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Study of diagnosis of tuberculosis cervical lymphadenopathy by FNAC in rural tertiary health care centre

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Abstract

Background: Tuberculosis is one of the most common diseases of peripheral lymph node enlargement. Approximately one-third of the global population is infected with tubercle bacilli; about 9 million new cases of tuberculosis develop each year and about 2 million people die of this disease. India is Highest TB burden country in the world and accounts for nearly 2/3rd of cases of SEAR. Every year approximately 1.8 million person develop tuberculosis. TB is responsible for up to 43% of peripheral Lymphadenopathy in the developing world like India.

The newer techniques have come for diagnosis of tuberculosis but they are too expensive and sophisticated to be any practical benefit to the high number of TB patient in rural India.

Material and Methods: This Cross sectional study was carried out in the Department of Otorhinolaryngology and Medicine, in a rural teaching hospital during the period of august 2014 to July 2015. Approval from the ethical committee has been taken.

Results: This study comprises of 85 patients, among them 40 cases were men and 45 cases were women. In our study the ratio of men to women was (1:1.2). This study revealed that youngest patient was 13 years old and oldest patient was 70 years old. tuberculosis cervical Lymphadenopathy was most commonly observed in age group of 21-30 years i.e. in 26 cases (30.58%). In our study 72.92% patients lymph nodes were matted while 28.23% cases had discrete lymph nodes.

Conclusion: Sensitivity of FNAC in diagnosis of tuberculosis was found to be 87.3% whereas specificity was found to be 100%. Excisional biopsy were done in 18 cases (21.7%). FNAC is important tool in diagnosis cervical tubercular Lymphadenopathy in rural condition where newer modalities like PCR, bacteriophage assay, are yet to come.

Keywords: TB, FNAC, Cervical Lymphadenopathy, Developing countries, rural population

1. Introduction

Mycobacterium lymphadenitis has plagued humanity since long. The classic term scrofula derived from the Latin word glandular swelling. Hippocrates (460-377 B.C.) mentioned scrofulous tumours in his writing [1]. Tuberculosis caused by mycobacterium tuberculosis produces chronic inflammatory changes forming tubercles. Approximately one-third of the global population is infected with tubercle bacilli; about 9 million new cases of tuberculosis develop each year and about 2 million people die of this disease. Developing countries, especially those in South East Asian region (SEAR) having a major burden of tuberculosis. India is Highest TB burden country in the world and accounts for nearly 2/3rd of cases of SEAR. Every year approximately 1.8 million person develop tuberculosis. TB is responsible for up to 43% of peripheral Lymphadenopathy in the developing world like India. Tuberculosis lymphadenitis is a local manifestation of the systemic disease. Cervical tubercular lymphadenitis may represent a spread from the primary focus of infection in the tonsil, adenoid, sinonasal cavity, osteomyelitis of the ethmoid bone [1]. Peripheral tuberculosis Lymphadenopathy is the commonest form of extra pulmonary tuberculosis in Indian sub continent & cervical lymph node is commonest site of involvement [2].

Tuberculosis cervical Lymphadenopathy in most patients presents with unilateral or bilateral, solitary or matted, painless mass in the region of cervical, submandibular, epitroclear or even inguinal region. In tuberculosis cervical Lymphadenopathy the time interval between onset of symptoms and time of presentation varied from 15 days to 36 months [3].

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The new automated culture techniques, molecular amplification technique, improvement in serology and introduction of new novel technique like PCR have made diagnosis in reality [4]. However these new techniques are too expensive and sophisticated to be any practical benefit to the high number of TB patient in rural India.

Fine needle aspiration cytology is important in diagnosis of tuberculosis Lymphadenopathy, we had used fine needle aspiration as a routine procedure in initial evaluation of cervical tuberculosis Lymphadenopathy [5]. On USG, TB lymphadenitis demonstrates singular or multiple hypoechoic and multiloculated cystic lesion that are surrounded with thick capsule. Tuberculosis cervical Lymphadenopathy diagnosis was confirmed on histological presence of caseous granuloma and acid fast bacilli [6]. The diagnosis of tuberculosis is based on clinical presentation, radiological findings and laboratory tests. The presentation may not be classic one but varies with age and type of disease pattern as in extrapulmonary tuberculosis including lymphadenitis.

The aim of the present study was to analyze demographic profile, clinical presentation, physical characteristic of Tuberculosis Lymphadenopathy and reliable diagnostic modality.

Material & Methods

This Cross sectional study was carried out in the Department of Otorhinolaryngology and Medicine in a rural teaching hospital during the period of August 2014 to July 2015. Approval from the ethical committee has been taken.

Sample size: Sample size (85) – Randomly 85 patients were selected for the study.

Inclusion Criteria

1. All the patients presenting to ENT & Medicine OPD with Age more than 12 years of age with Cervical Lymphadenopathy more than 1 cm in longest diameter with or without ulcer/ Abscess/ sinus formation of more than 6 week duration with confirmed diagnosis of tubercular cervical Lymphadenopathy obtained on microbiological, histological examination done on material obtained from FNAC and /or lymph node biopsy for demonstration of epithelioid granuloma were assessed.

Exclusion Criteria

1. Patients in whom diagnosis of tuberculosis not confirmed on microbiological / histological examination were excluded from the study.
2. Patients with age less than or equal to 12 year were excluded.

A detailed clinical history was elicited. Age, sex, duration of symptoms, constitutional symptoms, history of contact with tuberculosis patient and other relevant aspects were noted.

Detailed local examination, General examination and Systemic examination was performed in all patients. All parameters regarding lymph node like size, site, number, location, consistency, laterality, matting or discreteness, mobility, secondary changes, level of lymph node and involvement of other lymph node (Inguinal / axillary) groups were carefully noted. Detailed ENT examination was carried out to find out any dental infection, tonsillar

pathology or head and neck malignancy for exclusion of cases.

After establishing a provisional clinical diagnosis of tubercular lymphadenitis, further investigations were carried out to confirm the diagnosis. These included Routine hematological Investigations like Hemoglobin estimation, total and differential leukocyte count, ESR, Liver function test, Renal function test and blood sugar level were established as preoperative investigations. All patients underwent ELISA for HIV infection. Mantoux test was done in patients suspected of tuberculosis. ECG, X-ray Chest, USG neck and FNAC were done in all patients. In Tuberculin test (Mantoux test) 1 TU PPD with RT 23 Tween 80 (Tween 80 is polysorbate 80 and is added to PPD to prevent its adsorption) is injected intra-dermally and the reaction is read between 48-72 hours. Induration of 10 mm or more in largest diameter is suggestive of positive case. For estimation of ESR Wintrobe method was used. ESR level is measured at the end of 1 hr. All patients with cervical lymphadenopathy were sent to Department of Pathology for performing Fine Needle Aspiration Cytology. FNAC is done under all aseptic precautions with prior valid consent. Aspirate from lymph node was subjected to ZN staining for Acid fast Bacilli and cytological examination. USG neck is performed on Sonalisa Machine with 2 probes available 3.0 MHz and 7.5 MHz. All USG neck were performed on B mode Scan with 7.5 MHz probe. X ray chest were done in all patient with cervical lymphadenopathy. Ideal X ray Chest film obtained with X-ray taken in upright PA view with good exposure and during mid inspiratory phase. In cases having inconclusive diagnosis excisional biopsy was taken. Before taking biopsies all patients were immunized with TT & XST were done in all patient and prior consent was taken. Small skin crease incision is taken over enlarged nodes, specimens were obtained and sent for histopathological examination in formalin bulb and incision closed with suture. Stitches were removed after 7 days. In diagnosed cases of tuberculosis lymphadenopathy DOTS treatment was started under RNTCP. All patients were asked to attend the ENT and Medicine OPD for follow up. Necessary advises were given to patients. All the findings were noted in pretested proforma and the data obtained were analysed using SPSS version 21.0 software. Results were expressed in frequencies and percentages.

Results

This study comprises of 85 patients, among them 40 cases were men and 45 cases were women. In our study the ratio of men to women was (1:1.2). This study revealed that youngest patient was 13 year old and oldest patient was 70 year old. tuberculosis cervical lymphadenopathy was most commonly observed in age group of 21-30 years i.e. in 26 cases (30.58%), followed by 13 -20 years in 18 cases (21.17%), then 31- 40 years 16 patients (18.82%), then 51-60 years in 13 patients (15.29%), followed by 41 -50 years in 11 patients (12.97%) and only one case of tuberculosis cervical lymphadenopathy was diagnosed in age group of 61 -70 years. All patients were presented with swelling in neck in 100% cases, & evening rise of temperature was second most common symptom and seen in 30.68% cases. Among 85 patients with tuberculosis cervical Lymphadenopathy majority (82.36%) had only cervical lymphadenopathy while approximately 18% had involvement of other group of

lymph nodes. Axillary and inguinal nodes were the other group of lymph nodes involved. Axillary nodes were involved in 9.41%, inguinal in 5.88% and in 2.35% of cases both axillary and inguinal lymph nodes were involved. In tuberculosis cervical lymphadenopathy commonest site affected was posterior triangle of neck in 50 cases (58.82%) followed by upper cervical 23 cases (27.05%), submandibular in 09 cases (10.58%), Middle and lower deep cervical lymph nodes involved in 8 cases (9.41%) and 7 cases (08.23%) respectively. In our study none of our patient had supraclavicular region involvement. In our study physical characteristics of tuberculosis lymphadenitis revealed that 88.76% patients had unilateral lymphadenitis against bilateral lymphadenitis in 11.24%, In 72.92% patients lymph nodes were matted while 28.23% cases had discrete lymph nodes. Tubercular abscess was seen in 9.5% cases and tuberculosis lymphadenopathy with discharging sinus was present in 3.52% cases. out of 85 patients The assessment of involvement of pulmonary Tuberculosis was made and found that 66 cases (77.65%) with tuberculosis lymphadenopathy had no pulmonary involvement, whereas only 19 cases (22.35%) had pulmonary involvement, This difference was statically significant ($p < 0.05$). The increase in Erythrocyte sedimentation rate more than 50 in first hour was observed in 48% cases. The Mantoux test was positive in 50 cases and negative in 35 cases. The role of FNAC in diagnosis of tuberculosis lymphadenitis was assessed using the criteria of sensitivity and specificity. Sensitivity and specificity of FNAC in diagnosis of tuberculosis was calculated and Sensitivity of FNAC in diagnosis of tuberculosis was found to be 87.3% whereas specificity was found to be 100%. Excisional biopsy were done in 18 cases (21.7%).

Table 3: Distribution of cases of according to most common symptoms in tuberculosis Cervical Lymphadenopathy

Sr. No.	Most common symptoms	No. of patients	Percentage
1	swelling in neck	85	100%
2	Evening rise of temperature	26	30.68%

All patients were presented with swelling in neck (100%) & evening rise of temperature was second most common symptom and seen in 30.68% cases.

Table 4: Distribution of cases of tuberculosis Cervical Lymphadenopathy according to Site.

Sr. No.	Sites	No. of patients (n=85)	Percentage
1	Posterior Triangle	50	58.82%
2	Upper Cervical	23	27.05%
3	Submandibular/submental	09	10.58%
4	Lower cervical	08	09.41%
5	Middle cervical	07	08.23%
6	Supraclavicular	00	00.00%

Above table shows that most common site affected in tuberculosis cervical lymphadenopathy was posterior triangle of neck in 50 cases (58.82%), followed by upper cervical in 23 cases (27.05%), submandibular in 09 cases

Table 1: Age Distribution of cases of Tuberculosis cervical lymphadenopathy.

Sr. No.	Age Group (in Years)	No. of T.B. cases (N=85)	Percentage
1	13-20	18	21.17%
2	21-30	26	30.58%
3	31-40	16	18.82%
4	41-50	11	12.97%
5	51-60	13	15.29%
6	61-70	01	01.17%
7	Total	85	100%

Above table shows that age distribution of patient with tuberculosis cervical lymphadenopathy, the youngest patient was 13 year and oldest patient was 70 year old, tuberculosis cervical lymphadenopathy was most commonly seen in age group of 21-30 years in 26 cases (30.58%), followed by 13 - 20 years in 18 cases (21.17%), then 31 -40 years in 16 patients (18.82%), then 51-60 years in 13 patients (15.29%), followed by 41 -50 years in 11 patients (12.97%) and only one case of tuberculosis cervical lymphadenopathy was diagnosed in age group of 61 -70 years.

Table 2: Distribution of cases of tuberculosis Cervical Lymphadenopathy according to Gender

Sr. No.	Sex of patient	No. of patients	Percentage
1	Male	40	47.05%
2	Female	45	52.94%
3	Total	85	100%

Above table shows that, this study comprises of 85 patients, among them 40 cases were men and 45 cases were women in our study the ratio of men to women was (1:1.2).

(10.58%), Middle and lower deep cervical lymph nodes involved in 8 cases (9.41%) and 7 cases (08.23%) respectively. In our study none of our patient had supraclavicular region involvement.

Table 5: Distribution of cases of tuberculosis Cervical Lymphadenopathy according to pulmonary involvement

Sr. No.	Involvement	No. of Cases (N=85)	Percentage
1	Pulmonary TB	19	22.35%
2	LNTB*	66	77.65%
	Total	85	100%

* LNTB- Lymph node tuberculosis

Above table shows that out of 85 patients the assessment of involvement of pulmonary Tuberculosis was made and found that 66 cases (77.65%) with tuberculosis

lymphadenopathy had no pulmonary involvement whereas only 19 cases (22.35%) had pulmonary involvement. This difference was statically significant (P<0.05).

Table 6: Distribution of cases of tuberculosis cervical lymphadenopathy according to involvement of Non cervical group of lymph node groups.

Sr. No	Lymph node groups	No of cases (N=15)	Percentage
1	Axillary	8	9.41%
2	Inguinal	5	5.88%
3	Axillary and Inguinal	2	2.35%
Total		15	17.64%

Above table shows that among 85 patients with tuberculosis cervical lymphadenopathy majority of patients 70 (82.36%) had only cervical lymphadenopathy while Approximately 18% had involvement of other group of

lymph nodes. Axillary and inguinal nodes were the other group of lymph nodes involved. Axillary nodes were involved in 9.41%, inguinal in 5.88%. & in 2.35% cases both axillary and inguinal lymph nodes were involved.

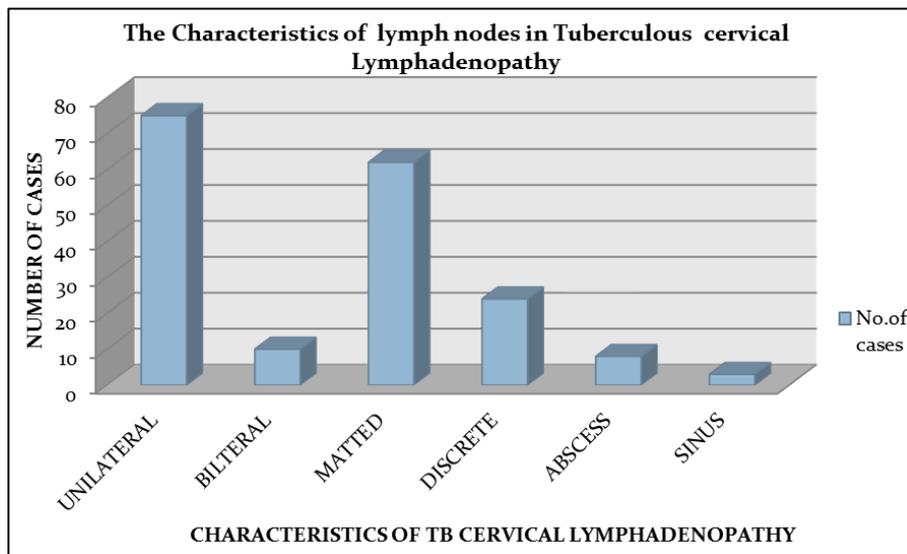


Fig 1: Characteristics of lymph nodes in tuberculosis cervical lymphadenopathy

Above graph shows that study of physical characteristics of tuberculosis lymphadenitis revealed that 88.76% patients had unilateral lymphadenitis against bilateral lymphadenitis in 11.24%, in 72.92% patients lymph nodes were matted while 28.23% had discrete lymph nodes. Tubercular abscess was seen in 9.5% cases and tuberculosis lymphadenopathy with discharging sinus was present in 3.52% cases.

Discussion

Tuberculosis is one of the most common diseases of peripheral lymph nodes. Despite of improvement in the living standard in general, significant reduction in the incidence of tuberculosis in Asian population has not occurred correspondingly. However in western countries tuberculosis ranks third as a cause of cervical lymphadenopathy, this might indicate difference in living standards and socioeconomic conditions. In present study majority of the patients with tuberculosis lymphadenitis were in the age group of 13- 30 years (51.75%) followed by 31 to 40 years (18.82%) & only 16.46% of patients with tuberculosis lymphadenopathy were above the age of 50 years. Similar figures were quoted from studies of Mutiullah *et al.* [4] where age incidence of TB in age group of 11- 30 seen in 72%. In Ahmad *et al* study [5] TB affected 3.8% of patients after the age of 50 years. A declining trend was noted in incidence of tubercular lymphadenitis after 30 years of age, which was in concordance with study of other co-

workers. It may be due to the development of immunity in older patients.

In the present study there was slight female preponderance. In our study 52.94% were women and 47.06% were men, this is accordance to others studies [3,4]. There is male preponderance in study of Ahmad SS *et al* [5], males 53% and females 47%. Relatively higher female preponderance could be because of male dominated society of India. It is a common practice in Indian culture that females take their meals after the males have finished. This could lead to relatively more malnutrition in females as compared to males. Also, females in their 2nd and 3rd decades are more conscious to their appearance with relatively higher self-detection rate of the affected lymph nodes. In this study unilateral involvement was present in 76.5% and bilateral in 23.5%. This is in accordance with the studies of Baskota *et al* [6] who reported figures of 83% and 17% for unilateral and bilateral involvement respectively.

Amongst the patients with tuberculosis lymphadenopathy posterior triangle was affected most commonly in 55.29% cases, followed by upper cervical (level II) in 22.35% cases, Submandibular in 10.6%, mid and lower cervical affected in 5.88% each. Mutiullah S. *et al* [4] study of cervical tuberculosis lymphadenitis of 50 cases found posterior triangle involved in 35 (70%) cases, upper deep cervical in 24% and lower deep cervical in 24% cases. Present study correlate well with Mutiullah S. *et al* [4] study.

In the present study, in cases of tuberculosis cervical lymphadenopathy multiple lymph node involvement was observed in 76.5% while single node was involved in 23.5%, Matted lymph nodes were present in 72.09% as against discrete lymph nodes in 28.2%. Tubercular abscess was seen in 8 cases (9.5%) and tuberculosis with discharging sinus in 3 cases (3.52%). Similar findings were noted by Motiullah *et al* [4], Ismail *et al* [7], and Ahmad *et al* study [5].

Tuberculosis cervical lymphadenitis may present with discrete single or multiple node. However matting is considered as one of the diagnostic criteria for tuberculosis lymphadenitis. It occurs because of periadenitis. Occasionally lymph node tuberculosis may present as abscess in neck, it is generally an intranodal abscess. if such an abscess is drained without anti tuberculosis therapy it lead to chronically discharging sinus. presence of discharging sinus is considered as almost pathognomic feature of tuberculosis. In the present study of 85 patients involvement of other group of lymph nodes were studied and its found that isolated cervical group involvement was seen in 82.3% cases It was observed that axillary lymph nodes were involved in 9.4% cases and inguinal in 5.8% cases. In 2.3% cases both axillary and inguinal lymph nodes were involved. present study correlate well with Jha *et al.* study [3] and Umar *et al* study [8] and. Tuberculosis is a systemic disease. Lymph node tuberculosis is classified as extrapulmonary tuberculosis. The cervical lymph nodes are the group of lymph nodes most commonly affected by tuberculosis. When an extrapulmonary focus is evident in a patient with pulmonary tuberculosis, such patients has been categorized under pulmonary tuberculosis whereas a patient with cervical lymphadenopathy without pulmonary involvement was categorised as lymph node Tuberculosis as per the guidelines of the World Health Organization (WHO).In the present study Pulmonary involvement was seen in 22.35% & lymph node tuberculosis was seen in 77.65% cases. This is in accordance with the study of Jha *et al.* [3] and Ismail *et al.* [7] study.

In the present study, sensitivity and specificity of FNAC for diagnosing tubercular cervical lymphadenopathy was 87% and 100% respectively, This is in accordance with the study of Jha *et al.* [3] and Prasad *et al.* [9] studies. FNAC is well established diagnostic tool in the assessment of tubercular lymphadenopathy, in the developing country like India where tuberculosis is common and other granulomatous diseases are rare, presence of granulomatous lesion on FNAC is highly suggestive of Tuberculosis. In present study it is very useful diagnostic tool to identify patient (87%) with tubercular lymphadenopathy, which avoid need of biopsy in most of cases, this was in accordance with Jha *et al* study [3].

The most reliable indicator for diagnosis of cervical lymph node tuberculosis is isolation of mycobacterial organism on Acid fast smear on FNAC sample. The ZN staining for identification of AFB should be incorporated to increase diagnostic accuracy in tubercular lymphadenitis. Despite its well established usefulness in the diagnosis of cervical tuberculosis lymphadenitis, it has several limitation on its application, since it require >10000 microorganism / ml, it cannot distinguish from other members of mycobacteria, its sensitivity ranges from 10% to 50% depending upon study [10].

In this case, excisional biopsy and subjecting the aspirate for cytological examination was very useful tool for the diagnosis of cervical lymphadenopathy. Some studies have suggested that amplification of bacterial DNA by PCR in diagnosing these remainder cases of tuberculosis lymphadenopathy. This test is rapid sensitive and specific and detect fewer than 10 organisms in short time. However the role of PCR is not full proof because its sensitivity for detection of mycobacteria in the specimen is ranges from 55% to 100% but specificity remained 95% to 98% [4]. In the developing country the cost is factor for such investigation. In present study PCR was not done.

Conclusion

Tuberculosis cervical lymphadenopathy is frequent disease in India especially in rural India where low socioeconomic strata and poor hygiene are key factor, it is important that a high index of suspicion for tubercular lymphadenopathy is required. FNAC is important tool in diagnosis cervical tubercular lymphadenopathy in rural condition where newer modalities like PCR, bacteriophage assay, are yet to come. Early diagnosis and treatment along with proper health education will cure the disease and prevent cold abscess and sinus formation.

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Abbreviations

AFB	-	Acid Fast Bacilli
DNA	-	Deoxyribonucleic Acid
DOTS	-	Directly Observed Short Course Chemotherapy
ENT	-	Ear Nose Throat
ESR	-	Erythrocyte Sedimentation Rate
ECG	-	Electrocardiogram
ELISA	-	Enzyme Linked Immune Sorbent Assay
FNAC	-	Fine Needle Aspiration Cytology
HIV	-	Human Immune Deficiency Syndrome
LNTB	-	Lymph Node Tuberculosis
MHz	-	Milli Hertz
OPD	-	Out Patient Department
PCR	-	Polymerase Chain Reaction
PPD	-	Purified Protein Derivative
RT	-	Research tuberculin
SEAR	-	South East Asia Region
TB	-	Tuberculosis
TT	-	Tetanus Toxoid
TU	-	Tuberculin unit
USG	-	Ultrasonography
WHO	-	World Health Organisation
XST	-	Xylocaine Sensitivity Testing
ZN	-	Zheil Nielson Staining

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