

# Fine-needle Aspiration Cytology in Tuberculous Lymphadenitis: A Study of 200 Cases of Superficial Lymphadenopathy

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## Abstract

**Background:** In developing countries, tuberculous lymphadenitis is one of the most common causes of lymphadenopathy. Moreover, India is one of them. Patients are presenting with the only lymph node enlargement, with or without any symptoms. However, antitubercular treatment cannot be given only on clinical suspicion. Cytomorphology with acid-fast staining proves to be a valuable tool in diagnosing these cases.

**Aims:** The aim is to study the advantages, limitations, and utility of fine-needle aspiration cytology (FNAC) and various cytomorphological presentations in reference to Ziehl-Neelsen (Z-N) staining in tuberculous lymphadenitis.

**Material and Methods:** In a study period of January 2015–December 2016, in Pathology Department, GMERS Medical College, Ahmedabad, 200 cases in case of 300 patients with enlarged superficial lymph nodes, clinically suspected to be tuberculous were subjected to cytological evaluation with Hematoxylin and Eosin, Giemsa and Z-N stained smears. In addition, the social status and economic profile of these patients with the clinical presentation were also studied.

**Results:** Incidence of tuberculous lymphadenitis was 63%. Overall acid-fast bacilli (AFB) positivity was 65.0%. Only necrosis without epithelioid cell granulomas was the most common cytological picture and that showed highest AFB positivity also. Three-fourth of the patients presented in the second to fourth decades of life. Cervical region was the most common site of involvement with solitary lymphadenopathy as the most common presentation in contrast to matted lymph nodes as reported by others.

**Conclusions:** FNAC is a safe, cheap procedure requiring minimal instrumentation and is highly sensitive to diagnose tuberculous lymphadenitis. The sensitivity can be further increased by complementing cytomorphology with acid-fast staining. In acid-fast staining negative cases, the yield of AFB positivity can be increased by doing Z-N staining on second smear or decolorized smear revealing necrosis or by repeat aspiration. Microbiological assessment should also be done in such cases.

**Key words:** Cytomorphological patterns, Fine-needle aspiration cytology, Tuberculous lymphadenitis, Ziehl-Neelsen staining

## INTRODUCTION

Fine-needle aspiration cytology (FNAC) is almost safe, cost-effective, and conclusive procedure.<sup>[1]</sup> It provides an alternative to excision biopsy for lymph nodes and is an easy procedure for collection of material for

cytomorphological and bacteriological examination.<sup>[2]</sup> Tuberculous lymphadenitis is a very common cause of superficial lymphadenopathy in India. The aim of this study was to confirm the diagnosis of tuberculosis as well as to describe various cytological pictures of tuberculous lymphadenitis with their relative frequency and to assess the correlation between FNAC and Ziehl-Neelsen (Z-N) staining in diagnosing tuberculous lymphadenitis.

## MATERIALS AND METHODS

A total of 200 patients with enlarged superficial lymph nodes, clinically suspected to be tuberculous, were

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aspirated for cytological evaluation after thorough clinical examination in a study period of January 2015–December 2016 at GMERS Medical College, Ahmedabad. Aspirations were performed using 22 G needle and disposable 10 ml/5 ml plastic syringe. The smears are fixed with methyl alcohol and stained with Hematoxylin and Eosin, one air-dried smear was stained with Giemsa stain, one smear was stained with Z-N technique, and an additional slide was kept unstained for any further required stain. The cytology smears revealing features of tuberculous lymphadenitis were grouped into four categories: Epithelioid granulomas with caseous necrosis, epithelioid granulomas without necrosis, only caseous necrosis without epithelioid granulomas, and polymorphs with necrosis with or without epithelioid granulomas.<sup>[3]</sup> In addition, the demographic profile of tuberculous patients with their present and past treatment history and clinical characteristics of lymph nodes was also studied.

## RESULTS

Of 200 patients's superficial lymph nodes aspirated, 83 cases showed acid-fast bacilli (AFB) positivity (of which smears initially AFB negative showed positivity by doing Z-N staining on decolorized smears), while 51 cases were AFB negative with cytological picture of tuberculous lymphadenitis, and 74 cases revealed reactive lymph node hyperplasia. We have performed repeat FNAC in case of inadequate sample. Among tuberculous cases, 72% of males and 54% of females were in the second to fourth decades of life with a male-to-female ratio of 1:3 [Tables 1 and 2].

Majority (45%) of the patients came to the institute from DOTS non-area, 25% from DOTS area, and 30 % were

**Table 1: Incidence of reactive versus tuberculous lymphadenopathy in male and female**

Diagnosis	Male	Female	Total
Reactive lymph node hyperplasia	38	36	74
Tuberculous lymphadenopathy	72	54	126
Total	110	90	200

**Table 2: Incidence of tuberculous lymphadenopathy in relation to age and sex**

Age group (years)	Male	Female	Total (%)
1–10	08	05	13 (10.3)
11–20	15	12	27 (21.4)
21–30	16	13	29 (23.02)
31–40	18	15	33 (26.1)
41–50	10	06	16 (12.7)
50 and above	5	3	8 (6.3)
Total	72	54	126 (100)

from outside Ahmedabad. Forty-eight patients had a history of tuberculosis in the past, and 38 patients were already on ATT at the time of aspiration.

The cervical region was the most common site, involved in 83% cases, followed by axillary (11.4%) and inguinal (5.6%). Only one case presented with generalized lymphadenopathy.

In our study, the most common presentation was single palpable cervical lymph node in 63.3% of cases, followed by multiple unilateral cervical lymphadenopathy in 19.2% of cases and multiple bilateral cervical lymphadenopathy in 7.2% of cases.

Grossly caseous or cheesy material in 50.6% and purulent material was aspirated in 22.9%, blood mixed material in 26.5% of AFB-positive cases, while blood mixed material was the most common aspirate in 65.1% of AFB-negative cases. Of 126 cases showing cytological picture of tuberculous lymphadenitis, smears revealed epithelioid granulomas with caseous necrosis in 23.1% of cases, epithelioid granulomas without necrosis in 16.7% of cases, necrosis only without epithelioid granulomas in 39.7% of cases, and polymorphs with necrosis with or without epithelioid granulomas in 20.1% of cases [Figure 1a-e]. AFB positivity was found in 69.5% of the cases showing epithelioid granulomas with caseous necrosis, 9.5% of cases with epithelioid granulomas without necrosis, 84% of cases with necrosis only without epithelioid granulomas, and 73.1% of cases with polymorphs with necrosis with or without epithelioid granulomas [Table 3]. Overall AFB positivity was seen in 65.0% of cases.

## DISCUSSION

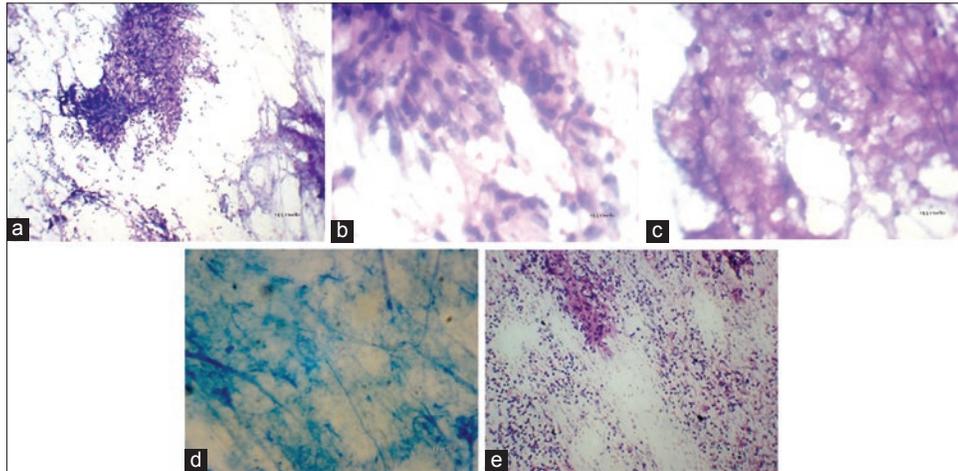
Superficial lymphadenopathy is a very common clinical finding, etiology of which can be suspected by clinical signs and symptoms. However, a morphological diagnosis is essential to start antituberculous treatment in cases of tuberculous lymphadenopathy. FNAC lymph node is a simple, non-invasive, cheap tool with high sensitivity in tuberculous cases and can replace excision biopsy for diagnosing tuberculosis in developing countries like India. Tuberculous lymphadenopathy can be seen in patients ranging from early to advanced age. In our study, the youngest patient was 3 years old and the oldest was 67 years old.

In a study by Ahmad *et al.*, the youngest patient was 2 years old and the oldest being 95 years.<sup>[4]</sup> Majority of the patients (70%) were in the second to fourth decades of life. Similar age distribution was seen in a study by Ergete and Bekele,<sup>[2]</sup> Purohit *et al.*,<sup>[5]</sup> and Dandapat *et al.*<sup>[6]</sup>

**Table 3: Various cytomorphological pictures in tuberculous lymphadenopathy**

Cytomorphological picture	Number of cases (%)	AFB-positive cases (%)	AFB-negative cases (%)
Epithelioid granulomas with caseous necrosis	29 (23.1)	20 (69.5)	9 (30.5)
Epithelioid granulomas without necrosis	21 (16.7)	2 (9.5)	19 (90.5)
Necrosis only without epithelioid granulomas	50 (39.7)	42 (84)	8 (16)
Polymorphs with necrosis	26 (20.1)	19 (73.1)	7 (26.9)
Total	126 (100)	83 (65.0)	43 (35)

AFB: Acid-fast bacilli



**Figure 1: (a) Epithelioid cell granuloma with necrosis (H and E 10x), (b) Epithelioid cell granuloma without necrosis (H and E 40x), (c) only necrosis, no granulomas (H and E 40x), (d) AFB-positive bacilli (Z-N stain 40x), (e) polymorphs with necrosis (H and E 10x)**

A slight male predominance with 1:3 sex ratio was seen in our study. Female predominance was noted by Pamra *et al.*,<sup>[7]</sup> Ergete and Bekele,<sup>[2]</sup> and Purohit *et al.*,<sup>[5]</sup> while male predominance was noted by Rajsekaran *et al.*<sup>[8]</sup> and Ahmad *et al.*<sup>[4]</sup>

Clinically, in our study, cervical region was the most commonly affected region, involved in 83% of cases. This was in concordance with Bezabih *et al.*<sup>[9]</sup> who observed cervical involvement in 74.2% of cases. A study conducted by Sharma *et al.*<sup>[10]</sup> in pediatric age group also showed similar results with female predominance and most common involvement of cervical region (88.2%). While matted lymph nodes were seen in the majority of cases (60%) by Ahmad *et al.*,<sup>[4]</sup> in our study, 63.3% of cases presented with solitary lymphadenopathy. Single lymph node enlargement was seen in 48.6% of cases of tubercular lymphadenopathy by Aggarwal *et al.*<sup>[11]</sup> We noted a much higher incidence (55%) of tuberculous lymphadenopathy while Ahmad *et al.*<sup>[4]</sup> found 38% and Tilak *et al.*<sup>[12]</sup> found 38.8% cases of tuberculous lymphadenopathy. The high incidence noted by us may be because our institute is a referral center for tuberculosis cases.

Most common cytological pattern seen was necrosis only without granulomas in 39.7% of cases and epithelioid granuloma with caseous necrosis in 23.1% of cases. While in a study by Gupta *et al.* epithelioid clusters with or without

Langhan's giant cells with necrosis was most commonly observed cytological pattern in 50.35% of cases.<sup>[13]</sup> This is also the classic pattern, commonly seen in excision specimens of tuberculous lymph nodes [Figure 1a].

Highest AFB positivity was seen in smears revealing necrosis only without epithelioid granulomas (84%) and polymorphs with necrosis with or without epithelioid granulomas (73.1%) while the lowest was seen in smears showing epithelioid granulomas without necrosis (9.5%). Bezabih *et al.*<sup>[9]</sup> found the highest AFB positivity in cases showing necrosis only without epithelioid granulomas (69.7%) and the lowest in cases showing epithelioid granulomas without necrosis (20.0%). Similarly, the highest AFB positivity (75.6%) was seen in smears revealing necrosis only without epithelioid granulomas by Gupta *et al.*<sup>[13]</sup> Maximum AFB positivity (61.6%) was found in smears containing purulent material on aspiration. Similarly, Ahmad *et al.*<sup>[4]</sup> noted 68.8% AFB positivity in smears containing purulent material on aspiration. In our study, overall AFB positivity was seen in 71% of cases. AFB positivity was observed in 71.7% of cases by Ergete and Bekele,<sup>[2]</sup> 59.4% cases by Bezabih *et al.*,<sup>[9]</sup> 45.6% cases by Dasgupta *et al.*,<sup>[14]</sup> and 19.6% of cases by Aggarwal *et al.*<sup>[11]</sup> High AFB positivity noted in our study may be because of extensive screening done as in addition to one Z-N stained smear in each case, we got Z-N staining done on second smear or decolorized smear where cytology suggested tuberculosis, especially when necrosis was present. The yield

of AFB positivity can further be increased by doing repeat FNAC of lymph node.<sup>[15]</sup> AFB-negative cases revealing only epithelioid cell granulomas without necrosis should be clinically correlated with microbiological assessment. Similarly, atypical cells should be ruled out in smears showing necrosis only without epithelioid cell granulomas and AFB negativity and material should be submitted for culture. Microbiological assessment is necessary in AFB-negative cases to confirm the diagnosis of tuberculosis as approximately 10,000–100,000 mycobacterial organism/ml of sample should be presented for smear AFB positivity.

## CONCLUSION

FNAC can be performed as outpatient department procedure in superficial lymphadenopathy cases. The procedure is safe, well accepted by patients, very cost-effective and requires minimum instrumentation in comparison to excision biopsy. Diagnostic accuracy as high as 100% in tuberculous lymphadenopathy cases has been reported by Tripathy *et al.*,<sup>[16]</sup> 84.4% by Dasgupta *et al.*,<sup>[14]</sup> 83.3% by Dandapat *et al.*,<sup>[6]</sup> and 87% by Narang.<sup>[17]</sup> Therefore, even in most remote areas, FNAC can be used for diagnosing tuberculous lymphadenopathy. Coupling FNAC with Z-N staining increases the diagnostic accuracy.

Diagnostic accuracy can be further increased by submitting some material obtained by FNA for culture.

## REFERENCES

1. Chaturvedi NK, Singh JP, Amita D. Fine needle aspiration cytology in the diagnosis of tuberculous lymphadenitis. *Indian J Pathol Microbiol* 1989;32:101-4.
2. Ergete W, Bekele A. Acid fast bacilli in aspirationsmeas from tuberculous patients. *Ethiop J Health Dev* 2000;14:99-104.
3. Heerde PV, Miliuskas J, Field A. Lymphnodes. In: Orell SR, Sterrett GF, Whitaker D, editors. *Fine Needle Aspirationcytology*. 4<sup>th</sup> ed; New York: Churchill Livingstone; 2005. p. 83-124.
4. Ahmad SS, Akhtar S, Akhtar K, Naseem S, Mansoor T, Khalil S. Incidence of tuberculosis from study of fine needle aspiration cytology in lymphadenopathy and acid fast staining. *Ind J Community Med* 2005;30:63-5.
5. Purohit MR, Mustafa T, Morkve O, Sviland L. Genderdifferences in the clinical diagnosis of tuberculouslymphadenitis - A hospital-based study from central India. *Int J Infect Dis* 2009;13:600-5.
6. Dandapat MC, Panda BK, Patra AK, Acharya N. Diagnosisof tubercular lymphadenitis by fine needle aspirationcytology. *Indian J Tuberc*1987;37:139-42.
7. Pamra S, Baily GV, Gupta SP. Cervical lymphadenopathies. *Indian J Tuberc* 1987;34:96-100.
8. Rajsekaran S, Gunasekaran M, Bhanumati V. Tuberculouscervical lymphadenitis in HIV positive and negativepatients. *Indian J Tuberc* 2001;48:201-4.
9. Bezabih M, Mariam DW, Selassie SG. Fine needleaspiration cytology of suspected tuberculouslymphadenitis. *Cytopathology* 2002;13:284-90.
10. Sharma S, Sarin R, Khalid UK, Singla N, Sharma PP, Behera D. Clinical profile and treatment outcome of tuberculous lymphadenitis in children using DOT S strategy. *Indian J Tuberc*2010;57:4-11.
11. Aggarwal P, Wali JP, Singh S, Handa R, Wig N, BiswasA. A clinico-bacteriological study of peripheral tuberculous lymphadenitis. *J Assoc Phys India* 2001;49:808-12.
12. Tilak V, Dhadel AV, Jain R. Fine needle aspiration cytology of head and neck masses. *Ind J Pathol Microbiol* 2002;45:23-30.
13. Gupta AK, Nayar M, Chandra M. Critical appraisal offline needle aspiration cytology in tuberculouslymphadenitis. *Acta Cytol* 1992;36:391-4.
14. Dasgupta A, Ghosh RN, Poddar AK, Mukherjee C, Mitra PK, Gupta G, *et al.* Fine needleaspiration cytology of cervical lymphadenopathy withspecial reference to tuberculosis. *J Indian Med Assoc* 1994;92:44-6.
15. Kumar N, Jain S, Murthy NS. Utility of fine need leaspiration in acute suppurative lesions. Follow-up of 263cases. *Acta Cytol* 2004;48:337-40.
16. Tripathy SN, Mishra N, Patel MM, Samantray DK, Das BK, Mania RN. Place of aspiration biopsy in the diagnosis of lymphadenopathy. *Indian J Tuberc* 1985;32:130-4.
17. Narang RK, Pradhan S, Singh RP, Chaturvedi S. Place offline needle aspiration cytology in the diagnosis of lymphadenopathy. *Indian J Tuberc* 1990;37:29.

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