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.¹ It provides an alternative to excision biopsy for lymph nodes and is an easy procedure for collection of material for cytomorphological and bacteriological examination.¹ 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
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. 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 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 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 65% of cases. 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. 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,[2] Purohit et al.,[3] and Dandapat et al.[6]
A slight male predominance with 1:3 sex ratio was seen in our study. Female predominance was noted by Pamra et al.,[7] Ergete and Bekele,[2] and Purohit et al.,[5] while male predominance was noted by Rajsekaran et al.[8] and Ahmad et al.[4]

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.[9] who observed cervical involvement in 74.2% of cases. A study conducted by Sharma et al.[10] 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.[4] 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.[11] We noted a much higher incidence (55%) of tuberculous lymphadenopathy while Ahmad et al.[4] found 38% and Tilak et al.[12] 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.[13] 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.[9] 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.[13] Maximum AFB positivity (61.6%) was found in smears containing purulent material on aspiration. Similarly, Ahmad et al.[4] 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,[2] 59.4% cases by Bezabih et al.[9] 45.6% cases by Dasgupta et al.[14] and 19.6% of cases by Aggarwal et al.[11] 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

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

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

AFB: Acid-fast bacilli

![Table 3](image-url)

Figure 1: (a) Epithelioid cell granuloma with necrosis (H and E 10×), (b) Epithelioid cell granuloma without necrosis (H and E 40×), (c) only necrosis, no granulomas (H and E 40×), (d) AFB-positive bacilli (Z-N stain 40×), (e) polymorphs with necrosis (H and E 10×)
of AFB positivity can further be increased by doing repeat FNAC of lymph node. 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., 84.4% by Dasgupta et al., 83.3% by Dandapat et al., and 87% by Narang. 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**


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