, metastatic deposits with 7.3% (11/150) cases, non-Hodgkin's lymphoma 1.3% (2/150) cases (Figure 5), and the least common was Hodgkin's lymphoma comprising 0.7% (1/150) (Table 1).

Patterns on microscopy among tuberculous lymphadenitis cases

The cases of tuberculous lymphadenitis on microscopy were divided into four patterns based on their cytological features from I to IV, as given in Figure 6. Among these, the pattern I constituting epithelioid granulomas with necrosis were the most common comprising 53.5% (31/58) cases, as given in Figure 7. Second most common

pattern was pattern II that consists of 36.2% (21/58) followed by pattern III constituting of 6.9% (4/58) cases and the least common was pattern IV with 3.4% (2/58) cases.

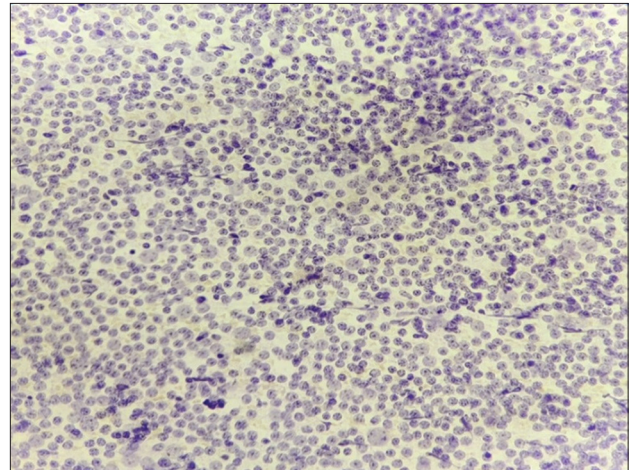


Figure 5: Non-Hodgkin's lymphoma (H&E, x400)

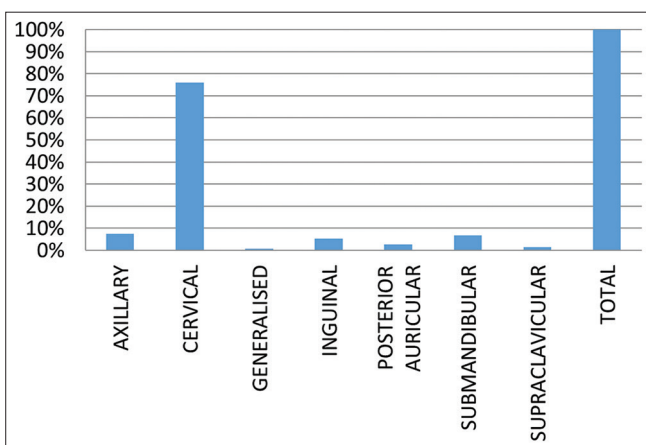


Figure 3: Distribution of site of lymphadenopathy

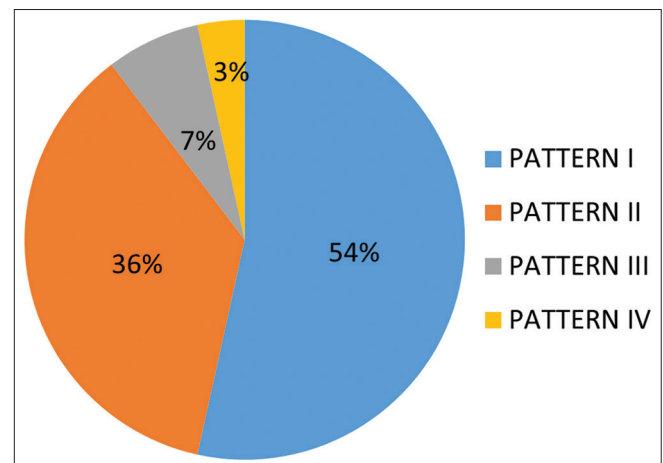


Figure 6: Distribution of patterns on microscopy

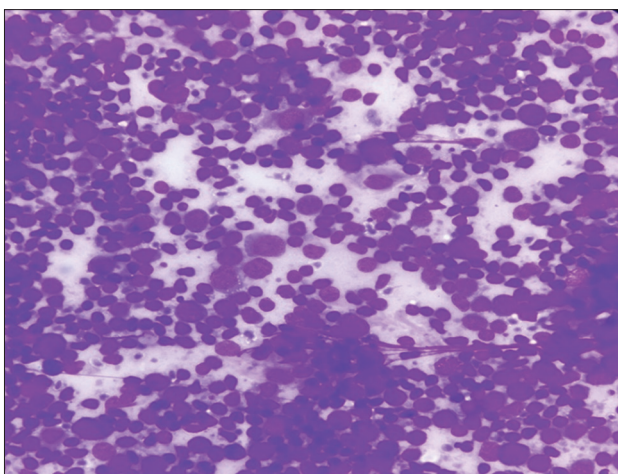


Figure 4: Reactive lymphadenitis (Giemsa, x400)

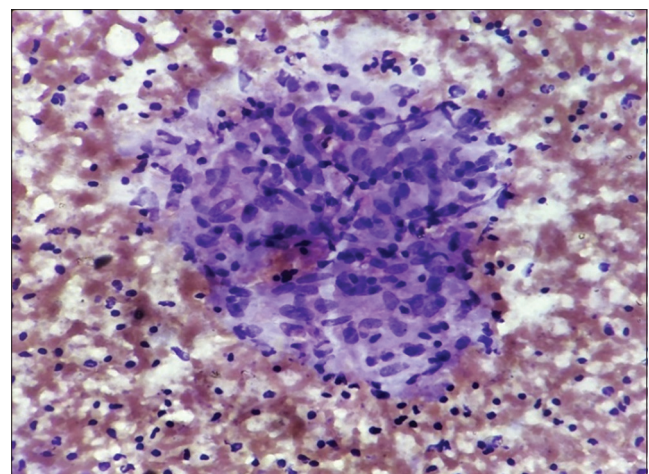


Figure 7: Pattern I – Granulomatous lymphadenitis (H&E stain, x40)

DISCUSSION

In our study, we analyzed the different cytomorphological patterns of peripheral lymphadenopathy with special reference of tuberculous lymphadenitis. In the present study, 21–30 years of age group had the highest proportion of lymphadenopathy with 37 (24.67%) cases which are correlating with studies Bhatta *et al.*,¹ with 40.47% cases in 21–30 years, Kagathara Pooja *et al.*,⁷ with 51% cases in 16–30 years, Swaroopa and Vani⁸ with 32% cases in 20–30 year age group. In our study, male preponderance was noted with male-female ratio of 1.5:1. Similar male-female ratio results were observed in studies Vashisht *et al.*,⁹ with 1.9:1, Swaroopa and Vani⁸ and Meena *et al.*,¹⁰ with 1.8:1.

In our study, the most common site of lymphadenopathy was cervical region with 113 (75.4%) of cases. Our findings correlated with studies Patro *et al.*,¹¹ with 74.25% cases, Vashisht *et al.*,⁹ with 87.2% cases, Chaurasia and Sharma⁵

with 83.09% cases, and Bohara *et al.*,³ with 43.25% cases presented in the cervical region. This may be attributed to the common site of access of the bacteria through the tonsillar lymphoid tissue. The most common type of lymph node seen was single with 68% (102/150) cases in our study. Similarly, Bohara *et al.*,³ reported single lymph node enlargement in 51.4% cases. The least common group was generalized lymphadenopathy with 0.7% cases. Similar results were observed by Sharma *et al.*¹² with 2.7% cases of multiple lymphadenopathy.

In the present study, benign lesions were more commonly seen than malignant lesions comprising of 90.7% and 9.3%, respectively. Similar results were observed in studies done by the previous researchers.^{8,10,11,13}

The most common diagnosis in this study was reactive lymphadenitis comprising 62 (41.3%) cases. Similar results with predominant reactive lymphadenitis were observed in studies Naz and Sharma¹³ with 43.5% of cases, Swaroopa and Vani⁸ with 35% cases, Meena *et al.*,¹⁰ with 30.32% cases, and Sharma *et al.*,¹⁴ with 21.8% cases (Table 2). However, the cause of peripheral lymphadenopathy may vary according to the geographical location. The infections, inflammation, and post-vaccination could be the possible etiology of reactive lymphadenitis.

In our study, the most common pattern seen on microscopy was pattern I showing epithelioid granuloma with necrosis in 53.5% (31/58) cases. Similar results were observed in studies Vashisht *et al.*,⁹ with 63.6% cases, Bhatta *et al.*,¹ with 53.17% cases, Naz and Sharma¹³ with 58.1% cases, Chaurasia and Sharma⁵ with 60% cases, Jamsheed *et al.*,¹⁵ with 33.7% cases, and Pradhan *et al.*,¹⁶ with 45.32% cases in pattern I (Table 3). Hence, the most common pattern of tuberculous lymphadenitis seen on microscopy in comparison with different authors was pattern I showing epithelioid granuloma with necrosis.

Limitations of the study

The limitation of the study was Histopathology, CBNAAT or culture was not used for the confirmation of diagnosis for lymph node lesions.

Table 1: Distribution of impression on microscopy

Type of lesion	Impression	Frequency	%
Benign (136/150=90.7%)	Acute suppurative lymphadenitis	16	10.7
	Tuberculous lymphadenitis	58	38.7
	Reactive lymphadenitis	62	41.3
	Metastatic deposits	11	7.3
Malignant (14/150=9.3%)	Non-Hodgkins lymphoma	2	1.3
	Hodgkin's lymphoma	1	0.7
	Total	150	100

Table 2: Comparison of studies on microscopy

Studies with predominant reactive lymphadenitis	n	%
Naz and Sharma ¹³ (2019)	190	43.5
Swaroopa and Vani ⁸ (2019)	220	35
Meena <i>et al.</i> , ¹⁰ (2020)	279	30.32
Sharma <i>et al.</i> , ¹⁴ (2021)	33	21.8
Our study (2021)	62	41.3

Table 3: Comparison of studies among different patterns on microscopy of tuberculous lymphadenitis

Studies	Pattern I		Pattern II		Pattern III		Pattern IV	
	N	%	N	%	n	%	n	%
Vashisht <i>et al.</i> , ⁹ (2018)	318	63.6	112	22.4	45	9	25	5
Bhatta <i>et al.</i> , ¹ (2018)	67	53.17	48	38.09	11	8.73	-	-
Chaurasia and Sharma ⁵ (2019)	330	60	157	28.54	63	11.46	-	-
Naz and Sharma ¹³ (2019)	93	58.1	30	23.1	37	23.1	-	-
Jamsheed <i>et al.</i> , ¹⁵ (2020)	-	33.7	-	31.1	-	3.6	-	30.6
Pradhan <i>et al.</i> , ¹⁶ (2020)	-	45.32	-	18.22	-	15.27	-	21.18
Our study (2021)	38	53.52	26	36.62	4	5.63	3	4.22

CONCLUSION

In the current prospective study, reactive lymphadenitis was found to be the most common lesion, while tuberculous lymphadenitis was the second most lesion diagnosed microscopically. Cervical group of lymph nodes was the most commonly affected nodes and the least commonly were generalized group of nodes. The most commonly seen pattern of tuberculous lymphadenitis was pattern I based on their cytological findings.

FNAC is a very useful, time-efficient, and cost-effective technique with minimal complications in detecting various benign and malignant lymphadenopathies. It can be useful for diagnosing inflammatory, infective, and neoplastic conditions at an early stage. In countries like India for tuberculous lymphadenitis, FNAC provides a rapid and valuable tool for the early diagnosis and management and prevents surgical intervention.

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Authors' Contributions:

SD- Concept and design of the study, prepared first draft of manuscript; **SSK**- Interpreted the results; reviewed the literature and manuscript preparation; **JJ**- Concept, coordination, statistical analysis and interpretation, preparation of manuscript and revision of the manuscript.

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