

Frequency of tuberculosis in cervical lymphadenopathy

Vasudha Bhagat, Pinal Shah, Chandni Patel

Department of Pathology, Government Medical College, Surat, Gujarat, India.
Correspondence to: Pinal Shah, E-mail: drpinalshah@gmail.com

Received July 15, 2015. Accepted September 9, 2015

Abstract

Background: Tuberculous lymphadenopathy is an important form of extrapulmonary tuberculosis. The role of fine needle aspiration cytology (FNAC) in the diagnosis of such lesions is a well-known fact.

Objective: To study the incidence, utility, limitations of FNAC, and various cytomorphological presentations in reference to Ziehl–Neelsen staining in tuberculous lymphadenitis.

Materials and Methods: A total 496 patients presenting with palpable cervical lymphadenopathies were referred to the cytology section of Pathology Department, Government Medical College, New Civil Hospital, Surat, Gujarat, India, over a period of 1 year (January to December 2014) were included in the study. The data entry was carried out using Microsoft Office Excel worksheet and analyzed.

Result: Of 496 total 227 case were diagnosed as tuberculous lymphadenitis. The age of the patient ranged from 5 months to 65 years. The maximum number of cases 167 (73.6%) suggestive of the cytomorphology of tuberculous lymphadenitis were aged in the range of 11–30 years. There were 113 (49.7%) female and 114 (50.3%) male subjects. Male subjects showed a slight predominance for tuberculosis. In this study, the most common site of the involved lymph nodes was of the cervical region in 91.2% (227/249) cases. The caseating epithelioid granulomatous pattern of tubercular lymphadenitis was the most common cytomorphological pattern seen in 47.6% of patients in this study. Acid-fast bacilli (AFB) positivity was the maximum in necrotizing and suppurative lymphadenitis (44.7%). The highest AFB positivity for tubercle bacilli was found in the aspirates, which were purulent in gross appearance (42.8%).

Conclusion: FNAC being a reliable, safe, rapid, and economical procedure is useful as an outdoor diagnostic procedure for the diagnosis of tubeculous lymphadenitis. From the cytomorphologic pattern and the AFB positivity, a rough estimate about the immune status can be made.

KEY WORDS: Tuberculous lymphadenitis, cytomorphological pattern, ZN stain for AFB, tubercle bacilli

Introduction

Lymphadenopathy is one of the general conditions faced in clinical practice with the likelihood of several causative factors.^[1] One of the most common causes of lymphadenopathy is the extrapulmonary tuberculosis (EPTB). In developing

and under developed countries, it continues to be caused by *Mycobacterium tuberculosis*, and atypical mycobacteria are seldom isolated. The commonly involved superficial lymph nodes (Scrofula or king's evil) comprise those in the posterior and anterior cervical chains or the suprascapular fossae, but others such as submandibular, periauricular, inguinal, and axillary groups may also be involved. Lymphadenopathy is bilateral and noncontiguous, in general. Intrathoracic (hilar, paratracheal, and mediastinal in decreasing order) and abdominal lymph nodes also take part in tuberculosis. The frequency of associated pulmonary involvement varies from 5% to 62%.^[2] The most common presentation of tuberculous lymphadenitis is neck swelling, followed by fever, cold abscess, nonhealing ulcer, discharging sinus, and weight loss.^[3] The exact reason of these enlarged lymph nodes is

Access this article online

Website: <http://www.ijmsph.com>

DOI: 10.5455/ijmsph.2016.15072015107

Quick Response Code:



usually hard to determine by history, physical examination, and radiographic studies alone. Fine needle aspiration cytology (FNAC) has occupied a key role in the assessment of peripheral lymphadenopathy as a promising noninvasive substitute to excisional biopsy.^[4] The aspirated material can be used for further ancillary studies.^[5] Despite the improvements in prophylaxis and therapy, tuberculous lymphadenitis continues to be an uncontrolled health issue in the developing countries. With the onset of HIV/AIDS (human immunodeficiency virus/acquired immunodeficiency syndrome) in India, tuberculosis (including tuberculous lymphadenitis) is on the rise.^[6]

This study aims to characterize the incidence of different types of lymphadenopathies, study various cytomorphological patterns in tuberculous lymphadenitis, and perform acid-fast staining in suspected cases of tuberculosis.

Materials and Methods

A total of 496 patients with cervical lymphadenopathy were referred for FNAC to the cytology section of the Department of Pathology, Government Medical College, Surat, Gujarat, India, from January to December 2014 were included in study. A pretested pro forma was used for the collection of demographic information, relevant clinical history, and physical examination findings of each patient. FNAC of the enlarged lymph nodes was performed with the informed consent of the patient, following thorough clinical examination; using a 22-23 G needle and 10 mL syringe. The smears were made from each aspirate: air-dried smears were stained with May-Grünwald Giemsa (MGG), Ziehl-Neelsen (ZN) stain for acid-fast bacilli (AFB), and wet-fixed smears were stained with hematoxylin and eosin and Papanicolaou's stain. An additional slide was kept unstained for any further required stain. If the aspirate was found to be inadequate, FNAC was repeated at the same time for a better retrieval of aspirate. Furthermore, the present condition/history and clinical characteristics of lymph nodes were also studied and correlated to cytological findings to ascertain the incidence of tuberculosis. The data entry was carried out using Microsoft Office Excel worksheet and analyzed.

Result

Of the 496 cases, 227 (45.8%) aspirates were reported as the cytomorphology of tuberculous lymphadenitis. The rest of the cases were of abscess 4.2% (21/496), chronic reactive hyperplasia 15.5% (77/496), metastatic carcinoma 32.7% (162/496), and lymphoma 1.8% (9/496). Tuberculous lymphadenitis was the most common cytological diagnosis (45.8%) in this study.

The age of the patients ranged from 5 months to 65 years. The maximum number [167 (73.6%)] of cases suggestive of cytomorphology of tubercular lymphadenitis were aged in the range of 11–30 years. There were 113 (49.7%) female and 114 (50.3%) male subjects. The male subjects showed

Table 1: Distribution according to group of lymph node

Group	Number of cases (%)
Cervical	227 (91.2)
Inguinal	6 (2.4)
Axillary	16 (6.4)
Total	249

a slight predominance for tuberculosis. As shown in Table 1, the most common site of involved lymph nodes in the cases was of the cervical region in 91.2%, followed by the axillary group (6.4%), and the inguinal group (2.4%). All the groups of cervical lymph node were involved including right and left cervical, posterior triangle, submental, submandibular, and supraclavicular regions.

The majority of the patients were otherwise healthy adults, and constitutional symptoms were present in 13% only. FNAC was the most effective diagnostic tool. The erythrocyte sedimentation rate was raised in 11.01% (25/227) of the patients with tuberculous cervical lymphadenopathy. Chest X-ray with positive lesions was found in only 10 patients (0.4%). Family history was found to be a cause in a few cases.

On the basis of the presence or absence of granulomas, caseous necrosis, and neutrophilic infiltration, tubercular lymph nodes were classified into four cytomorphological categories: caseating epithelioid granulomas (showed epithelioid granulomas and caseous necrosis.), granulomatous lymphadenitis (showed only epithelioid granulomas without caseous necrosis), necrotizing lymphadenitis (showed caseous necrosis only without epithelioid granulomas), and necrotizing suppurative lymphadenitis (showed plenty of polymorphs, necrotic debris with or without epithelioid granulomas).

In this study, the cytomorphological features observed in the cases were caseating epithelioid granulomas [47.6% (108/227)], granulomatous lymphadenitis [33.9% (77/227)], necrotizing lymphadenitis [1.8% (4/227)], and necrotizing suppurative lymphadenitis [16.7% (38/227)] of cases. ZN staining for AFB was done in all the cases. Smear positivity for *Mycobacterium* sp. by conventional ZN method was 19.4% (44/227). AFB positivity was the maximum (44.7%) in necrotizing suppurative lymphadenitis [Table 2].

As shown in Table 3, the appearance of aspirates found more commonly was blood mixed in 68.3% cases, followed by whitish cheesy material in 21.1%, pus-like in 6.2%, and yellowish in 4.4%. AFB positivity was the maximum (42.8%) in pus-like aspirate.

Discussion

Although tuberculosis is chiefly considered a pulmonary disease, it has the ability to cause infection in almost every organ system through lymphohematogenous dissemination during the initial pulmonary infection. Since 1984, the incidence of EPTB has increased at an even faster rate than that of pulmonary tuberculosis.^[7]

Table 2: Various types of cytomorphological pictures with AFB positivity in patients of tuberculous lymphadenitis

Group number	Cytological feature on aspirated smear	Number of cases (%)	Number of AFB-positive cases (%)	Number of AFB-negative cases
I	Caseating epithelioid granulomas	108 (47.6)	26 (22.3)	80
II	Granulomatous lymphadenitis	77 (33.9)	–	77
III	Necrotizing lymphadenitis	4 (1.8)	1 (25)	5
IV	Necrotizing and suppurative lymphadenitis	38 (16.7)	17 (44.7)	21
Total (N)		227	44	183

AFB, acid-fast bacilli.

Table 3: Appearance of aspirate and AFB positivity

Appearance of aspirate	Number of cases (%)	AFB positivity (%)
Blood mixed	155 (68.3)	24 (15.5)
Whitish cheesy	48 (21.1)	12 (25)
Pus-like	14 (6.2)	6 (42.8)
Yellowish	10 (4.4)	2 (20)
Total	227	44

AFB, acid-fast bacilli.

In this study, the youngest patient was aged 5 months and the oldest aged 60 years. In a study by Fazal-i-wahid *et al.*,^[7] the youngest patient was aged 3 years and the oldest 67 years. The majority of the patients [73.6% (167/227)] were in the range of second and third decade of the life, followed by fourth decade. Similar age distribution was seen in the studies done by Fazal-i-wahid *et al.*^[7] and Nidhi *et al.*^[8]

In this study, the male predominance was noted by us, with the male:female ratio 1.008:1, which was in concordance with the study conducted by Ahmad *et al.*^[9] in which the male:female ratio was 1.2:1; but, in some studies, such as those done by Fazal-i-wahid *et al.*^[7] and Nidhi *et al.*^[8] they noted female predominance with male:female ratio of 1:1.4 and 1.2:1, respectively.

In this study, we found 45.8% cases of tubercular lymphadenopathy. This finding was in concordance with the studies done by Tirumalasetti and Latha,^[5] Madan *et al.*,^[6] and Ahmad *et al.*^[9] who noted 41.9%, 41.1%, and 38% cases of tuberculosis, respectively, during their study; but, Ismail *et al.*^[3] 74.5%, Thakur *et al.*^[4] 62.06%, Fazal-i-wahid *et al.*^[7] 75.24%, Iqbal *et al.*^[10] 70.45%, and Tanwir *et al.*^[11] 62.28%, in their studies noted a higher number of cases of tuberculosis. The high rate is owing to low socioeconomic status, illiteracy, incomplete treatment, resistance, and increased incidence of HIV infection.

The most common site involved in this study was cervical region (91.9%), followed by axillary region 6.5%, and inguinal region 2.4%. These findings were similar to the study by Madan *et al.*^[6]

There are two specific pathological criteria for diagnosing tubercular lymphadenitis—caseation and granuloma formation.

Both are less likely to be present in tubercular lymphadenitis associated with advanced HIV disease. This is because T-cell function, which is suppressed in advanced HIV disease, is required for granuloma formation.^[12]

The caseating epithelioid granulomatous pattern of tubercular lymphadenitis was the most common cytomorphological pattern, seen in 47.6% (108 of 227 cases of tubercular lymphadenitis) of patients in this study. It is the most typical pattern of tubercular lymphadenitis. This pattern was reported in 56.7% and 31.1% cases of tubercular lymphadenitis by Madan *et al.*^[6] and Thakur *et al.*,^[4] respectively [Table 4].

The granulomatous lymphadenitis pattern can occur owing to several causes. However, in a country such as India, where tuberculosis is very common, this pattern is considered to be owing to tuberculosis until proven otherwise.^[7,12] This was the second most common pattern reported in this study. We found this pattern in 33.9% (77 of 227 cases of tubercular lymphadenitis) of cases. Other studies have reported it in the range of 5.4%–57.8% [Table 4].^[1,4,6,8,12]

Necrotizing lymphadenitis represents the most severe cytomorphological pattern of tubercular lymphadenitis. There is complete necrosis with only “acellular” debris. It is not labeled as “purulent,” because there are no degenerated polymorphonuclear cells. Complete necrosis reflects impaired cell-mediated immunity in this group of patients. Cases of caseating epithelioid granulomatous pattern can be wrongly labeled as necrotizing lymphadenitis pattern if material is aspirated from that part of the node that contains only caseation. It was present in 1.8% (4 of 227) cases of tubercular lymphadenitis. In other studies, the reported prevalence rates range from 9.4% to 39.2% [Table 4].^[1,4,6,8,12]

Table 4: Comparison of different cytomorphologic patterns by various workers

Cytomorphological pattern	Narayanamurthy and Kodanda Swamy (%)	Thakur et al. (%)	Madan et al. (%)	Nidhi et al. (%)	Kumar et al. (%)	Our study (%)
Caseating epithelioid granulomas	16.67	31.1	56.7	16.4	19	47.6
Granulomatous lymphadenitis	7.3	57.8	31.1	14.3	5.4	33.9
Necrotizing lymphadenitis	11.12	–	9.4	39.2	32.4	1.8
Necrotizing and suppurative lymphadenitis	50	11.1	2.8	30.1	43.2	16.7

The necrotizing suppurative lymphadenitis pattern of tubercular lymphadenitis was seen in 16.7% (38 of 227 cases of tubercular lymphadenitis) of patients in this study. Other studies have reported it in the range of 2.8%–43.2% [Table 4].^[1,4,6,8,12] Although reported in these case series, unlike the other three patterns, the necrotizing suppurative lymphadenitis pattern is not yet a well-recognized cytomorphological type of tubercular lymphadenitis. However, this pattern is important, especially in HIV patients. If ZN staining is not done, the thin caseation commonly present in these cases can be mistaken for pus, and the case wrongly labeled as pyogenic lymphadenitis. In this study, the highest AFB positivity was seen in necrotizing suppurative lymphadenitis (44.7%). These findings correlated with the study carried out by Kumar *et al.*^[12]

The cytomorphologic patterns to some extent denote the immune status of the individuals. Necrotizing and suppurative patterns are more commonly seen in immunocompromised patients with a higher and heavy positivity of AFB.^[7]

Of the 227 cases of tuberculous lymphadenopathy, 44 (19.4%) cases showed the presence of AFB by conventional ZN staining method. Our finding was in correlation with that of the studies done by Narayanamurthy and Kodanda Swamy^[1] and Thakur *et al.*^[4] who reported AFB positivity in 18.3% and 26.6%, respectively.

In this study, the highest AFB positivity of tubercle bacilli was found in aspirates that were purulent in gross appearance (42.8%). These findings correlated with the study done by Narayanamurthy and Kodanda Swamy.^[1]

The presence of AFB and its relation to immunological spectrum has been described by many authors. Lenzi and his colleagues (1977) proposed a point spectrum, at one pole were reactive cases showing a good cell-mediated response, comparatively few bacteria, and a good response to treatment. At the other pole were unreactive cases resembling lepromatous leprosy in showing numerous organisms in the apparent absence of all cell-mediated immune response.^[1]

Strength of this Study

Necrotizing suppurative lymphadenitis should be recognized as an established pattern of tuberculous lymphadenitis. Patients with a heavy AFB load on ZN stain and cytomorphological pattern of necrotizing suppurative lymphadenitis should be screened for HIV/AIDS.

Limitation

In few cases, histopathological examination is required for the diagnosis of tuberculosis.

Conclusion

FNAC being a reliable, safe, rapid, and economical procedure is useful as an outdoor diagnostic procedure for the diagnosis of tuberculous lymphadenitis. From the cytomorphologic pattern and the AFB positivity, a rough estimate about the immune status can be made.

References

- Narayanamurthy C, Kodanda Swamy CR. Study of cytological pattern of tubercular lymphadenitis. *Global J Med Res* 2012;12(1):1–5.
- Gupta PR. Difficulties in managing lymph node tuberculosis: review. *Lung India* 2004;21(4):50–3.
- Ismail M, Muhammad M. Frequency of tuberculosis in cervical lymphadenopathy. *J Postgrad Med Inst* 2013;27(3):342–6.
- Thakur B, Mehrotra R, Nigam JS. Correlation of various techniques in diagnosis of tuberculous lymphadenitis on fine needle aspiration cytology. *Patholog Res Int* 2013;2013:824620.
- Tirumalasetti N, Latha PP. Lymph nodes cytology in HIV seropositive cases with haematological alterations. *Indian J Med Res* 2014;139(2):301–7.
- Madan Y, Joshi VS, Perumal RV. Fine needle aspiration cytology for the diagnosis of tuberculous lymphadenopathies. *Indian J Res* 2014;3(6):159–61.
- Fazal-i-wahid, Habib-Ur-Rehman, Ahmad I. Extra pulmonary tuberculosis in patients with cervical lymphadenopathy. *J Pak Med Assoc* 2013;63(9):1094–7.
- Nidhi P, Sapna T, Shalini M, Kumud G. FNAC in tuberculous lymphadenitis: experience from a tertiary level referral centre. *Indian J Tuberc* 2011;58(3):102–7.
- Ahmad SS, Akhtar S, Akhtar K, Naseem S, Mansoor T, Khalil S. Incidence of tuberculosis from study of fine-needle aspiration cytology in lymphadenopathy and acid-fast staining. *Indian J Community Med* 2005;30(2):63–5.
- Iqbal M, Subhan A, Aslam A. Frequency of tuberculosis in cervical lymphadenopathy. *J Surg Pakistan (International)* 2010;15(2):107–9.

11. Tanwir F, Ahmed I, Hashmi S, Ahmed S. Tuberculosis and cervical lymphadenopathy-a study of 175 cases in a tertiary care hospital. *J Oral Hyg Health* 2013;1(3):1-3.
12. Kumar N, Gupta BB, Sharma B, Kaushal M, Rewari BB, Sundriya D. Role of fine-needle aspiration cytology in human immunodeficiency virus-associated lymphadenopathy: a cross-sectional study from northern India. *Hong Kong Med J* 2015;21(1):38-44.

How to cite this article: Bhagat V, Shah P, Patel C. Frequency of tuberculosis in cervical lymphadenopathy. *Int J Med Sci Public Health* 2016;5:666-670

Source of Support: Nil, **Conflict of Interest:** None declared.