

Original Research Article**Cytomorphological Spectrum of Childhood Tuberculous Lymphadenitis****M.G. Panchal^a, A.A. Bhure^b, S.A. Deshpande^c, S.V. Suvernakar^d**

^aAssitant Professor ^cProfessor and Head of Department ^dAssociate Professor, Department of Pathology, Dr. Shankarrao Chavan Government Medical College, Nanded, Maharashtra 431606, India. ^bAssistant Professor, Department of Pathology, Swami Ramanand Teerth Rural Government Medical College, Ambajogai, Maharashtra 431517, India.

Abstract

Introduction: Tuberculosis (TB) in children is a neglected aspect of the TB epidemic despite it constituting 20% or more of all TB cases in many countries with high TB incidence. Childhood TB is a direct consequence of adult TB but remains overshadowed by adult TB because it is usually smear-negative. Infants and young children are more likely to develop life-threatening forms of TB than older children and adults due to their immature immune systems. Therefore, prompt diagnoses are extremely important although difficult since clinical and radiological signs of TB can be non-specific and variable in children. In developing countries like India, tuberculous lymphadenitis is one of the most common causes of lymphadenopathy. However, anti-tubercular treatment cannot be given only on clinical suspicion. Cytomorphology with acid fast staining proves to be a valuable tool in diagnosing these cases.

Aims: To study the utility of fine needle aspiration cytology (FNAC) and various cytomorphological presentations in reference to Ziehl-Neelsen staining in tuberculous lymphadenitis in paediatric age group.

Methodology: Total 120 patients attending OPD at Dr. Shankarrao Chavan Government medical college, Nanded were studied for the period of two years.

Result: Out of 120 aspirations from tuberculous lymph nodes, we found that only Necrosis without epithelioid cell granulomas was the most common cytological picture seen in 66 cases followed by necrotising granuloma in 25 cases. ZN-stained smears were positive in 76 cases while culture was positive in only 54 cases. The highest smear and culture positivity was noted in cases with only necrosis. Overall AFB positivity was 66.3%.

Conclusion: Fine needle aspiration cytology 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 Ziehl-Neelsen (ZN) staining for acid-fast Bacilli (AFB) and microbiological culture.

Keywords: Fine Needle Aspiration Cytology (FNAC); Tuberculous Lymphadenitis; Ziehl-Neelsen (ZN) Staining.

Corresponding Author:

A.A. Bhure,
Assistant Professor,
Department of Pathology,
Swami Ramanand Teerth Rural
Government Medical College,
Ambajogai, Maharashtra 431517,
India.
E-mail:
apurva.bhure29@gmail.com

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Introduction

Lymphadenopathy is a common clinical problem in paediatric age group. It may be a sign of inflammation,

tuberculosis, malignant lymphoma or metastasis. Tuberculosis (TB) is a major cause of morbidity and mortality in India. Tuberculous lymphadenopathy is a prominent cause of peripheral adenopathy amongst

children in the developing world; amongst Indian children it is, not only the commonest cause of such adenopathy [1], but is also the commonest form of extrapulmonary tuberculosis [2].

Demonstration of acid fast bacilli (AFB) in smears and culture of sputum are widely employed for diagnosis of pulmonary tuberculosis, while biopsy with histopathologic examination and demonstration of AFB is the gold standard for diagnosis of extrapulmonary lesion. With the advent of fine needle aspiration cytology (FNAC) the scenario has changed. FNAC is a simple, cost effective, non invasive technique readily performed in the out patient (O.P) setting and has proved to be useful in the diagnosis of TB from practically any site in the body [3].

It provides an alternative to excision biopsy for lymph nodes and is an easy procedure for collection of material for cytomorphological and bacteriological examination [4]. Tuberculous lymphadenitis is a very common cause of superficial lymphadenopathy in countries like India. 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.

Material and Method

The present study included 120 cases of clinically suspected tuberculous lymphadenitis attending our hospital from January 2015 to December 2016, who were aspirated for cytological evaluation. In all these cases, FNAC was performed under aseptic conditions using 22G needle with or without suction, as per requirement. A minimum of two smears were prepared in each case - one for pap stain and other for ZN stain. The residual material was submitted for mycobacterial culture.

A record was made of all relevant findings, including site and size of the swelling, multiplicity of lesions, and character of the aspirate. The character was described as caseous for cheesy or yellow-white aspirate, pus for greenish yellow or yellow aspirate, and blood mixed for hemorrhagic material. The pap- and ZN-stained smears were examined for presence of epithelioid cell granulomas with or without necrosis and presence of AFB, respectively.

The cytology smears revealing features of tuberculous lymphadenitis were grouped into four categories: epithelioid granulomas with caseous necrosis, epithelioid granulomas without necrosis, necrosis only without epithelioid granulomas and polymorphs with necrosis with or without epithelioid granulomas [5]. In addition, demographic profile of tuberculous patients with their present and past treatment history and clinical characteristics of lymph nodes were also studied.

Observations

Out of 120 superficial lymph nodes aspirated which were clinically suspected as tuberculous lymphadenitis, 76 cases showed AFB while 44 cases were AFB negative with cytological picture of tuberculous lymphadenitis. Among tuberculous cases in children, the most common age group affected was 7-9 yrs and the male to female ratio was found to be 1.1:1. (Tables 1 and 2).

48 patients had history of tuberculosis in the past and 42 patients were already on ATT at the time of aspiration. Majority of aspirates were from cervical lymph nodes and in the cervical region, posterior triangle was the most common site; involved in 90% cases.

In our study, most common presentation was single palpable lymph node in 63.3% of cases followed by multiple unilateral lymphadenopathy in 19.2% of cases and multiple bilateral lymphadenopathy in 7.2% of cases. Grossly pus like material was aspirated in 61.6%, caseous or cheesy material in 23.3% and blood mixed material in 15.1%. Out of 120 cases showing cytological picture of tuberculous lymphadenitis, smears revealed epithelioid granulomas with caseous necrosis in 20.8% of cases, epithelioid granulomas without necrosis in 13.4% of cases, necrosis only without epithelioid granulomas in 55% of cases and polymorphs with necrosis with or without epithelioid granulomas in 10.8% of cases.

AFB positivity was found in 53% of the cases showing epithelioid granulomas with caseous necrosis, 4.5% of cases with epithelioid granulomas without necrosis, 81.4% of cases with necrosis only without epithelioid granulomas and 76% of cases with polymorphs with necrosis with or without epithelioid granulomas (Table 3). Overall AFB positivity was seen in 63.33% cases.

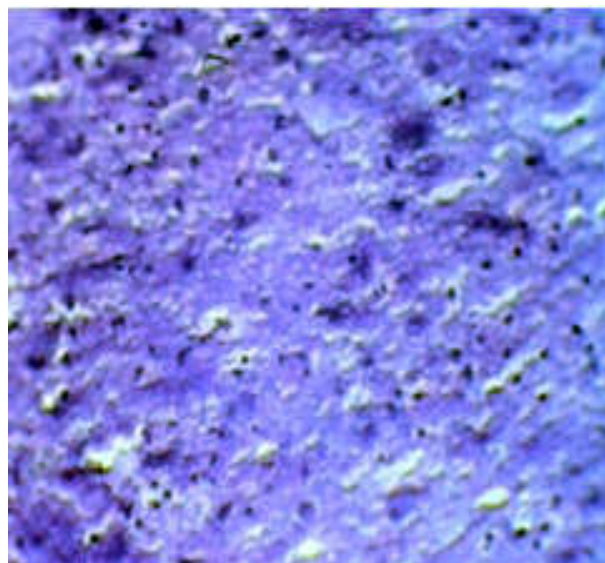


Fig. 1: Aspirate from a case showing only caseous necrosis (40X)

Table 1: Incidence of tuberculous lymphadenopathy in relation to age and sex

Age group (Yrs.)	Male	Female	Total	Percentage %
0-3	8	6	14	11.7
4-6	9	11	20	16.7
7-9	16	12	28	23.3
10-12	13	10	23	19.1
13-15	7	9	16	13.4
16-18	10	9	19	15.8
Total	63	57	120	100

Table 2: Various cytomorphological pictures in cervical tuberculous lymphadenopathy

Cytomorphological picture	No. of cases	%	AFB positive cases	AFB negative cases
Epithelioid granuloma with caseous necrosis	25	20.9	13 cases(52%)	12 cases (48%)
Epithelioid granuloma without necrosis	16	13.4	1 case (6.2%)	15 cases(93.8%)
Necrosis only without epithelioid granulomas	66	55	53 cases(80.3%)	13 cases (19.7%)
Polymorphs with necrosis	13	10.8	9 cases (69.2%)	4 cases (30.8%)
Total	120	100	76	44

Table 3: Comparison of Ziehl-Neelsen and culture positivity in cases of cervical tuberculous lymphadenitis

Cytomorphologic category	Number	Culture	
		Positive	Negative
Epithelioid granuloma with caseous necrosis			
ZN-positive	13	7	6
ZN-negative	12	3	9
Epithelioid granuloma without necrosis			
ZN-positive	1	0	1
ZN-negative	15	0	15
Necrosis only without epithelioid granulomas			
ZN-positive	53	39	14
ZN-negative	13	2	11
Polymorphs with necrosis			
ZN-positive	9	3	6
ZN-negative	4	0	4
Total	120	54	66

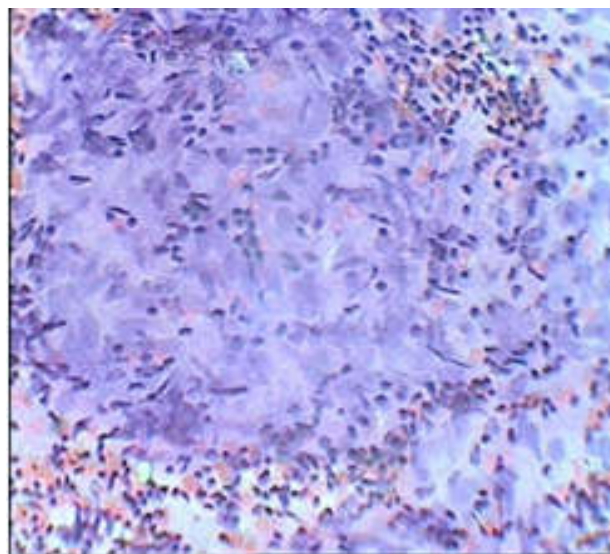


Fig. 2: Aspirate from a case showing epithelioid cell granuloma (40X)



Fig. 3: Ziehl-Neelsen stain shows acid-fast Bacillus (arrow) within granulomas (100X)

Mycobacterium TB could be isolated by culture in a total of 54 cases (45%). The comparison of ZN stain and culture positivity in various cytological categories is given in [Table 3]. The highest culture positivity was noted in the cases with mainly necrosis (41 out of 54 positive cases) while cases with only granulomas without necrosis did not yield positive cultures. As can be seen from [Table 3], five cases (4.2%) were positive by culture but negative on ZN stain.

Discussion

TB, a contagious disease caused by *Mycobacterium* TB, affects respiratory tract as well as extrapulmonary sites. Tuberculous lymphadenitis is the most common form of extrapulmonary TB in regions with high prevalence of mycobacterial infection [6].

Tissue diagnosis is the mainstay of diagnosis of tuberculous lymphadenitis. For this purpose, FNAC is established as a cheap, simple, rapid, and minimally invasive method to avoid excision biopsy in a large number of cases [7].

The cytological diagnosis of tuberculous lymphadenitis is usually based upon demonstration of epithelioid cell granulomas with necrosis and/or AFB. Smears with only granulomas without necrosis and AFB need to be clinically correlated with microbiological assessment [7].

Though culture isolation of the organism is considered the gold standard in most infections, culturing *Mycobacterium* TB is often not feasible in clinical set up due to the long time taken for culture (6-8 weeks in conventional Lowenstein-Jensen medium, 3-4 weeks in Middlebrook medium) [8].

In the present study, the most common cytological pattern was the presence of necrosis only in 55% of cases followed by necrotizing granulomas in 20.9% of cases. This is similar to earlier reports by Mahana S. et al [9] and Nidhi et al [7]. Other studies have reported granulomas with necrosis as the most commonly observed cytological pattern [10]. The highest AFB positivity was seen in smears with necrosis only (80.3%), similar to results of Mahana S et al., Nidhi et al., Bezabih et al. and Dua et al [7,9,11,12].

The overall AFB positivity in the present study was 63.33%, which is similar to the rate reported by Mahana S et al. (71.4%), Nidhi et al. (71%) but higher than other authors such as Mistry et al. (22.9%), Dua et al. (27.1%), and Aggarwal et al. (19.6%) [6,7,9,12,13]. The frequency of AFB positivity in FNA smears in various studies has ranged from 10% to 70% [13,14].

High AFB positivity in our study may be a result of extensive screening done on ZN-stained smear, especially in cases with high cytological suspicion of TB.

Mycobacterium could be isolated only in 54 cases (45%) was lower than the smear ZN positivity. This is similar to the rate reported by Mahana S et al [9].

Of note, however, there are the five cases where smear for AFB was negative and culture was positive. Of these five cases, three showed epithelioid cell granulomas with necrosis and TB was the most likely diagnosis, considering the endemicity in our region. In the remaining two cases, smears showed only necrosis, on which confirmed diagnosis of TB was not possible on cytology alone and culture clinched the diagnosis.

Conclusion

The use of fine-needle aspiration, combined with microbiological examination of the aspirates, could improve the diagnosis of tuberculous lymphadenopathy and provide valuable information for appropriate treatment. Culture should be resorted to in all suspected cases to enhance mycobacterial detection, especially in smear-negative aspirates. Our study highlighted the various cytomorphological patterns of lymphadenopathy and revealed a huge burden of tuberculous lymphadenitis in this region.

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