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Cervical tuberculous lymphadenitis: Clinicopathological profile with correlation to ultrasonography

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***Abstract*---**Background: Diagnosis of cervical tuberculous lymphadenitis has been challenging to clinicians as it mimics multiple diseases. USG has upper hand over other diagnostic modalities as it is non- invasive, low cost, time saving and guided procedures like FNAC and core needle biopsy can be performed. Methods: This is a prospective observational study conducted in 100 patients from June 2019 to May 2020 in Dept of Pulmonary medicine, PRM Medical College and Hospital, Baripada. A complete clinical examination, routine blood investigations, CXR, USG Neck, FNAC and CBNAAT were done and data was recorded. Results: Maximum numbers of patients were in age group of 11-20 years (38%) followed by 21-30 years (32%) and presented between the duration of 1-3 months. There were 44(44%) males and 56(56%) females; male to female ratio was 1:1.3. Most of the patients (70%) did not have any constitutional

symptoms and maximum number of patients i.e. 53% had matting of LN followed by discrete node 29% whereas 10% patients presented with abscess and 8% had discharging sinuses. In USG, 46 (46%) showed cervical lymphadenopathy with tubercular aetiology with sensitivity and specificity of 90% and 50% respectively with accuracy of 88%. In FNAC, most common finding was tubercular adenitis i.e in 50(50%) of patients, followed by chronic granulomatous in 29(29%) with overall sensitivity and specificity of FNAC in diagnosis of tuberculous lymphadenitis were 68% and 50% with accuracy of 85%. Conclusion: Present study showed that ultrasonography along with FNAC and CBNAAT can be preferred diagnostic modalities for cervical tuberculous lymphadenitis diagnosis.

***Keywords*---**cervical lymphadenopathy, USG, FNAC, CBNAAT.

Introduction

In 2020, an estimated 10 million people fell ill with Tuberculosis (TB) worldwide. India leading among high TB burden countries [1]. Burden of extrapulmonary tuberculosis (EPTB) is high, ranging from 15% -20% of all TB cases in immunocompetent patient, while in HIV positive people it accounts for 40-50% of new TB cases [2]. Tuberculous lymphadenopathy is most common form of EPTB, constitutes 35% of all EPTB [3]. Cervical lymph nodes are the most common site of Tuberculous lymphadenopathy 60-90% of cases, and its diagnosis remain a challenge [3]. Due to paucibacillary nature of specimen, smear microscopy and culture offer low sensitivity [4]. Tubercular lymphadenitis mimic other pathological process, yields in inconsistent physical and laboratory result [5]. As a recommended imaging method for examination of cervical lymph node disease, ultrasound can pinpoint the dimension and distribution of nodes more precisely than physical examination [6] and also helps site selection for fine needle aspiration cytology. The aim of present study was to evaluate clinical, pathological profile and diagnostic modalities of Tuberculous cervical adenitis with special reference to ultrasonography.

Aims and objectives

1. To evaluate clinical and pathological profile of tuberculous cervical lymphadenitis.
2. To evaluate efficacy and correlate FNAC, USG and CBNAAT

Methods

This is a prospective observational study conducted in Dept of Pulmonary medicine, PRM Medical College and Hospital, Baripada from June 2019 to May 2020. This study was started after clearance from Institutional ethical committee. Written and informed consent was taken from the patients and from parents in case of paediatric age group.

Study Period

The duration of study was 12 months from June 2019 to May 2020.

Sample Size

100 patients from the outpatient Department of Pulmonary Medicine at PRM Medical College and Hospital, Baripada, Odisha.

Inclusion Criteria

1. Patients of all age group with provisional diagnosis of cervical tuberculous lymphadenitis.
2. Patients given consent for the study.

EXCLUSION CRITERIA

1. Patients with cervical lymphadenopathy due to other disease were excluded
2. HIV positive patients were excluded
3. Patients not giving consent for the study

Procedure

A total of 100 patients were included in this study. Demographic data of all the patients were recorded and a detailed history was taken. A complete clinical examination done. All routine blood investigations were carried out in all patients then CXR, USG Neck, FNAC and CBNAAT were and data was recorded. All ultrasonographic exploration were performed with 12MHz probe. USG guided FNAC done from the largest node with morphological feature suggestive of Tuberculosis. FNAC specimen were collected from the patients by aspirating 2 to 3 passes of a 23-gauge needle attached to a 5ml syringe. A separate prick was taken for CBNAAT test so as to obtain adequate quantity of sample. Sample obtained was then added to Falcon tube with normal saline and sent for CBNAAT testing

Statistical Analysis

Study Structure

No. of Sample used – 100
Types of variables – Numerical and Categorical
Number of groups – 1 groups and >2 datasets
Study design – Paired (observational)
Distribution – Normal & Dichotomous

Methods

It is an observational study and randomized simple sampling method is used. Sample size calculated using the population (N). Confidence level is 95% and Z score is 1.96.

Data Analysis

I used SPSS version 22 and MS excel for data analysis. Descriptive statistics are done for demographic variables and presented with plot and chart. The variables are in non-normal form number (n) and percentage (%) are presented. P value <0.05 considered as statistically significant.

Tests used

1. Paired t-test (for normal data)
2. Mc Nemar test
3. Chi-square test

Observations

Table-1: Age and Gender distribution

Age in Years	No. of patients (%)	Males (%)	Females (%)
0--10	7 (7)	4 (4)	3 (3)
11--20	38 (38)	16 (16)	22 (22)
21--30	32 (32)	13 (13)	19 (19)
31--40	10 (10)	5 (5)	5 (5)
41--50	6 (6)	2 (2)	4 (4)
51--60	5 (5)	2 (2)	3 (3)
>60	2 (2)	2 (2)	0 (0)
Total	100 (100)	44 (44)	56 (56)

Table-2: USG findings

USG finding	No. of Patients	Percentage
1. Cervical lymphadenopathy with tubercular etiology	46	46
2. Cervical lymphadenopathy	31	31
3. Cervical lymphadenopathy with abscess	5	5
4. Abscess	6	6
5. Necrotic Cervical lymphadenopathy	12	12
Total	100	100

Table-3: FNAC diagnosis

FNAC finding	No. of Cases	Percentage
Chronic granulomatous lymphadenitis	29	29
Tubercular adenitis	50	50
Reactive adenitis	4	4
Acute suppurative adenitis	3	3
Chronic non-specific adenitis	7	7
Abscess	7	7
Total	100	100

Table-4: Correlation between FNAC and CBNAAT

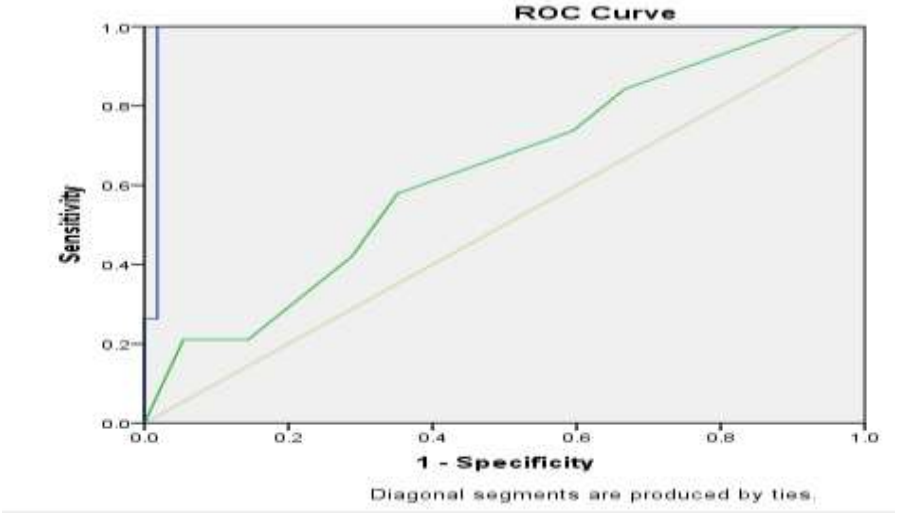
FNAC finding	No. of Cases	CBNAAT		p value
		Positive (%)	Negative (%)	
Chronic granulomatous lymphadenitis	29	9 (31)	20 (69)	0.037
Tubercular adenitis	50	21 (42)	29 (58)	0.024
Reactive adenitis	4	0 (0)	4 (100)	0.084
Acute suppurative adenitis	3	0 (0)	3 (100)	0.31
Chronic non-specific adenitis	7	1 (14.3)	6 (85.7)	0.077
Abscess	7	6 (85.7)	1 (14.3)	0.041
Total	100	37 (37)	63 (63)	0.051

Table-5: Correlation between FNAC and USG

FNAC finding	No. of Cases	USG finding					p value
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	
Chronic granulomatous lymphadenitis	29	14	9	3	1	2	0.11
Tubercular adenitis	50	31	13	1	1	4	0.043
Reactive adenitis	4	0	3	0	0	1	0.094
Acute suppurative adenitis	3	0	1	0	0	2	0.103
Chronic non-specific adenitis	7	0	5	0	0	2	0.049
Abscess	7	1	0	1	4	1	0.059
Total	100	46	31	5	6	12	0.026

Table-6: Correlation between USG finding and CBNAAT

S. No	USG-finding	CBNAAT	
		Positive	Negative
1	Cervical lymphadenopathy with tubercular etiology	27	19
2	Cervical lymphadenopathy	1	30
3	Cervical lymphadenopathy with Abscess	4	1
4	Abscess	5	1
5	Necrotic cervical lymphadenopathy	1	11
Total		38	62



Area Under the Curve

Test Result Variable(s)	Area
USG	.987
FNAC	.633

Output

As the value of AUC lies between 0.5 to 1 denotes the excellent classifier. As the ROC curve closer to the top-left corner for USG shows better performance and FNAC is closer to the diagonal shows that the model has pretty good discrimination ability. This can be considered as a good model.

Sensitivity, Specificity, positive predictive value, negative predictive value of FNAC

Sensitivity	Specificity	PPV	NPV	Accuracy
68%	50%	76%	45%	85%

Sensitivity, Specificity, positive predictive value, negative predictive value of USG

Sensitivity	Specificity	PPV	NPV	Accuracy
90%	51%	84%	47%	88%

Results

Among 100 patients, 44(44%) were males and 56(56%) were females; male to female ratio was 1:1.3. Maximum numbers of patients were in age group of 11-20 years (38%) followed by 21-30 years (32%) as shown in Table- 1. Maximum number of patients presented between the duration of 1-3 months.

Most of the patients (70%) did not have any constitutional symptoms whereas 30% patients had symptoms like fever, cough, anorexia and weight loss. On physical examination, maximum number of patients i.e., 53% had matting of LN followed by discrete node 29% whereas 10% patients presented with abscess and 8% had discharging sinuses. Majority of patients (45%) had level IV lymph nodes involvement followed by 23% patients had level II lymph node involvement. Right sided cervical lymph nodes were found to be more commonly affected (69%) then left side (31%).

In USG, 46(46%) showed cervical lymphadenopathy with tubercular aetiology followed by cervical lymphadenopathy 31(31%), necrotic cervical lymphadenopathy 12(12%), abscess 6(6%), cervical lymphadenopathy with abscess 5(5%). In FNAC, most common finding was tubercular adenitis i.e in 50(50%) of patients, followed by chronic granulomatous in 29(29%), chronic non-specific lymphadenitis and abscess in 7(7%) of cases. Modalities like FNAC, USG, CBNAAT were correlated with each other in Table 4, 5 and 6. The overall sensitivity and specificity of FNAC in diagnosis of tuberculous lymphadenitis were 68% and 50% with accuracy of 85%. Ultrasonography reported sensitivity and specificity of 90% and 50% respectively with accuracy of 88%.

Discussion

This study is prospective observational study is observational study on the diagnosis of cervical tuberculous lymphadenitis by USG in comparison to FNAC and CBNAAT in a tertiary care hospital in tribal district of Odisha. Our study included 100 clinically suspected cases of cervical tuberculous lymphadenitis. Maximum number of patients (70%) were in age group of 11-30 years, which was similar to study conducted by Patil SB et al [7] where majority of patients (53%) were in this age group, also in Tadesse. M et al [8] maximum no of patients (58%) were in 16-30 years age group and Swati Nair et al [9] reported 59% cases in the age group of 11-30 years.

Our study showed female predominance which was similar to Patil SB et al[7], Tadesse M et al[8] and Gautam et al[10], but in contrast to Swati Nair et al[9] which reported male to female ratio 1.27:1. In our study most of patients(70%) did not have constitutional symptoms which is similar to Jha et al(12) and contrast to Dandapat et al[13].

Matted lymph nodes were the commonest finding in present study followed by discrete nodes which was similar to Jha et al [12] and contrast to Swati Nair et al [9] where 89% had discrete node. In this study 10% patients presented with abscess whereas 8% had discharging sinuses. This was similar to study by Gautam et al[10] and Jha et al [12] but contrast to Cheung et al [14].

Right sided cervical lymph nodes were more commonly involved (69%) than left side (31%) which was similar to Swati Nair et al [9] and Gautam et al(10). Commonest site of lymph node involvement was anterior triangle i.e. 81%, which was similar to Swati Nair et al [9], Jha et al [12] and Dandapat et al (13). In Jha et al [12], the most common group of lymph nodes involved were upper deep jugular followed by jugulo - omohyoid lymph node. In present study sensitivity and

specificity of FNAC for diagnosis of tuberculous lymphadenitis were 68% and 50% respectively, whereas Sharma et al [11] reported 91.1% sensitivity. The sensitivity and specificity of FNAC in Motiwala et al [15] were 79.36% and 100%.

Ultrasonographic examination showed cervical lymphadenopathy with tubercular aetiology in 46% of cases whereas cervical lymphadenopathy in 31% of cases in contrast to Sharma et al [11] where cervical lymphadenopathy with tubercular aetiology were reported in 9.8% of cases whereas cervical lymphadenopathy in 63.9% of cases. Overall sensitivity of USG was 90% and specificity was 51% which was also reported by Sharma et al [11] in which overall sensitivity and specificity were 91.1% and 40.0% with accuracy was 86.9%.

Conclusion

There are always challenges in diagnosis of tuberculous lymphadenitis as it mimics other non – tubercular pathologies and of its paucibacillary nature. Histopathology and culture are regarded as most reliable methods for diagnosis. Due to invasiveness, associated complications and delay in diagnosis, overall acceptability of biopsy is limited. Non-availability of culture facilities in resource limited settings, its complex procedure and delay in culture results other diagnostic modalities like USG, FNAC and CBNAAT are preferred. USG, FNAC and CBNAAT are inexpensive, less invasive, rapid and easily available methods at peripheral institution for diagnosis of tubercular lymphadenitis. In our study ultrasonographic examination is very helpful for diagnosing cervical tuberculous lymphadenitis. Combination of USG, FNAC and CBNAAT can be utilized for early diagnosis and avoidance of biopsy.

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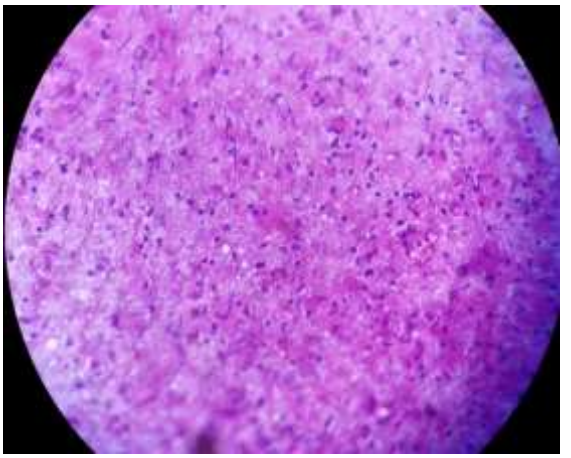
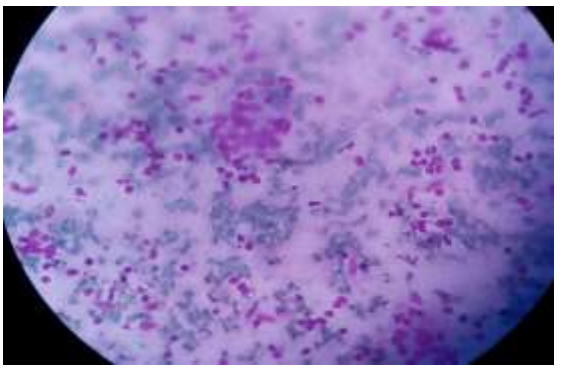
Figures



Cytosmear shows extensive caseous necrosis H&E 400X



Cytosmear shows a granuloma due to multinucleated giant cells, scattered epithelioid cells and lymphocyte in background: Giemsa stain 1000X

Necrotic lymph node with loss of fatty hilum

Round to oval heterogenous, hypoechoic lymph node with loss of fatty hilum

Heterogenous irregular outlined necrotic lymphnode

Irregular outlined tubercular abscess