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RESEARCH ARTICLE

ROLE OF FNAC IN TB LYMPHADENITIS

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ABSTRACT

Background: Tuberculosis (TB), which is one of the oldest diseases known to affect humans and is a major cause of death worldwide. Primarily considered to be a pulmonary disease, TB can affect almost any organ. The term "extrapulmonary TB" has been used to describe the isolated occurrence of TB at body sites other than the lung. Lymphadenitis is the most common extrapulmonary manifestation of tuberculosis. . Over the last two to three decades, fine needle aspiration cytology (FNAC) has emerged as a simple out-patient diagnostic procedure for the evaluation of tuberculous lymphadenitis.

Aims and objectives: To study cytomorphologic appearances of tuberculosis in FNAC in suspected Tuberculous lymphadenitis, to detect the presence of acid fast organism on these aspirates using Ziehl-Neelsen stain as well as correlate the cytomorphological findings with Ziehl-Neelsen staining.

Material and Method: A retrospective study was done on 650 patients which presented with lymphadenopathy to Civil hospital, Ahmedabad between January 2016 to September 2016. Fine needle aspiration and routine staining with H&E, PAP and MGG was one. Also special staining with Ziehl Nelson staining was done. The slides were examined microscopically and categorised into various light microscopic patterns. The results of confirmed as well as suspicious tuberculous cases on FNAC were compared with those of AFB staining .

Results: In the present study, 650 cases of lymphadenopathy were studied out which 277 cases were of tuberculosis (42.7%). 21-40 years was the most common age group involved with tuberculous lymphadenitis and females were more commonly afflicted than men (Female: Male ratio – 1.3:1). Out of all the cytomorphological patterns, Caseating Koch's lymphadenitis is the most common. Of all the positive cases on FNAC, 71.4 % cases showed AFB positivity.

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 acid fast staining. In acid fast staining negative cases, yield of acid fast bacilli positivity can be increased by doing Ziehl-Neelsen staining on second smear or decolourized smear revealing necrosis or by repeat

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INTRODUCTION

Tuberculosis (TB), which is one of the oldest diseases known to affect humans and is likely to have existed in prehominids, is a major cause of death worldwide (Mario, 2011). TB is worldwide in distribution, but is particularly more prevalent in Asia and Africa. According to 2015 Global World Health Organization (WHO) report, there were 9.6 million incident cases of TB in 2014 : 5.4 million among men, 3.2 million among women and 1.0 million among children were detected.

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Globally in 2014, there were an estimated 1.2 million new HIVpositive TB cases (12% of all TB cases). Almost three-quarters of these cases were in the African Region. India, Indonesia and China had the largest numbers of cases (23%, 10% and 10% of the global total, respectively) (WHO, 2015). According to a report issued by the government of India, nearly 40% of the Indian population is infected with the TB bacillus (Ministry of Health and Family Welfare, 2015). This disease is caused by bacteria of the *Mycobacterium tuberculosis* complex and usually affects the lungs, although other organs are involved in up to one-third of cases (Mario, 2011). Primarily considered to be a pulmonary disease, TB can affect almost any organ (Beyene *et al*., 2009). The term "extrapulmonary TB" has been used to describe the isolated occurrence of TB at body sites other than the lung. The most

common sites of extrapulmonary tuberculosis consist of lymphatic, genitourinary, bone and joint, and central nervous system involvement, followed by peritoneal and other abdominal organ involvement (Backer *et al*., 2006). Isolated peripheral tuberculous lymphadenitis has afflicted mankind for thousands of years. Lymphadenitis is the most common extrapulmonary manifestation of tuberculosis (handa et al., 2012). Tuberculous lymphadenitis is a local manifestation of the systemic disease, whereas lymphadenitis due to nontuberculous mycobacteria is truly a localized disease. Worldwide, TB is the leading cause of death among people living with HIV.TB is an issue for people living with HIV/AIDS in the because- CDC estimated 6% of all TB cases and 10% of TB cases among people aged 25–44 occurred among people who were HIV-positive (http://www.cdc.gov/hiv/resources). A high index of suspicion is needed for the diagnosis of tuberculous lymphadenitis which is known to mimic a number of pathological conditions. Over the last two to three decades, fine needle aspiration cytology (FNAC) has emerged as a simple out-patient diagnostic procedure for the evaluation of tuberculous lymphadenitis and has replaced lymph node biopsy for histopathology. These facts arouse a pathologist's interest in the study of lymph node lesions which are widely prevalent and ample material is available for the detailed study.

Aims and objectives

To study incidence of tuberculosis amongst various cases of lymphadenopathy as well as study its age, sex and site distribution. The study also reveals cytomorphological patterns of tuberculous lymphadenitis and there correlation with AFB staining.

MATERIAL AND METHODS

A retrospective study was done on 650 patients which presented with lymphadenopathy to Civil hospital, Ahmedabad between January 2016 to September 2016. Detailed clinical history, past history and history of tuberculosis contact and HIV was taken. Fine needle aspiration using 22 gauge needle, fixation with 95 % ethyl alcohol and routine staining with H&E, PAP and MGG was one. Also special staining with Ziehl Nelson staining was done. The slides were examined microscopically and categorised into various light microscopic patterns. The results of confirmed as well as suspicious tuberculous cases on FNAC were compared with those of AFB staining, followed by comparison with other studies.

RESULTS

Out of 650 cases of lymphadenopathy, 277 cases were of tuberculosis (42.7 %). On microscopy of tuberculosis, following diagnosis were made. A diagnosis of caseating tuberculosis was made when large amounts of necrotic debris were observed in addition to epithelioid cells, multinucleated giant cells and epithelioid granulomas. A diagnosis of tuberculous lymphadenitis was made when no necrotic debris is seen accompanying the epithelioid granulomas, Koch's abscess was made when smear contains necrotic debris, neutrophils and epithelioid granulomas. Few cases were reported as suspicious of tuberculosis when the smear contained extensive caseation only or scattered epithelioid cells only or ill formed granuloma.

Maximum cases of tuberculous lymphadenitis were of Caseating Koch's (32.9 %) followed by tuberculous lymphadenitis (27.5 %) and Koch's abscess(25.6 %). 14 % cases (39) were reported as suspicious for tuberculosis because they either showed only extensive caseation or only ill defined granuloma etc. Amongst the suspicious cases 69.2 % cases were positive for AFB. Overall AFB sensitivity was 71.4 % which was comparable to other studies. 11-30 years was the most common age group of affliction with TB and females were commonly affected (female : male ratio of 1.3 : 1). Cervical nodes were most commonly involved.

DISCUSSION

650 patients with variable causes of lymphadenopathy were studied. There pathological distribution is as follows.

Table 1. Distribution of Cases

S No.	Diagnosis	No. Of Cases	Percentage
1.	Tuberculosis	277	42.7 %
2.	Chronic Non-specific Lymphadenitis	147	22.7%
3.	Abscess	89	13.7%
4.	Metastasis	86	13.2%
5.	Non-Hodgkins Lymphoma	26	4%
6.	Hodgkins Lymphoma	9	1.3%
7.	Inadequate aspiration	16	2.4%

Table 2. Comparison with case distribution of other studies

S No.	Diagnosis	Rajeev *et al*. (1999)	Uwimana *et al*. (2009)	Our study
1.	Tuberculosis	42%	18.1 %	42.7 %
2.	Non-specific Lymphadenitis	36 %	13.8 %	22.7 %
3.	Hodgkins Lymphoma	8 %	2 %	1.3 %
4.	Non Hodgkins Lymphoma	6 %	6 %	4%
5.	Metastasis	5 %	3 %	13.2%
6.	Leukemia	3 %	-	-
7.	Inadequate aspiration	-	23.9	2.4 %

Most common cause of lymphadenopathy was tuberculosis in the present study followed by non-specific lymphadenitis.

Table 3. Agewise distribution of tuberculous lymphadenitis

Age group	No. of Cases	Percentage
0-10	17	6.1%
11-20	65	23.5%
21-30	82	29.7%
31-40	62	22.5%
41-50	33	11.8%
51-60	15	5.4%
61-70	3	1%

Most common age group afflicted with tuberculosis is 21-30 years of age

Table 4. Comparison of Agewise distribution of TB lymphadenitis

Age group	Fazal *et al*.(2011)	Our study
0-10	17 %	6.1%
11-20	23 %	23.5%
21-30	23 %	29.7%
31-40	8%	22.5%
41-50	12 %	11.8%
51-60	10	5.4%
61-70	7	1%

Table 5. Distribution of nodes afflicted by TB

S No.	Nodes	No. of Cases	Our study
1.	Cervical	257	92.7%
2.	Inguinal	4	1.4%
3.	Axillary	16	5.9%

Cervical Lymph Nodes were most commonly involved as seen in other studies. In a study at Department of Pathology, Government Medical College, Chandigarh Tuberculosis accounted for 63 % cases of cervical lymphadenopathy (Handa, 2001). In another German study, the majority of the cases reported were immigrants of Afghani, Pakistani and Indian origin. In these cases cervical lymph nodes were involved in 63.3% of cases (Geldmacher *et al*., 2002)

Table 6. Sex distribution of Tuberculous Lymphadenitis

Sex	No. Of Cases	Percentage
Male	122	44%
Female	155	56%

Table 7. Comparison of Sex Distribution with other studies

Parameter	Fazal *et al*. (2011)	Our study
Female :Male Ratio	1.6 :1	1.3:1

Table 8. Cytological Patterns of TB Lymphadenitis

S No.	Diagnosis		No. Of Cases	Percentage Of Cases
1.	Confirmed TB Cases	Caseating Koch's Lymphadenitis	91	32.9%
2.		TB Lymphadenitis	76	27.5%
3.		Koch's abscess	71	25.6%
4.	Suspicious For TB	Extensive caseous necrosis only	19	6.8%
5.		Caseation with scattered epithelioid cells	10	3.7%
6.		Caseation with scattered lymphocytes	2	0.7%
7.		Scattered epithelioid cells only	8	2.8%

Table 9. Comparison of cytological patterns with other studies

Cytological Pattern	Rajeev *et al*. (1999)	Handa *et al*. (2001)	Our study
Epithelioid clusters with necrosis	31.2%	44%	32.9%
Epithelioid granulomas only	12.5%	15%	27.5%
Koch's abscess	-	-	25.6%
Single epithelioid cells with necrosis	43%	15%	3.7%
Only necrotic material	6.25%	26%	6.8%
Caseation with scattered lymphocytes	7.05%	-	0.7%

All the 39 suspicious cases were followed with AFB staining The results were as follows: 27/39 i.e 69.2% cases were positive for Acid Fast Bacilli. Maximum AFB positivity correlated with cases with caseation. Overall confirmed positive tuberculous cases showed AFB positivity in 170/238 (percentage - 71.4%) i.e there is a sensitivity of 71.4% by Acid Fast Bacilli in our study.

Table 10. AFB results of suspicious tuberculous lymphadenitis

Diagnosis	No. Of Cases	AFB Results
Extensive caseous necrosis only	19	15
Caseation with scattered epithelioid cells	10	8
Caseation with scattered lymphocytes	2	1
Scattered epithelioid cells only	8	3
Total	39	27

AFB shows 100% specificity i.e all cases considered positive on FNAC showed positive AFB staining ,

Table 11. Comparison of AFB sensitivity/specificity with other studies

Parameter	Handa *et al*. (2001)	Our Study
Sensitivity	76.4%	71.4%
Specificity	100%	100%

Granulomas were described as comprising of pale staining epithelioid cells which were round to oval to spindle against an eosinophilic background (Figure 1). Few degenerated epithelioid histiocytes were also seen in long-standing mycobacterial infection with caseation necrosis in the background (Figure 2). Few suspicious cases showed only extensive caseation (Figure 3) which can be confirmed only after AFB staining. On Ziehl Neelson's staining, mycobacterium tuberculosis appeared as red/pink beaded rod-shaped bacteria against a blue background (Figure 4).

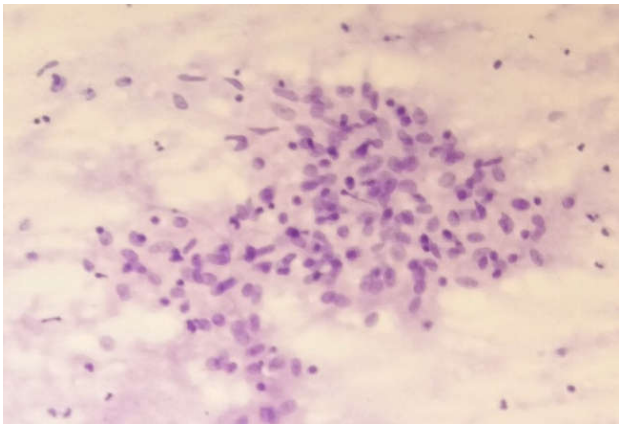

Figure 1. Granuloma –collection of epithelioid cells (H&E, 40 x)

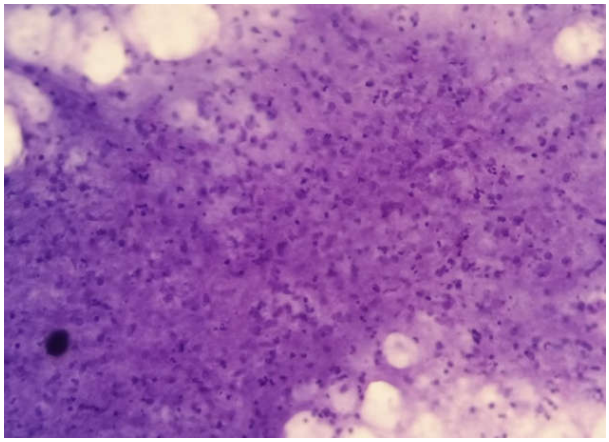

Figure 2. Degenerated epithelioid cells against necrotic background (H&E, 20 x)

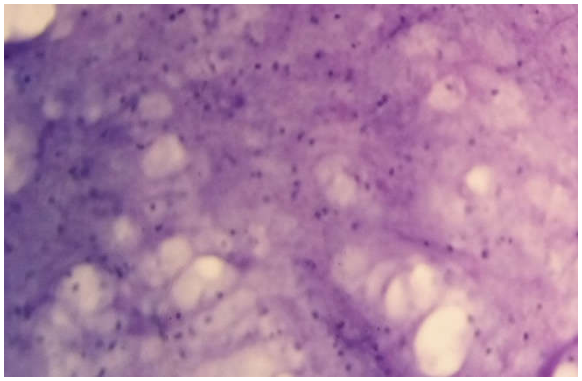

Figure 3. Extensive caseous necrosis(H&E, 20 x)

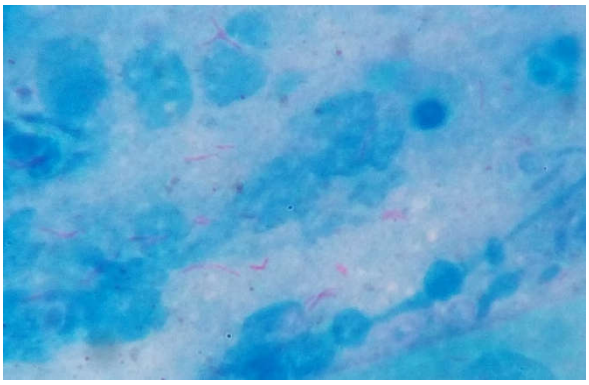

Figure 4. Pink rod shaped bacteria against blue background (ZN stain, 100 x)

Conclusion

Every case of granulomatous inflammation seen on aspiration cytology should be subjected to special stains like ZN. It would increase the diagnostic accuracy of this technique and help to differentiate between different infectious causes which can present with the same morphology. When physicians are confronted with enlarged lymph nodes, the node may be punctured with a sterile disposable needle, and if cheesy material is aspirated then the physician can strongly consider tuberculous adenitis in areas where tuberculosis and immunodeficiency states are rampant and pathology services are lacking. Patients who are not responding to empirical ATT should be considered for other causes of granulomatous inflammation other than TB, and proper workup should be done. 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 acid fast staining. In acid fast staining negative cases, yield of acid fast bacilli positivity can be increased by doing Ziehl-Neelsen staining on second smear or decolourized smear revealing necrosis or by repeat aspiration. Microbiological assessment should also be done in such cases. Present scenario considering patient anxiety and poor follow up, FNAC holds a major role in diagnosis of tuberculous lymphadenitis and has largely surpassed need for biopsy in such cases. Atleast outpatient care and treatment can be started with, if confirmed on cytology.

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