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Original Research Article

A Cytological Study of Prevalence and Pattern of Tuberculosis at Tertiary Center Uttar Pradesh

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ABSTRACT

Tuberculous lymphadenitis is the commonest cause of lymphadenopathy in developing countries. Cytomorphology along with acid fast staining plays an important role in diagnosing these cases, thus avoiding unnecessary surgical intervention. The aim is to study the epidemiological patterns and cytomorphological presentations of tuberculous lymphadenitis in reference to Ziehl- Neelsen staining. This was a retrospective study and a total of 935 patients including all age groups and both sexes presenting with palpable or deep lymph nodes in fine needle aspiration cytology (FNAC) clinic at Kanti Devi Medical College over a period of 4 years and 2 months were included in the study. Smears were fixed in 95% ethyl alcohol and stained with Papanicolaou stain. Leishman stain was done on air dried smears. Ziehl- Neelsen (ZN) staining was done wherever required. During this period, 550(58.82%) cases of tuberculous lymphadenitis were diagnosed on cytology. These were further categorised into three patterns based on cytomorphological features and the percentage of acid fast bacilli (AFB) positive cases in each category were noted. Data was entered in excel spread sheet and statistical analysis was done. P value <0.05 was taken to represent significant difference. Out of 935 FNAC from lymph nodes, 550 cases were diagnosed as Tuberculous lymphadenitis. Three cytomorphological patterns were observed. These were- Group 1: Granulomas without necrosis (28.54%) 157 cases, Group 2: Caseating epithelioid Granulomas (60%) 330 cases, Group 3: Necrotizing lymphadenitis (11.46%) 63 cases. Overall, AFB positivity was seen in (32.36%) 178 cases. The incidence of Tuberculous lymphadenitis in our study population is significantly high. FNAC is useful in diagnosing Tuberculous lymphadenitis and its sensitivity can further be increased by complementing cytomorphology with acid fast staining.

Keywords: FNAC, Tuberculous lymphadenitis, epithelioid cell granuloma, Cytomorphological patterns, Necrotizing lymphadenitis.

INTRODUCTION

Tuberculous lymphadenitis is the most common form of extrapulmonary tuberculosis. [1] In developing countries, almost two third of the cases of lymphadenopathy are due to tuberculosis. [2] FNAC as first line of investigation has assumed importance in diagnosing a variety of disease processes as it is rapid, simple, reliable, minimally invasive and cost effective procedure which can be used in outpatient setting. [3] FNAC is economical and rapid as compared to culture studies (considered as gold standard but time consuming) and Polymerase chain reaction; which is expensive. [4] Tuberculosis is very common in our country and tuberculous lymphadenitis is the most common cause of chronic lymphnode enlargement. [5] Though the most reliable criteria for diagnosing tuberculous lymphadenitis is demonstration of acid fast culture of bacilli from aspirates.

But considering the high tubercular disease burden and limited resources, in our population, the presence of epithelioid cell granuloma is considered as an evidence of tuberculous lymphadenitis. [6,7] With this background, we did a retrospective study with the following aims and objectives: 1) To study the epidemiological pattern of tuberculous lymphadenitis in our population. 2) To study the spectrum of various cytomorphological patterns of Tuberculous lymphadenitis in our population and 3) To correlate the AFB positivity with cytomorphological patterns.

MATERIAL AND METHODS

This study was carried out in the Department of Pathology Kanti Devi Medical College Hospital and Research Center Akbarpur, Mathura, Uttar Pradesh a tertiary care hospital catering medical services to the rural population. This is a retrospective review of FNAC of lymph node lesions between Oct 2015 and Nov 2019. During this period, FNAC was performed on 935 cases of palpable/ deep lymphadenopathy. Detailed clinical history and meticulous physical examination including the duration of swelling, size, number, matted/ discrete, consistency and mobility were taken into account. Informed consent of patient was taken and in case of minor, consent of parent/ guardian was obtained. FNAC was performed using 22-24G needles attached to 10c.c syringes. One to two passes were given and the aspirated material was smeared onto glass slides. Smears were fixed in 95% ethyl alcohol and stained with Papanicolaou stain. Leishman stain was done on air dried smears. Ziehl-Neelsen (ZN) staining was done whenever a cytological diagnosis of granulomatous disease was made and also in cases with abundant necrosis and suppuration. In cases where fluid was aspirated on FNAC, the fluid was centrifuged and smears were prepared from the sediment followed by the above staining methods. The cytological diagnosis for each case was based on cytomorphology and available clinical information. For study purpose, the tuberculous lymphadenitis cases were further divided into three groups on the basis of cytomorphological analysis: group1- Epithelioid cell granulomas with/ without Langhans giant cells without necrotic material, group 2- Epithelioid cell granulomas with/ without Langhans giant cells with necrotic material, and group 3- Mainly necrotic material with many polymorphs without epithelioid cells or giant cells. A definitive cytological diagnosis of TB lymphadenitis could be considered in the smears with the first two patterns, while in the third, with the help of ZN stain and relevant routine investigations like Complete blood counts (CBC), Erythrocyte sedimentation rate (ESR) and special investigations like Mantoux test, Chest radiograph and Ultrasound of lymph nodes, final diagnosis was made. Data was entered in excel spread sheet and statistical analysis was done. Chi square test was applied to correlate cytomorphological pattern and bacillary load. P value <0.05 was taken to represent significant difference.

RESULTS

A total of 935 cases of palpable/ deep lymphadenopathy subjected to FNAC were studied. Tuberculous lymphadenitis was the most frequent diagnosis and was seen in 550 cases. Cervical lymph nodes were involved in 457 of 550 cases (83.09%) followed by axillary lymph nodes in 49 cases (8.90%), supraclavicular lymph nodes in 18 cases (3.27%), inguinal lymph nodes in 14 cases (2.54%). One case (0.18%) of tuberculous mesenteric lymphadenitis was reported (Table 1). Multiple lymph nodes were involved in 11 cases (2%). The age range of Tuberculous lymphadenitis patients was 9 months to 85 years with the male to female ratio of 0.71:1. Maximum numbers of cases were seen in the age group 10-19 years followed by 20-29 years (Table 2). The size of the lymph nodes varied from 0.8cm to 5cm.The TB lymphadenitis cases were further divided into three groups on the

basis of cytomorphological analysis; Group 1: Granulomas without necrosis- 157/ 550 (28.54%), Group 2: Caseating epithelioid granuloma-330/550 (60%),Group 3:Necrotizing lymphadenitis- 63/ 550 (11.46%). ZN positivity for acid- fast bacilli was found in 178 cases (32.36%). Different patterns showed varied AFB positivity. Necrotizing lymphadenitis showed 87.30% (55/ 63) positivity. The pattern Caseating epithelioid granuloma had 32.72% (108/330) AFB positivity and in Granuloma without necrosis, it was 9.55% (15/ 157) (Table3). Significant statistical difference was seen among the three patterns and AFB positivity. The p value was <0.001 and was highly significant statistically.

Table -1: Lymph node groups involved in Tuberculous Lymphadenitis

Cervical	457 (83.09%)
Axillary	49 (8.90%)
Supraclavicular	18 (3.27%)
Inguinal	14 (2.54%)
Mesenteric	01 (0.18%)
Multiple	11 (2.00%)
TOTAL	**550**

Table-2: Incidence of Tuberculous lymphadenitis in relation to age and sex

Age Group (Years)	Tuberculous lymphadenitis		TOTAL	%
	Male	Female		
0 – 9	36	35	71	12.90%
10 – 19	73	113	186	38.81%
20 – 29	78	94	172	31.27%
30 – 39	21	45	66	12%
40 – 49	13	19	32	5.81%
50 – 59	6	8	14	2.54%
60 – 69	4	5	9	1.63%
70 – 79	2	0	2	0.36%
80 – 89	0	1	1	0.18%
TOTAL	**230**	**320**	**550**	

Table-3: Various cytomorphological patterns of tuberculous lymphadenopathy

Cytomorphological picture	No. of cases	AFB positive Cases	P value
Granuloma without necrosis	157 (28.54%)	15 (9.55%)	<0.001* Highly significant
Caseating Granuloma	330 (60%)	108 (32.72%)	
Necrotising Lymphadenitis	63 (11.46%)	55 (87.30%)	
Total	**550**	**178 (32.36%)**	

*Chi square test was applied.

DISCUSSION

FNAC is an important diagnostic tool to aid in the diagnosis of lymph node lesions. It is rapid, inexpensive, safe and reduces the need for surgical biopsy. [8] It was Dudgeon and Patrick in 1927, who first used FNAC in diagnosing Tuberculous lymphadenitis. [9] In our hospital, a rural tertiary care centre, tuberculous lymphadenitis constituted 58.82% of all lymph node aspirates forming the most common cause of lymph node enlargement. Maximum numbers of cases in our study were in the age group 10-19 years (38.81%) 186 cases followed by the age groups 20-29 years (31.27%) 172 cases and 0-9 years (12.90%) 71 cases. Majority of cases in our study (78%) 429 cases were younger than 30 years of age. Whereas majority of patients were in the second to fourth decades of life in studies by Paliwal et al, [10] Ergete and Bekele et al, [11] Purohit et al, [12] Dandapat et al, [13] Ahmad et al [14] and Hemlata et al. [15] A declining trend was seen in the geriatric population in concordance with that observed by Ahmed et al. [14] It may be attributed to development of cell mediated immunity against tubercle bacilli in the elderly. Significant female preponderance; 0.71: 1 (M: F) sex ratio was observed in our study. This may be because of malnutrition and overall low living standards among females in this area. Female preponderance has also been observed by Fatima et al, [8] Paliwal et al, [10] Ergete and Bekele et al, [11] Purohit et al, [12] Aslam S et al, [16] Chand et al [17] and Pamra et al. [18] Male predominance was noted by Ahmad et al [14] and Rajsekaran et al. [19] Cervical lymph nodes (83.09%) were most frequently involved in our study. Similar observation was made by Paliwal et al, [10] Pavithra et al, [16] Chand et al, [17] Khajuria et al [20] and Das et al. [21] In our study, the commonest cause of lymphadenopathy in pediatric age group males was reactive lymphadenitis whereas it was tuberculous lymphadenitis in pediatric age group females. This is in concordance to study by Sharma et al [22] in pediatric age

group that showed female predominance and most common involvement of cervical region (88.2%).We noted slightly higher incidence 550 cases(58.82%) of tuberculous lymphadenitis than that reported by Paliwal et al [10] (55%) from a referral centre for tuberculosis cases. There are wide variations in the prevalence of TB lymphadenitis which may be due to variation in geographical prevalence of TB, age and immunological status of the patients selected. Sarda et al [23] reported 86% of the enlarged nodes to be tuberculous in origin. Similar high incidence was reported by Jha et al [24] (63%), Mahajan et al [25] (54%), Dandapat et al [13] (41.5%), Castro et al [26] (46%), Ahmad et al [14] (38%) and Tilak et al [27] (38.8%). ZN staining for acid fast bacilli was seen in 178 cases (32.36%) in our study while Paliwal et al [10] reported 71%, Ergete and Bekele et al [11] reported 71.7%, Chand et al [17] reported 44.54%, Bezabih et al [28] reported 59.5%, Dasgupta et al [29] reported 45.6% AFB positivity in their studies. On the other hand, a low positivity rate of AFB (19.6% cases) on ZN Staining was reported by Aggarwal et al [30] in their study. Low incidence of AFB positivity in our study may be due to combined maximum percentage (88.54%) 487 cases having epithelioid cell granulomas with necrosis and cases with epithelioid cell granulomas without necrosis unlike series of Paliwal et al [10] where these groups together accounted for only 30.7%. In our study, necrosis alone was seen in 63 cases and 55(87.30%) of these were positive for acid fast bacilli. It has been observed that the foci of necrosis are associated with marked proliferation of tubercle bacilli whereas lymphocytes, epithelioid cells and multinucleated giant cells have a role in limiting the proliferation of AFB. [21, 31] Therefore, it is expected that FNAC from a tuberculous abscess yields more AFBs than early tuberculous lymphnodes. [32] The characteristic necrotic background comprising of eosinophilic granular material containing nuclear debris was described as 'tubercular diathesis'. Those cases lacking the typical finding and showing scattered epithelioid cells with or without granulomas or only necrotic material with neutrophilic infiltration were diagnosed as tuberculous lymphadenitis when this tubercular diathesis was found cytologically, even though AFB were absent in these smears. [33] Granulomas can be seen in a variety of other conditions causing lymphadenopathy including sarcoidosis, carcinoma, lymphoma, fungal diseases, cat scratch disease, collagen vascular disease and disease of the reticuloendothelial system. [34] But, in a region where tuberculous infection is common and other granulomatous diseases are rare, the presence of a granulomatous feature on FNAC is highly suggestive of tuberculosis. [32] Also for AFB positivity, 10,000- 100,000 mycobacterium/ ml of sample should be present for smear AFB positivity. [10]

CONCLUSION

FNAC is a simple Outpatient department (OPD) procedure which is well accepted by patients. It can be effectively used for diagnosing tuberculous lymphadenitis and the diagnostic accuracy can be enhanced by combining cytomorphology with ZN staining. Our study revealed a huge burden of tuberculous lymphadenitis in this region and also highlighted the various cytological patterns of tuberculous lymphadenitis with AFB positivity in these patterns.

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