Original Article

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Cytomorphological Patterns of Tuberculous Lymphadenitis in Correlation with AFB Positivity

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Abstract

Objective: Despite progress in prophylaxis and treatment modalities, tuberculous (TB) lymphadenitis still remains a major health problem in developing countries. In India, extrapulmonary TB accounting 20% of all TB cases and its prevalence in the country varies between 8.3% and 13.1%. The aim of this study was to describe various cytological pictures of tuberculous lymphadenitis with their relative frequency and to assess correlation between Fine needle aspiration cytology (FNAC) and Ziehl-Neelsen (Z-N) staining in diagnosing tuberculous lymphadenitis. *Materials and Methods:* A total of 132 cases with cytological proven tuberculous lymphadenitis were taken up for the study. Details such as age, sex, group of lymph nodes involved, type of aspirate, cytomorphological patterns and Acid fast bacilli (AFB) positivity on ZN staining were analysed. *Results:* The sites of distribution of lymphadenopathy were as follows: Cervical lymph nodes – 109, Axillary – 21, Inguinal lymph nodes – 02. Cytological patterns in all 132 cases were as follows: Pattern A – 22, Pattern B – 73, Pattern C – 37 cases. On grading of AFB positivity, Grade 1+ observed in 22.7%, Grade 2+ observed in 31.6% 2, and Grade 3+ observed in 45.5% cases. *Conclusion:* FNAC is a simple, cost effective and minimally invasive technique to diagnose tuberculous lymphadenitis. Since granuloma formation is not often seen in purulent aspirate, ZN staining must be done to rule out tuberculous lymphadenitis.

Keywords: Cytomorphological Patterns; Tuberculous Lymphadenitis; Ziehl Neelsen Stain.

Introduction

Despite various changes and trends in prophylaxis and treatment modalities, tuberculous (TB) is still considered as one of the major life threatening health problems in developing and poorly developed countries[1]. There were an estimated 1.9 million new cases of TB occurring every year. India has the highest incidence of TB infection accounting for one-fifth of the world wide population and approximately 40% of the Indian population showed increased TB burden[2]. The incidence of Extrapulmonary tuberculosis in India account for 20 % of all TB cases and its prevalence in the country varies between 8.3% and 13.1% in different districts. according to the study by the Central TB Division, Ministry of Health and Family Welfare in 2009 [2,3]. Among the all extra pulmonary tuberculosis, tubercular lymphadenitis (TBL) is found to be the most common form [3]. TB lymphadenitis is found occurring more commonly in females and in younger age groups. Whereas the classical pulmonary TB occur more commonly in males and in the older age group and show a peak age of onset between 20-40 years [4,5]. Many pathological investigations such as fine needle aspiration cytology (FNAC), histopathological examination of excised lymph node, sputum culture and newer molecular methods such as polymerase chain reaction have been implicated for confirmation of tubercular lymphadenitis. However, FNAC is a simple, cost effective, routinely done procedure, used in diagnosing tubercular lymphadenitis because of its high sensitivity and specificity when compared to other cost effective

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diagnostic methods [6,7]. The aim of this study was to describe various cytological pictures of tuberculous lymphadenitis with their relative frequency and to assess correlation between FNAC and Ziehl-Neelsen (Z-N) staining in diagnosing tuberculous lymphadenitis.

Materials and Methods

Study Design

The present retrospective study was carried out in the department of Pathology, a tertiary care hospital, over the period of 2 years from March 2014 to March 2016, after obtaining approval from the Institutional Ethical Committee.

Study Population

A total of 132 cases, cytologically diagnosed as tuberculous lymphadenitis were taken up for the study. Informed consent was obtained from the patient before doing fine needle aspiration procedure.

Collection of Data

Clinical details such as age, gender, group of lymph nodes involved, types of aspirate obtained on FNAC were retrieved from the files. Exclusion criteria included Patients with the presence of Pulmonary Koch's, atypical mycobacterial infection, Bacillus Calmette-Guerin vaccination induced lymphadenitis and positive periodic acid-schiff organisms in FNAC smears.

Cytomorphological Findings

Papanicolaou's stain, hematoxylin and eosin stain and May Grunwald Giemsa stained smears were used for categorization of cytomorphological patterns of tuberculous lymphadenitis. Categorization was done in accordance with Das et al [8], which included: Pattern A: Epithelioid granuloma without necrosis (Figure 1a), pattern B: Epithelioid granuloma with necrosis (Figure 1b), and pattern C: Necrosis without epithelioid granuloma (Figure 1c).

AFB Interpretation

ZN stained smears were used for screening of AFB and grading was done based on the bacillary load. ZN stained AFB positive smears were categorized into three groups as follows: Cases with a large number of bacilli arranged in bundles detected under × 1000 magnification were graded as 3+, cases with singly scattered AFB were graded as 2+ (Figure 1d), those with occasional bacilli were graded 1+ [8].

Results

Age

Patient's age ranged from 6 months to 78 years in 132 cases of tubercular lymphadenitis. The distribution of cases in various age groups in relation to sex distribution is represented in Table 1. Maximum numbers of cases were seen in the age group of 31-40 years followed by 11-20 years and 21-30 years.

Site

The sites of distribution of lymphadenopathy were as follows: Cervical lymph nodes – 109, Axillary nodes – 21, Inguinal lymph nodes – 02.

Nature of Aspirate

Aspirate was blood tinged in 90 cases while it was grey white purulent to cheesy in 42 cases. Blood tinged aspirate was predominantly seen in Pattern A and B. Purulent aspirate was seen predominantly in Pattern C.

Table 1: Age and sex distribution of cases of Tuberculous lymphadenitis

S. No	Age	Male	Female
1.	0 – 10 years	4	4
2.	11 - 20	20	18
3.	21 - 30	5	8
4.	31 – 40	22	27
5.	41 – 50	2	5
6.	51 – 60	3	6
7.	61 – 70	2	3
8.	71 - 80	2	1
		60	72

Table 2: Various studies showing cytomorphological features of Tuberculous lymphadenitis in relation to AFB positivity

Studies	Epithelioid granuloma without necrosis (%)	Epithelioid granuloma with necrosis (%)	Necrosis/suppurations without Granuloma (%)	AFB Positivity (%)
Nidhi et al (2011)	14.3	16.4	39.2	71
Chand et al (2013)	28.4	21.8	15.4	44.5
Hemalatha et al (2014)	19.3	56	22.7	54
Masilamani et al (2015)	18.9	48.1	33	55.7
Present study (2016)	16.6	55.3	28	59

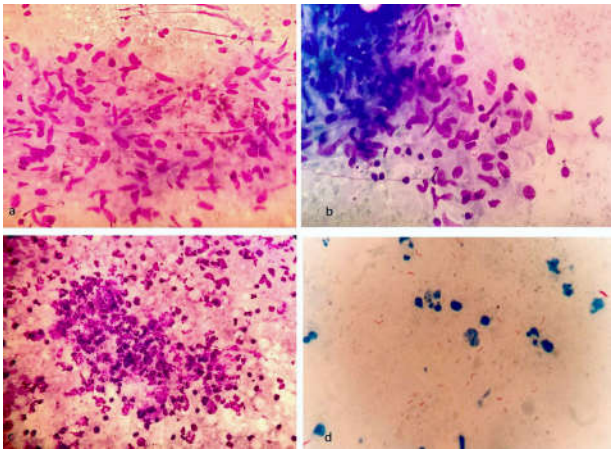

Fig. 1: Cytomorphological patterns of Tuberculous lymphadenitis and AFB Positivity. **a)** Pattern A : Epithelioid granuloma without caseous necrosis (May-Grunwald Giemsa, X400). **b)** Pattern B: Epithelioid granuloma with caseous necrosis (May-Grunwald Giemsa, X400). **c)** Necrotic without epithelioid granuloma (May-Grunwald Giemsa, X400). **d)** Grade 2 + acid fast bacilli positivity (Ziehl Neelsen, X1000)

Cytomorphological Pattern and AFB Positivity

Cytological patterns in all 132 cases were as follows: Pattern A – 22, Pattern B – 73, Pattern C – 37. AFB positivity was seen in 79/132 (59%) cases. On grading of AFB positivity, Grade 1+ observed in 22.7%, Grade 2+ observed in 31.6% 2, and Grade 3+ observed in 45.5% cases.

Of the 2 HIV-positive cases, pattern C were seen with Grade 3+ AFB positivity.

Discussion

FNAC is a rapid, safe and important diagnostic tool which can aid in the diagnosis of lymph node lesions. In developing countries like India, this inexpensive technique can reduce the need for surgical biopsy [9,10]. The bacillary load and cytological pattern was found proportional to the immune status of an individual [9]. In the present study, the maximum of 49 cases were seen in the age group of 31-40 years followed by age group of 11-20 years and 21-30 years. Studies conducted by Nidhi et al, Ergete and Bekele et al, Purohit et al, Ahmad et al and Hemalata et al also showed that majority of patients were in the second to fourth decades of life [11-15]. It may be due to the progression of cellular mediated immunity against mycobacterium tubercle bacilli in the elderly. Similar to the studies of Nidhi et al and Rana et al, slight female predominance with 1:1.2 sex ratio was seen in our study [11,16]. This might be due to malnutrition and poor standard of living in this area. In this study, the most common presentation was palpable cervical lymphadenopathy which was noted in 82.5% cases which can be comparable to the studies of Chand et al. (81.6%) and Bezabih et al. (74.23%) [17,18].

In view of the appearance of aspirates, blood mixed aspirates were noted in 68.1% and remaining cases were showing purulent to cheesy material. This was in concordance with study of Hemalatha et al, in which the blood mixed aspirates and purulent cheesy materials were found to be 87.3% and 12.7% respectively [15]. Similar to the study of Hemalatha et al, Pattern A and B were ost commonly observed in blood mixed aspirate and pattern C was commonly observed in purulent to caseous or cheesy aspirates [15].

In our study, Pattern B was most commonly observed, which constituted 55.3% cases followed by Pattern C (28%) and pattern A (16.6%). Similar observations were made in the studies conducted by Hemalatha et al and Masilamani et al [15,19]. The present study showed overall AFB positivity in 59% cases which was found to be lower than the study of Nidhi et al [11]. Various studies in comparison to the present study is depicted in Table 2. Study conducted by Prasoon showed that there were stronger association between purulent aspirate and bacillary load [20]. In our study also, we observed AFB positivity in 68% of cases where purulent material was aspirated. Tuberculous lymphadenitis mimicking acute suppurative lesions can be confirmed by either

repeat aspiration or by looking into bacillary load in ZN staining [15]. AFB smear negative cases revealing only epithelioid cell granulomas without necrosis should be correlated with microbiological assessment and other laborartory investigations. Varying Grades of AFB positivity was directly related to the immune status of the tuberculous patient. In immuno-compromised patients, where macrophage activation fails, tissue destruction occurs with necrosis and increased bacillary load [21,22].

Conclusion

FNAC is a simple, cost effective and minimally invasive technique to diagnose tuberculous lymphadenitis. Since granuloma formation is not often seen in purulent aspirate, ZN staining must be done to rule out tuberculous lymphadenitis. Thus, study of both cytomorphological patterns and ZN staining can improve the diagnostic yield.

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Competing Interests

Competing interests: None declared.

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