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Demographic, Clinical and Laboratory Findings of Positive Cervical Tuberculous Lymphadenitis Patients

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ABSTRACT

Background: Cervical tuberculous lymphadenitis (CTL) is the most common form of extrapulmonary tuberculosis, presenting predominantly as painless cervical swelling. Early diagnosis is critical to prevent complications and limit disease transmission. This study aimed to evaluate the demographic, clinical, and laboratory characteristics of patients with CTL in a tertiary care hospital in Bangladesh. **Methods:** A cross-sectional study was conducted in the Department of Otolaryngology and Head Neck Surgery, Dhaka Medical College Hospital, from January 2022 to June 2023. Ninety-six patients presenting with cervical lymphadenopathy were enrolled using purposive consecutive sampling. Detailed clinical evaluation, laboratory investigations including erythrocyte sedimentation rate (ESR), Tuberculin Skin Test (TST), fine-needle aspiration cytology (FNAC), histopathology, and GeneXpert MTB/RIF assay were performed. Data were analyzed using descriptive statistics. **Results:** The majority of patients (59.3%) were aged 31–45 years and female predominance (71%; male-to-female ratio 1:2.42) was observed. Socioeconomic analysis showed 44% of patients were from the poor class and 38% from the middle class; 66.7% were urban residents. All patients presented with painless cervical swelling, with additional symptoms including weakness (36.4%), fever (39.5%), weight loss (27%), cough (15.6%), and night sweats (12.5%). Lymph node involvement was predominantly unilateral (89.6%), multiple (86.4%), and measured 3–6 cm in 63.5% of cases, most commonly affecting level V nodes (56.25%). ESR was elevated in 65.6% of patients, and TST was positive in 78.1%. FNAC and histopathology confirmed TB in 64.5% and 67.7% of cases, respectively, while GeneXpert MTB/RIF was positive in 72.9%. **Conclusion:** CTL in Bangladesh predominantly affects young to middle-aged adults, especially females, with characteristic clinical and laboratory features. Accurate diagnosis requires an integrated approach combining clinical assessment, cytology, histopathology, and molecular testing to guide timely management and reduce morbidity.

Keywords: Cervical Tuberculous Lymphadenitis, Extrapulmonary Tuberculosis, FNAC, Genexpert MTB/RIF, Tuberculin Skin Test, Bangladesh.

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INTRODUCTION

Globally, tuberculosis is still a major disease causing mortality and morbidity. Around 10 million people (8.9–11.0 million) developed tuberculosis worldwide in 2020. In Bangladesh, 292,942 TB cases reported to the National Tuberculosis Control Program in 2019 and 221 new cases with 24 deaths per 100,000 people recorded yearly [1, 2]. Tuberculosis (TB), primarily caused by Mycobacterium tuberculosis, is a chronic infectious disease. Despite advances in diagnostic methods and treatment strategies, TB continues to cause considerable morbidity and mortality worldwide [3]. While pulmonary tuberculosis is the most common manifestation, extrapulmonary tuberculosis (EPTB) also represents a significant proportion of cases. Notably, lymph node tuberculosis (LNT) is one of the most frequently encountered presentations, commonly manifesting as lymphadenopathy, particularly in TB-endemic regions [3, 4]. Tuberculous lymphadenitis is the leading cause of peripheral lymphadenopathy in areas where TB is prevalent. It typically presents as a painless, palpable mass in the cervical lymph nodes, which account for approximately 63.8% of cases of generalized lymph node enlargement [5]. Overall, lymph node tuberculosis constitutes about 5% of all TB cases, with cervical lymph node involvement occurring in nearly two-thirds of patients [6]. Clinically, tuberculous lymphadenitis usually appears as a slowly progressive, painless enlargement of lymph nodes, most commonly in the cervical region. Cervical lymph nodes are involved in approximately 45–70% of cases, while supraclavicular lymph nodes are affected in about 12–26% of cases. Bilateral lymph node involvement occurs in nearly 20% of patients [7-9]. The duration of symptoms before diagnosis may vary from several weeks to a few months. In most patients, swelling is painless, and tenderness is present in only a minority of cases [8, 9]. The burden of lymph node tuberculosis continues to evolve due to increased migration and globalization. As a result, many developed regions, such as Europe, have seen a rise in extrapulmonary TB cases, including scrofula [10]. In this context, a retrospective case series reported diagnostic yields of 83% for the tuberculin skin test, 46% for fine-needle aspiration cytology, and 97% for excisional lymph node biopsy [11]. Diagnosis of cervical tuberculous lymphadenitis can be challenging because its clinical features often overlap with other infectious and non-infectious causes of lymphadenopathy. Definitive diagnosis is achieved by demonstrating Mycobacterium tuberculosis in lymph node tissue through culture or molecular diagnostic techniques. While mycobacterial culture remains the gold standard, it is time-consuming and may require several weeks to produce results [3].

Several laboratory investigations can assist in the diagnostic process. Hematological abnormalities such as anemia, leukocytosis, thrombocytosis, and elevated erythrocyte sedimentation rate (ESR) are frequently associated with chronic infections, although these findings are nonspecific [12]. The tuberculin skin test (TST) supports the diagnosis by detecting delayed-type hypersensitivity reactions to mycobacterial antigens; however, certain conditions may yield false-positive or false-negative results [13]. Ziehl–Neelsen staining with microscopic examination is a rapid and inexpensive diagnostic method with reported sensitivity ranging from 46–78% and specificity approaching 100% [14]. Histopathological examination of lymph node tissue remains one of the most important diagnostic approaches for cervical tuberculous lymphadenitis [15]. In addition to these traditional methods, molecular diagnostic techniques have significantly improved the rapid detection of tuberculosis in clinical practice over the past few years. The GeneXpert MTB/RIF assay, recommended by the World Health Organization, is a nested real-time polymerase chain reaction (PCR) test that enables rapid detection of Mycobacterium tuberculosis and rifampicin resistance directly from clinical samples, providing faster and more clinically useful results than conventional diagnostic methods [16]. Therefore, a clear understanding of the characteristics of patients with cervical tuberculous lymphadenitis is essential for early diagnosis and effective management. This is especially important in TB-endemic regions like Bangladesh. Thus, this study aimed to evaluate the demographic characteristics, clinical presentation, and laboratory findings of patients with cervical tuberculous lymphadenitis.

MATERIALS AND METHODS

Study Design

The cross-sectional study was carried out among 96 patients presenting with cervical lymphadenopathy who attended the outpatient and inpatient departments of the Department of Otolaryngology and Head Neck

Surgery, Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh from January 2022 to June 2023.

Selection Criteria

Patients were selected using a purposive consecutive sampling technique from those fulfilling the inclusion criteria.

Inclusion Criteria

Patients of any age group, both male and female patients and clinically suspected cases of cervical tuberculous lymphadenopathy.

Study Procedure

After obtaining written informed consent from patients detailed history and clinical examination, including general, ENT, and systemic examinations were performed. Demographic information and clinical findings were recorded in a structured Case Record Form (CRF). Relevant investigations were performed as required, including erythrocyte sedimentation rate (ESR), Tuberculin Skin Test (TST), Fine Needle Aspiration Cytology (FNAC), Excisional biopsy of lymph nodes and GeneXpert MTB/RIF assay.

Data Analysis and Ethical Considerations

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize demographic, clinical, and laboratory findings. Continuous variables were expressed as mean and standard deviation, while categorical variables were presented as frequency and percentage. Ethical approval for the study was obtained from the Ethical Review Committee of Dhaka Medical College, Dhaka.

RESULTS

Table 1: Demographic Characteristics of the Patients (n=96)

Age (years)	**Number (%)**
15-30	22 (22.9)
31-45	57 (59.3)
46-60	15 (15.6)
>60	2 (2.1)
Sex	
Male	68 (71)
Female	28 (29)
Socioeconomic status	
Poor class	42 (44)
Middle class	37 (38)
Upper class	17 (18)
Residence	
Rural	32 (33.3)
Urban	64 (66.7)

Table shows maximum numbers of patients (59.3%) were between 31-45 years age group, and mean age of the patient was 41.35 ± 8.74 years. Male and female ratio was 1:2.42.

Table 2: Distribution of Respondents by Clinical Presentation's (n=96)

Clinical presentation's	**Frequency**	**Percentage (%)**
Painless neck swelling	96	100%
Fever	38	39.5%
Cough	15	15.6%
Night sweats	12	12.5%
Weight loss	26	27%

Weakness	35	36.4%
Characteristics of LN		
Unilateral	86	89.6%
Bilateral	10	10.4%
Number of enlarged lymph node		
Single	13	13.5%
Multiple	83	86.4%
Size of involved lymph node		
<3 cm	30	31.2%
3-6 cm	61	63.5%
>6 cm	5	5.20%
Mode of presentation		
Level I	3	3.12%
Level II	25	26.04%
Level III	9	9.37%
Level IV	5	5.20%
Level V	54	56.25%

(*Multiple responses)

Table 2 shows that indolent painless swelling was detected in all cases. Most common symptoms were weakness (36.4%), fever (38%) and weight loss (27.0%). Lymph node examination findings revealed maximum cases (89.6%) were unilateral distribution. Multiple enlarged lymph node was observed in most of the cases.

Table 3: Distribution of Cases According to ESR And Tuberculin Skin Test (TST) result (n=96)

ESR findings	**mean±SD (mm in 1st hour)**	**Frequency**	**Percentage (%)**
Raised	34.6±7.4	63	65.6
Normal	15.5±5.8	33	34.4
Mantoux Test/ TST		**Frequency**	**Percentage (%)**
Positive		75	78.1
Normal		21	21.8

Table shows the raised level of ESR was found in 63 (65.6%) cases with mean value 34.6±7.4 mm in 1st hour. A total of 75 (78.1%) patients with tuberculous lymphadenitis had a positive tuberculin skin test (TST) result.

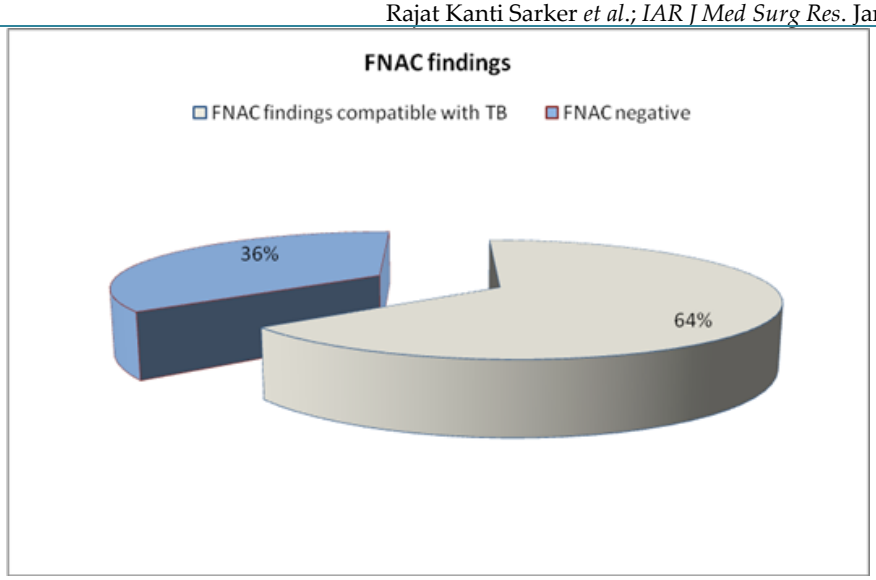

Figure 1: Results of the FNAC Findings (n=96)

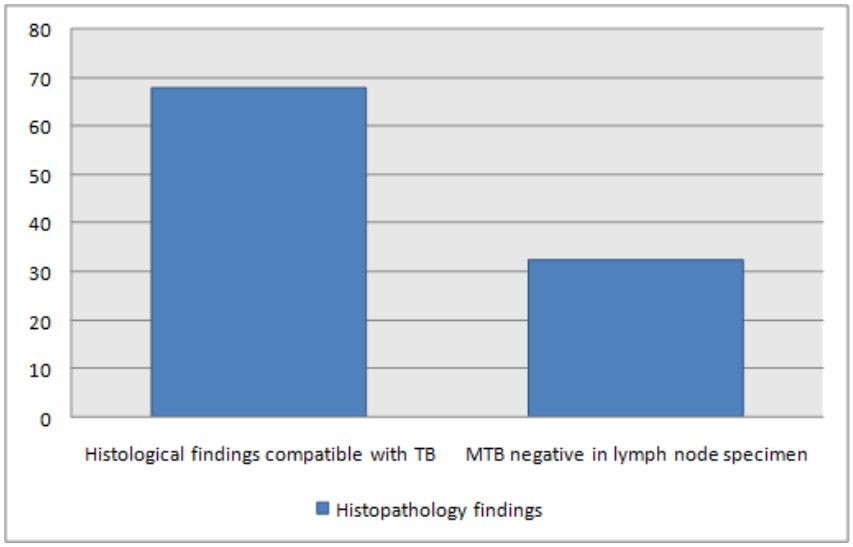

Figure 2: Results of the Histopathological Findings (n=96)

Figure 2 shows histological findings compatible with TB in lymph node specimen was found in 65 (67.7%) cases.

DISCUSSION

This cross-sectional study demonstrated that the majority of patients (59.3%) were aged 31–45 years, consistent with previous reports from Bangladesh indicating peak incidence of cervical tuberculous lymphadenitis (CTL) in young to middle-aged adults [17]. Female predominance was observed, with 71% of cases being female (male-to-female ratio 1:2.42), aligning with earlier studys suggesting higher susceptibility among women [7]. Socioeconomic analysis revealed that 44% of patients belonged to the poor class and 38% to the middle class, reflecting the well-established link between lower socioeconomic status and TB risk due to overcrowding, malnutrition, and limited access to healthcare. Urban residents accounted for 66.7% of cases, consistent with increased exposure risk in densely populated areas. Clinically, all patients presented with painless cervical swelling, the hallmark of CTL. Common systemic symptoms included weakness (36.4%), fever (39.5%), weight loss (27%), cough (15.6%), and night sweats (12.5%), broadly consistent with previous studies,

although symptom prevalence may vary with population and comorbidities [18, 19].

Lymph node examination showed that most cases were unilateral (89.6%), with multiple nodes affected (86.4%) and sizes between 3–6 cm (63.5%). Level V nodes were most frequently involved (56.25%), reflecting typical cervical chain distribution and providing an important clinical clue for early suspicion of CTL [19]. Laboratory evaluation revealed raised ESR in 65.6% of patients (mean 34.6 ± 7.4 mm), highlighting its role as a nonspecific marker of inflammation but limiting its value as a standalone diagnostic tool [20]. The Tuberculin Skin Test (TST) was positive in 78.1% of cases, confirming its usefulness as a screening test while recognizing its limitations due to potential false positives from prior BCG vaccination or exposure to nontuberculous mycobacteria [7]. FNAC was positive in 64.5% of patients, supporting its role as a reliable diagnostic tool for extrapulmonary TB [21]. The GeneXpert MTB/RIF assay demonstrated positivity in 72.9% of patients, consistent with international data and emphasizing its value in rapid and accurate diagnosis of CTL [22]. These findings underscore the importance of an integrated diagnostic approach, combining clinical evaluation, FNAC, histopathology, and molecular testing, for timely and accurate identification of CTL. Overall, the study confirms that cervical tuberculous lymphadenitis remains common among young to middle-aged adults in Bangladesh, with characteristic clinical and laboratory features, highlighting the need for early diagnosis and prompt management to reduce morbidity and prevent disease progression.

Limitations

This study was limited by its single-center design and relatively small sample size, which may affect generalizability of the results. All tests should compare to find out the diagnostic accuracy of the tests.

CONCLUSION

Cervical tuberculous lymphadenitis predominantly affects young to middle-aged adults in Bangladesh, and accurate diagnosis requires combined clinical, cytological, histopathological, and molecular evaluation.

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