



CYTOMORPHOLOGY PATTERN ON FNAC AND AFB POSITIVITY IN CASES OF TUBERCULAR LYMPHADENITIS IN A TERTIARY CARE CENTRE OF CENTRAL INDIA

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ABSTRACT **Background-** One of the most typical diagnoses at OPDs in a developing nation like India is tuberculous lymphadenitis. Anti-tubercular therapy, however, cannot be started based solely on clinical suspicion. Along with culture, cytology with acid fast staining is an effective tool for diagnosing these cases. The purpose of the study was to examine the usefulness, limits, and relationships between Ziehl-Neelsen staining in tuberculous lymphadenitis and various cytological presentations using fine needle aspiration cytology. **Materials and Methods-** At a tertiary care facility, the study was carried out over the course of a year with a total of 146 cases. Patients who had lymphadenopathy that was clinically suspected were chosen. **Result-** There were 36.3% cases of tuberculous lymphadenitis out of which 66.04% cases were overall AFB positive. The most frequent cytological finding was epithelioid cell granulomas with lymphocytes, and cases with granulomas and necrosis had the highest levels of AFB positivity. Most patients first showed up in their third or fourth decade of life. Solitary lymphadenopathy, as opposed to matted lymph nodes as reported by others, was the most frequent presentation and the cervical area was the most frequently involved site. **Conclusion-** Fine needle aspiration cytology is a highly sensitive method for diagnosing tuberculous lymphadenitis that is inexpensive, safe, and dependable. By adding acid fast staining and culture procedures to cytology, the diagnostic index can be raised even higher. However, FNAC combined with methods like ELISA and PCR would improve the current landscape of diagnostic and therapeutic options.

KEYWORDS : Tubercular Lymphadenitis, Cervical Lymphadenopathy, Granuloma, AFB

INTRODUCTION-

With the global upsurge of mycobacterial infection, tuberculosis (TB) has become a major cause of morbidity and mortality [1]. In India, the incidence of tuberculosis is high (77 cases per 1 lakh population) and also tuberculosis is the leading cause of lymphadenopathy [2]. Granulomatous lymphadenitis is a manifestation of several conditions including mycotic, viral and bacterial infections like tuberculosis, leprosy, syphilis, Sarcoidosis, toxoplasmosis and secondary response in lymph nodes draining carcinomas or lymphomas [3]. One of the significant health risk in developing nations is tuberculosis. The mortality rate in India from tuberculosis is 1000 per day, or one every minute which was about 37 cases per 1 lakh population in 2020 [4,5,6]. Globally, extrapulmonary TB is on the rise. It is a complex illness that almost always affects all organs [7]. The immunosuppression caused by HIV is thought to be the primary driver of the global increase. The most frequent type of extrapulmonary mycobacterial illness involves peripheral lymph nodes, and cervical area is most usually affected [5,8,9]. For the diagnosis of tuberculosis, fine needle aspiration cytology (FNAC) offers a low-cost, rapid, and secure alternative to histopathology. It offers a good assessment of cytological traits and is patient-friendly. The diagnosis of tuberculosis is made based on the presence of epithelioid granulomas. Even if epithelioid cell granulomas are not visible, the aetiology is finally established by the direct or indirect demonstration of AFB in FNAC smears [4, 10]. The goal of the current study was to assess the utility of the diagnostic value of FNAC in tuberculous lymphadenitis, Ziehl-Neelsen staining in FNAC smears, the prevalence of tuberculosis in clinically suspected patients with lymphadenitis and the cytological characteristics of tuberculous lymphadenitis aspirates in relation to the presence of acid fast bacilli.

MATERIALS AND METHODS-

This paper is an analysis of a prospective research conducted over a year in the pathology and microbiology department of a tertiary care facility. Regardless of age, sex, or the location of the lymphadenopathy, patients were chosen based on a clinical suspicion of tuberculous lymphadenitis. A thorough clinical examination was conducted after taking the patient's comprehensive medical history.

The patient was informed of the FNAC technique and given the opportunity to consent. The patient's history was meticulously gathered, including information about the duration of lymphadenopathy, any increase in node size, accompanying low grade fever, anorexia, and malaise, and was officially recorded on the

Performa. The aspirates were noted after an effort at FNA. After allowing the smears to air dry, H and E, Pap, and ZN staining were carried out as necessary. H&E and Pap stained slides were used to study the cytological characteristics. Under oil immersion, the ZN smears were carefully examined for the presence of acid-fast bacilli. If the aspirated material was insufficient or unrepresentative, FNAC was repeated with the patient's permission. The demonstration of AFB was indicative of a tubercular aetiology.

RESULTS-

The study included all lymphadenopathy patients who had a clinical suspicion of tuberculosis. There were 146 cases evaluated in all, of which 53 were determined to have tubercular lymphadenitis, 71 to have reactive lesions with abscess content, 6 to have metastatic deposits, 12 to have cystic lesions, and 4 to have inconclusive results. (Table 1)

Table 1 Frequency of Lymph node lesions in present study-

Lymph Node lesions	No.	Percentage
Tuberculous Lymphadenitis	53	36.3%
Reactive Lymphadenitis and abscess	71	48.6%
Metastatic deposits	6	4.1%
Benign cystic lesions	12	8.2%
Inconclusive aspirates	4	2.7%

22 men and 31 females, or a M: F ratio of 1:1.4, were among the cases of tuberculous lymphadenitis, and a small prevalence was observed in the third and fourth decades of life. In 67% of patients, there were associated clinical symptoms like low-grade fever, cough, anorexia, lethargy, and weight loss. 76% of the patients experienced lymphadenopathy lasting longer than a week. 62% of patients had cervical lymphadenopathy, followed by supraclavicular lymphadenopathy in 17%, axillary nodes in 16%, and inguinal lymphadenopathy in 3%. (Table 2).

Table 2 Site of Lymph Nodes-

Sites of Lymph node	Percentage
Cervical	62%
Supraclavicular	17%
Axillary	16%

Inguinal	3%
Generalized Lymphadenopathy	2%

Sizes of the lymph nodes ranged from less than 1 cm to more than 2 cm. 70% of cases had lymph nodes with a firm consistency, whereas 22.4% had soft nodes. Blood was present in the aspirate in 46% of cases, cheesy or whitish granular in 34%, and purulent in 20% of cases.

Following cytomorphological characteristics were noted in the current investigation, and cases with tuberculous lymphadenitis were categorised as follows:

- Group I: Epithelioid cell granulomas without necrosis
- Group II: Epithelioid cell granulomas with necrosis.
- Group III: Only necrosis
- Group IV: Necrosis with poly morphonuclear leukocytosis.

Table 3- Correlation of Cytomorphological features with ZN staining-

Group	No. of cases	AFB positive
Group I	11 (20.75%)	4 (36.36%)
Group II	26 (49.05%)	20 (76.9%)
Group III	6 (11.3%)	4 (66.6%)
Group IV	10 (18.86%)	7 (70%)

Cytomorphologically, Group II had the highest incidence (49.05%) while Group I had the second-highest incidence (20.7%). Table 3 shows that there were 18.86% instances in group IV and 11.3% cases in group III. The maximum ZN positivity was found in Group II (76.9%) and overall ZN positivity ranged from 36.36% to 76.9%. Group III (66.6%) and Group IV (70%) came in close second place. ZN positivity was lowest in Group I (36.36%). Figure 1 (A,B) shows epithelioid cell clusters in MGG stain along with Acid fast bacilli positivity in ZN staining.

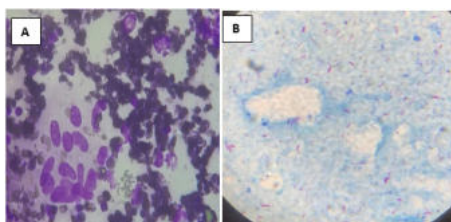


Figure 1 (A): Clusters of epithelioid cells in MGG stain. (B): AFB positivity in ZN staining

DISCUSSION-

Clinical findings of enlarged symptomatic lymphadenopathy are rather frequent, most usually affecting the head, neck, axilla, and inguinal areas. The aetiology can be anything from a straightforward reactive hyperplasia to cancers and TB. Despite recent advancements in diagnostic laboratory techniques, the diagnosis of mycobacterial cervical lymphadenitis remains a diagnostic challenge for many clinicians. A quick, easy, and patient-friendly diagnostic procedure is fine needle aspiration. 53 (68.8%) of the 146 cases that were aspirated from lymph nodes were found to have tubercular lymphadenitis. The majority of the patients (66%) were female and were in their second or third decade (M: F 1:1.4), while most of the patients in present study were in their third to fourth decade. These results were consistent with research by Rajshakeran et al. and Natraj et al. [11, 12].

Considering the location, the majority of patients had affected superficial cervical lymph nodes. Kusum Verma et al. [4], Rajshakeran et al. [11], Das et al. [13], Gupta et al. [14], and Tripathy et al. [15] reported similar findings. 70% of the instances had a firm consistency, while the remaining 22.4% had a soft consistency. A blood-mixed aspirate was recovered in approximately half (46%) of the cases, followed by cheesy material in 34% of the cases, and purulent material in 20% of the instances. The patients' clinical stage and immunological condition were associated to the aforementioned finding. Cytomorphologically, Group II had the highest incidence (49.05%) while Group I had the second-highest incidence (20.7%). Group III included 11.3% of the cases, and group IV had 18.86%. The maximum ZN positivity was found in Group II (76.9%) and overall ZN positivity ranged from 36.36% to 76.9%. Group III (66.6%) and Group IV (70%) came in close second place. ZN positive was lowest in Group I (36.36%). The low total ZN positivity (66.04%) can be attributed to the

clinical stage and immunological condition of the patient, as well as the fact that a minimum of 5 to 10000 bacilli/ml of the aspirate are needed to produce a positive ZN stain result. [17,18]. Because the liquefaction of a necrotic focus is linked to an increased proliferation of AFB, the pattern of AFB positivity in question exhibits an inverse relationship with the presence of epithelioid cell granulomas and a direct relationship with necrotic material. This ZN positivity pattern was identified in the research of Das et al. [13] and Gupta et al. [14].

However, despite its value in the diagnosis of tuberculous lymphadenitis, fine needle aspiration cytology (FNAC) has a number of drawbacks, and both its sensitivity and specificity are not very good. Alternate methods for a quick and accurate diagnosis have been made possible by advances in molecular and immunological techniques. These include DOT ELISA and Polymerase Chain Reaction (PCR).

Whereas PCR is regarded as the gold standard, FNAC accurately predicted the diagnosis in 62% of cases while having a high false negative rate (38%) because early tuberculosis cases' smears lacked granuloma/necrosis. In the latter group, PCR turned out to be the most useful test, and when FNAC and PCR were used together, a 100% diagnostic success rate was attained. In addition, in the vast majority (96.2%) of cases in the study population, PCR enabled for the quick characterization of *M. tuberculosis* [16].

ELISA is not only easy to use and affordable, but it also makes a precise and quick diagnosis of pulmonary and extrapulmonary tuberculosis. It has been determined that ELISA has a 95.4% sensitivity rate and an 88.5% specificity rate. Even in cases where a culture and smear are negative, PCR can show mycobacterial DNA in lymph nodes. Therefore, ELISA is a quick, simple, and affordable screening test that can be used in cases of tuberculous lymphadenitis that do not test positive for AFB.

CONCLUSION-

A dependable, efficient, and affordable investigative technique for tubercular lymphadenopathy is FNAC. It delivers a high degree of accuracy in detecting tuberculosis despite several drawbacks and hazards. Rapid diagnosis is beneficial in lowering tuberculosis morbidity and death. The gold standard for diagnosing tuberculosis is the presence of AFB in the FNAC smear. ZN staining makes this approach simple to accomplish. Since epithelioid cell granulomas were sufficient to make the diagnosis and can be used as the first line diagnostic tool in diagnosing tuberculous lymphadenitis when combined with ZN staining and culture examination, the low ZN and culture positivity should not be seen as a disadvantage of FNAC in diagnosing tuberculous aetiology. However, combining ELISA, PCR, and molecular techniques can improve the FNAC's diagnostic accuracy.

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