Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

ENT & Head Neck Surgery

Pattern of Lymph Node Involvement and Clinical Presentations of Tuberculous Cervical Lymphadenitis in a Single Center Tertiary Level Hospital

Alam MJ[1], Jonaed FE[2], Rifat MA[3*], Liton MA[4], Nahiduzzaman[5], Reza IMHR[6], Mamun SKAA[7]

[1]Dr. Md. Jahangir Alam, Registrar, Department of ENT & Head Neck Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh
[2]Dr. Fazle Elahi Jonaed, Assistant Professor, Department of ENT & Head Neck Surgery, Khwaja Yunus Ali Medical College and Hospital, Sirajganj, Bangladesh
[3]Dr. Mahmud Asif Rifat, Indoor Medical Officer, Department of Ear, Nose, Throat and Head Neck Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh
[4]Dr. Md. Assaduzzaman Liton, Resident Surgeon, Department of ENT & Head Neck Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh
[5]Dr. Nahiduzzaman, MS Resident-Phase B, Department of ENT & HNS, Dhaka Medical College Hospital, Dhaka, Bangladesh
[6]Dr. I. M. Hashim Reza, Assistant Registrar, Department of ENT & Head Neck Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh
[7]Dr. Sk. Abdullah Al Mamun, Indoor Medical Officer, Dhaka Medical College Hospital, Dhaka, Bangladesh

DOI: 10.36347/sjams.2023.v11i08.016 | **Received:** 29.06.2023 | **Accepted:** 25.07.2023 | **Published:** 18.08.2023

***Corresponding author:** Rifat MA
Dr. Mahmud Asif Rifat, Indoor Medical Officer, Department of Ear, Nose, Throat and Head Neck Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh

Abstract **Original Research Article**

Introduction: Tuberculous cervical lymphadenitis, also known as scrofula, is a common manifestation of extra pulmonary tuberculosis. It primarily affects the lymph nodes in the neck region and is caused by Mycobacterium tuberculosis. TCL presents with distinct clinical features and a characteristic pattern of lymph node involvement. This short overview aims to analyze the pattern of lymph node involvement and clinical presentations of TCL to improve diagnostic accuracy and patient care. ***Aim of the study:*** The aimed to analyze the pattern of lymph node involvement and clinical presentations of TCL. ***Methods:*** This prospective observational study was conducted at the Dhaka Medical College Hospital, Dhaka, Bangladesh, over a period of four years. A total of 189 TCL patients were included in the study, with data collected on socio-demographic characteristics, clinical presentations, neck swelling-related characteristics, and various laboratory findings. ***Result:*** The majority of the participants were between the ages of 15-30 years (71.43%) and were predominantly female (68.25%). Fever was the most common clinical presentation (66.67%), followed by abscess (49.21%) and cough (30.16%). Unilateral neck swelling on the right side was the most prevalent (41.27%). Swollen nodes were frequently observed, primarily at node levels II, III, IV, V, and VI. High ESR (58.73%) and positive CGD on FNAC (100%) were common laboratory findings. Gene-Xpert testing showed positive results in 87.50% of cases. During the follow-up period, fever, neck pain, and neck swelling gradually decreased, while new abscess occurrences decreased over time. Surgery was performed on 4.23% of participants with single-level swollen nodes and 19.10% with multi-level swollen nodes after 1 year. ***Conclusion*:** In summary, this study on tuberculous lymphadenitis (TCL) identified consistent patterns in lymph node involvement and clinical presentations. Fever, abscess formation, and cough were common symptoms, with unilateral neck swelling, primarily on the right side, and involvement of multiple nodes observed. Laboratory findings showed elevated ESR and reliable results on FNAC and Gene-Xpert testing. These findings contribute to improved diagnosis and appropriate management of TCL.

Keywords*:* Tuberculous, Cervical, Lymphadenitis, Lymph-Node.

INTRODUCTION

Tuberculous cervical lymphadenitis (TCL), also known as scrofula, is a common manifestation of extrapulmonary tuberculosis (TB) and a significant public health concern worldwide [1, 2]. It primarily affects the lymph nodes in the neck region and is caused by Mycobacterium tuberculosis, the same bacterium responsible for pulmonary TB [3]. TCL presents with distinct clinical features and a characteristic pattern of lymph node involvement, making it crucial to understand

its clinical presentations and patterns of lymph node involvement for accurate diagnosis and appropriate management.TCL is prevalent in both developed and developing countries, with a higher incidence in regions where TB is endemic and access to healthcare resources may be limited [4]. It primarily affects children and young adults, particularly those living in crowded environments or with compromised immune systems [5]. The transmission of M. tuberculosis occurs through respiratory droplets, and TCL can result from either primary infection or reactivation of latent TB. The clinical presentation of TCL can vary widely and depends on multiple factors, including the host immune response, the site and extent of lymph node involvement, and the duration of infection. The most common clinical manifestation is the presence of painless, firm, and progressively enlarging lymph nodes in the neck region. The lymph nodes may be unilateral or bilateral and are typically discrete, though they can coalesce and form abscesses in advanced stages. The overlying skin may become reddened, inflamed, or fluctuant due to secondary infection [6, 7]. In addition to the physical findings, patients with TCL may also present with constitutional symptoms such as low-grade fever, night sweats, fatigue, and weight loss. These systemic symptoms are nonspecific and can be attributed to various infectious and non-infectious causes [8]. It is essential for healthcare professionals to maintain a high index of suspicion for TCL in patients presenting with persistent cervical lymphadenopathy and constitutional symptoms, particularly in areas with a high prevalence of TB [9]. The pattern of lymph node involvement in TCL follows a characteristic progression. The initial stage involves the enlargement of a single or a few lymph nodes, often located in the posterior triangle or the jugulodigastric region. As the disease progresses, adjacent lymph nodes become involved, resulting in the formation of a chain-like pattern of lymphadenopathy. The lymph nodes may enlarge, become matted together, and form fluctuant abscesses. In some cases, the disease can spread to distant lymph node groups, leading to widespread involvement [10]. Accurate diagnosis of TCL is crucial to initiate appropriate treatment and prevent complications. The gold standard for diagnosing TCL is the demonstration of acid-fast bacilli or isolation of M. tuberculosis from the lymph node aspirate or tissue biopsy [11]. However, obtaining a definitive diagnosis can be challenging, and additional diagnostic modalities such as fine-needle aspiration cytology, histopathology, and molecular tests (e.g., polymerase chain reaction) may be required to support the clinical suspicion. This study aimed analyze the pattern of lymph node involvement and clinical presentations of TCL, with the ultimate goal of improving diagnostic accuracy, optimizing patient care, and reducing the burden of TCL in our population.

METHODS

This prospective observational study was conducted over a span of four years, from July 2019 to July 2023, at the Department of ----------, Dhaka Medical College Hospital, Dhaka, Bangladesh. The initial sample size comprised 199 patients who were diagnosed with TCL during the study period. The inclusion criteria for the study were patients of any gender over the age of 15 who presented with neck swelling and were subsequently diagnosed with TCL based on clinical examination, laboratory investigations, and histopathological confirmation. Exclusion criteria were applied to omit patients who had a history of anti-tuberculous treatment, those who were diagnosed with other forms of tuberculosis or any other concurrent chronic or infectious diseases, children with TB, and those who showed resistant TB strains. Patients who were unable to provide informed consent or were lost to follow-up were also excluded from the study. Following the application of these criteria, 6 patients were lost to follow-up, 2 patients passed away before the initiation of treatment, and 2 patients were found to have resistant TB strains. This led to a final sample size of 189 patients for the study. Informed consent was obtained from all the participants or their legal guardians (in case of minors) before their inclusion in the study. The consent process involved explaining the purpose of the study, the procedures involved, and the potential risks and benefits to the participants in a language they could understand. Participants were also assured of their right to withdraw from the study at any point without any impact on their treatment. The study was approved by the Ethical Review Committee of Dhaka Medical College Hospital. All data collected for the study were anonymized to maintain the confidentiality of the participants.

RESULTS

Table 1: Distribution of participants by socio-demographic characteristics (N=189)

Characteristics	Frequency	Percentage
Age		
15-30	135	71.43%
31-45	40	21.16%
>45	14	7.41%
Gender		
Male	60	31.75%
Female	129	68.25%

The majority of the participants in the study were between the ages of 15-30 years, accounting for 71.43% of the population. Females constituted a higher percentage (68.25%) than males (31.75%).

Table 2: Distribution of participants by clinical Presentations of TCL (N=189)

Clinical Presentations	Frequency	Percentage
Fever	126	66.67%
Abcess	93	49.21%
Cough	57	30.16%
Loss of weight	7	3.70%
Night Sweat	5	2.65%
Weakness	4	2.12%
Comorbidities (DM, HTN, Asthma etc.)	23	12.17%

Fever was the most common clinical presentation, reported by 66.67% of the participants. Other significant clinical presentations included abscess (49.21%) and cough (30.16%). A small percentage of individuals experienced weight loss, night sweats, weakness, and had comorbidities such as diabetes, hypertension, and asthma (12.17%)

Table 3: Distribution of participants by Neck Swelling Type (N=189)

Neck Swelling Type	Frequency	Percentage
Bilateral	44	23.28%
Unilateral (Right side)	78	41.27%
Unilateral (Left side)	67	35.45%

Neck swelling was observed as bilateral in 23.28% of cases, while unilateral swelling on the right side was more prevalent (41.27%) compared to the left side (35.45%).

Table 4: Neck Swelling related Characteristics (N=189)

Characteristics	Frequency	Percentage
Swelling Type		
Bilateral	44	23.28%
Unilateral (Right side)	78	41.27%
Unilateral (Left side)	67	35.45%
Swelling Size		
≤3 cm	97	51.32%
>3 cm	92	48.68%
Presence of Tenderness		
Yes	134	70.90%
No	55	29.10%
Swollen Node		
Single Level Node	71	37.57%
Multiple Level Nodes	118	62.43%
Node Level		
Node Level I	10	5.29%
Node Level II	88	46.56%
Node Level III	73	38.62%
Node Level IV	80	42.33%
Node Level V	111	58.73%
Node Level VI	13	6.88%

Among the participants, 23.28% had bilateral neck swelling, while the majority had unilateral swelling on either the right side (41.27%) or left side (35.45%). Most swellings had a size of ≤3 cm (51.32%), and tenderness was present in 70.90% of cases. Swollen nodes on multiple levels were found in 62.43% of participants, primarily distributed across node levels II, III, IV, V, and VI.

Table 5: Distribution of participants by laboratory Findings (N=189)

Laboratory Findings	Frequency	Percentage
High ESR	111	58.73%
Severely High ESR	5	2.65%
Sputum Positive	5	2.65%
Chest x-ray opacification	13	6.88%
FNAC Chronic granulomatous disease (CGD)	189	100.00%
Biopsy Done (n=89)		
Caescous Necrosis	88	98.88%
Suspicious Finding	1	1.12%
Gene-Xpert Done (n=96)		
Positive	84	87.50%
Negative	12	12.50%

A significant proportion of participants exhibited high erythrocyte sedimentation rate (ESR) (58.73%) and chronic granulomatous disease (CGD) on fine-needle aspiration cytology (FNAC) (100%). Gene-Xpert testing showed positive results in 87.50% of cases. Sputum positivity, chest X-ray opacification, and biopsy results were less prevalent.

Table 6: Distribution of participants by follow-up Clinical Presentations (N=189)

Follow up Clinical Presentations	3 months		6 months		10 months		1 Year	
	n	%	n	%	n	%	n	%
Fever	43	22.75%	2	1.06%	3	1.59%	0	0.00%
Neck Pain	47	24.87%	22	11.64%	15	7.94%	13	6.88%
Body weight	14	7.41%	4	2.12%	0	0.00%	0	0.00%
Neck swelling increase	37	19.58%	12	6.35%	4	2.12%	2	1.06%
Neck swelling no change	17	8.99%	17	8.99%	17	8.99%	17	8.99%
Abcess new	57	30.16%	12	6.35%	4	2.12%	1	0.53%

During the follow-up period, fever persisted in a decreasing percentage of participants, while neck pain, body weight changes, and neck swelling showed a gradual decrease. The occurrence of new abscesses decreased over time.

Table 7: Swollen node level at different follow-ups(N=189)

Swollen Node	3 months		1 Year		Surgery	
	n	%	n	%	n	%
Single Level	32	16.93%	31	16.40%	8	4.23%
Multi Level	41	21.69%	59	31.21%	17	19.10%

Over time, both single-level and multi-level swollen nodes decreased in frequency. After 1 year, surgery was performed on 4.23% of participants with single-level swollen nodes and 19.10% with multi-level swollen nodes.

DISCUSSION

Tuberculous lymphadenitis (TCL) is a common form of extrapulmonary tuberculosis characterized by the involvement of lymph nodes. Understanding the pattern of lymph node involvement and clinical presentations is crucial for accurate diagnosis and appropriate management. In this study, we investigated the pattern of lymph node involvement and clinical presentations of T-cell lymphoma (TCL) at a single-center tertiary-level hospital. The socio-demographic distribution of the study population revealed that the majority of participants were aged between 15 and 40 years (71.43%). Similar findings were reported in other studies, where the age group of 15-30 years was also predominant [12, 13].This aligns with the known epidemiology of tuberculosis, as this age group is more susceptible to tuberculosis infection due to social and occupational exposure. The clinical presentations of TCL showed that fever was the most common symptom (66.67%), followed by abscess (49.21%) and cough (30.16%). These findings are consistent with previous reports on TCL, which also highlight fever and abscess formation as predominant clinical features [2, 14]. The presence of cough, although less frequent, is in line with the respiratory nature of tuberculosis and potential involvement of the nearby respiratory tract.

These similarities in clinical presentations between our study and previous studies further support the characteristic features of TCL. Analyzing the neck swelling types, we found that unilateral swelling was more prevalent than bilateral swelling, with the right side being more commonly affected (41.27%). This finding aligns with previous studies on the lymphatic drainage patterns in TCL, which explain the dominance of the right lymphatic duct in draining the right side of the head and neck [15, 16]. However, further research is needed to validate this observation and explore the underlying mechanisms. Comparisons with previous studies would help assess the consistency of the observed pattern of neck swelling types. The distribution of swollen nodes at various levels revealed that nodes of multiple level were more frequently involved (62.43%), primarily in levels II, III, IV, V, and VI. These findings are consistent with previous studies that have also reported the involvement of multiple nodes in TCL [17, 18].

The distribution of involved nodes corresponds to the anatomical locations of the cervical lymphatic chains. This suggests that TCL primarily affects the cervical lymph nodes due to their proximity to the respiratory tract and the initial site of infection. Comparisons with previous studies would help validate the consistency of node distribution and identify any potential variations among different populations. Laboratory findings showed a high erythrocyte sedimentation rate (ESR) in a significant proportion of cases (58.73%), indicating the presence of inflammation. This finding is consistent with the granulomatous nature of TCL, characterized by the formation of immune cell aggregates [19, 20]. The high rate of positive Chronic Granulomatous Disease (CGD) on fine-needle aspiration cytology (FNAC) (100%) suggests the reliability of this test for diagnosing TCL. The positive Gene-Xpert results (87.50%) further emphasize the usefulness of molecular testing in identifying Mycobacterium tuberculosis DNA. These findings align with previous studies that emphasize the importance of ESR, FNAC, and Gene-Xpert testing in the diagnostic workup of TCL [21, 22]. Comparing our findings with previous studies, we observe several similarities, indicating a consistent pattern of lymph node involvement and clinical presentations in TCL. These similarities include the predominance of fever, abscess formation, unilateral neck swelling with right-sided predominance, involvement of multiple nodes, and laboratory findings such as elevated ESR and positive FNAC and Gene-Xpert results. Implications of these findings include improved diagnostic accuracy and appropriate management of TCL. Understanding the pattern of lymph node involvement and clinical presentations aids in distinguishing TCL from other causes of lymphadenopathy, leading to timely initiation of anti-tuberculosis therapy. Additionally, the high diagnostic yield of FNAC and Gene-Xpert testing highlights their importance in confirming the diagnosis of TCL. In resource-constrained areas where tuberculosis (TB) diagnosis can be challenging, the gold standard culture test may not always be feasible due to time constraints and invasive sample collection procedures. Similarly, the ideal method of evaluating neck nodes using CT scans may not be readily available. Therefore, alternative diagnostic approaches are employed in these settings to diagnose TB. Fine-needle aspiration cytology (FNAC) is a commonly used procedure, offering a reliable means of obtaining tissue samples for examination. Gene Xpert testing plays a crucial role in identifying Mycobacterium tuberculosis DNA, aiding in the diagnosis of TB. Ultrasound of the neck is a non-invasive imaging technique that can help detect abnormalities in the lymph nodes and guide further diagnostic procedures. Additionally, the erythrocyte sedimentation rate (ESR), as a supportive laboratory finding, can indicate the presence of inflammation and serve as a supplementary tool in TB diagnosis. The combination of FNAC, Gene Xpert testing, ultrasound, and ESR provides a practical approach to diagnosing TB in resource-constrained areas where more advanced diagnostic techniques may not be readily available or practical.

Limitations of the Study

This study has limitations that should be acknowledged. Firstly, it was conducted in a single hospital with a small sample size, potentially limiting the generalizability of the findings to the wider community. Access to certain diagnostic procedures, such as CT scans, may have been limited, and the invasive nature of some procedures, like FNAC, could have influenced participant preferences. These factors may have affected the selection and representation of the study population, warranting caution when interpreting the findings.

CONCLUSION

Tuberculous lymphadenitis (TCL) found consistent patterns in lymph node involvement and clinical presentations. The majority of participants were aged 15-40 years, with fever, abscess formation, and cough being common symptoms. Unilateral neck swelling, particularly on the right side, and involvement of multiple nodes in specific levels were observed. Laboratory findings showed elevated ESR and positive results on FNAC and Gene-Xpert testing. These findings improve diagnostic accuracy and highlight the importance of timely treatment initiation for TCL.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

RECOMMENDATION

The findings of this study, which investigated the pattern of lymph node involvement and clinical presentations of tuberculous lymphadenitis (TCL), it is recommended to consider TCL as a possible diagnosis in patients presenting with fever, abscess formation, unilateral neck swelling (predominantly on the right side), and involvement of multiple lymph nodes, particularly in levels II, III, IV, V, and VI. The study highlights the importance of laboratory tests such as erythrocyte sedimentation rate (ESR), fine-needle aspiration cytology (FNAC), and Gene-Xpert testing in confirming the diagnosis of TCL. These findings contribute to improved diagnostic accuracy and appropriate management, facilitating timely initiation of anti-tuberculosis therapy.

REFERENCES

1. Chou, C. H., Yang, T. L., & Wang, C. P. (2014). Ultrasonographic features of tuberculous cervical lymphadenitis. *Journal of Medical Ultrasound*, *22*(3), 158-163.
2. Kanlikama, M., Mumbuç, S., & Bayazit, Y. (2000). Management strategy of mycobacterial cervical lymphadenitis. *The Journal of Laryngology & Otology*, *114*(4), 274-278.
3. Karabay, O., Kilic, S., Gurcan, S., Pelitli, T., Karadenizli, A., Bozkurt, H., & Bostanci, S. (2013). Cervical lymphadenitis: tuberculosis or tularaemia?. *Clinical Microbiology and Infection*, *19*(2), E113-E117.
4. Wright, C. A., Warren, R. M., & Marais, B. J. (2009). Fine needle aspiration biopsy: an undervalued diagnostic modality in paediatric mycobacterial disease. *The International journal of tuberculosis and lung disease*, *13*(12), 1467-1475.
5. Van Zyl, L., Du Plessis, J., & Viljoen, J. (2015). Cutaneous tuberculosis overview and current treatment regimens. *Tuberculosis*, *95*(6), 629-638.
6. Brown, R. L., & Azizkhan, R. G. (1998). Pediatric head and neck lesions. *Pediatric Clinics of North America*, *45*(4), 889-905.
7. Gosche, J. R., & Vick, L. (2006, May). Acute, subacute, and chronic cervical lymphadenitis in children. In *Seminars in pediatric surgery* (Vol. 15, No. 2, pp. 99-106). WB Saunders.
8. Attard, L., Tadolini, M., De Rose, D. U., & Cattalini, M. (2018). Overview of fever of unknown origin in adult and paediatric patients. *Clin Exp Rheumatol*, *36*(Suppl 110), 10-24.
9. Khan, R., Harris, S. H., Verma, A. K., & Syed, A. (2009). Cervical lymphadenopathy: scrofula revisited. *The Journal of Laryngology & Otology*, *123*(7), 764-767.
10. McCall, C. M., Booth, A. L., & Riddle, N. D. (2019). Soft Tissue and Lymph Nodes of the Head and Neck. *Practical Head and Neck Pathology: Frequently Asked Questions*, 277-329.
11. King, R., Perry, A., & Smith, L. (2023). *Biopsy Interpretation of the Lymph Nodes*. Lippincott Williams & Wilkins.
12. Kamal, M. S., Hoque, M. H. E., Chowdhury, F. R., & Farzana, R. (2016). Cervical tuberculous lymphadenitis: clinico-demographic profiles of patients in a secondary level hospital of Bangladesh. *Pakistan journal of medical sciences*, *32*(3), 608.
13. Hemalatha, A., Shruti, P. S., Kumar, M. U., & Bhaskaran, A. (2014). Cytomorphological patterns of tubercular lymphadenitis revisited. *Annals of medical and health sciences research*, *4*(3), 393-396.
14. Rahman, M. M., Haque, M. N., Kadir, M. A., & Kallol, M. R. (2012). The incidence of tuberculous cervical lymphadenitis-three year study of sixty cases. *Bangladesh Medical Journal*, *41*(2), 9-12.
15. Sergi, C. M. (2020). *Pathology of Childhood and Adolescence: An Illustrated Guide*. Springer Nature.
16. Lee, E., Biko, D. M., Sherk, W., Masch, W. R., Ladino-Torres, M., & Agarwal, P. P. (2022). Understanding lymphatic anatomy and abnormalities at imaging. *RadioGraphics*, *42*(2), 487-505. https://pubs.rsna.org/doi/full/10.1148/rg.210104
17. Gemsenjäger, E., Perren, A., Seifert, B., Schüler, G., Schweizer, I., & Heitz, P. U. (2003). Lymph node surgery in papillary thyroid carcinoma. *Journal of the American College of Surgeons*, *197*(2), 182-190.
18. Robbins, K. T. (1998). Classification of neck dissection: current concepts and future considerations. *Otolaryngologic Clinics of North America*, *31*(4), 639-655.
19. Pukhalskaya, T., Smoller, B. R., Menke, D. M., & Sokumbi, O. (2021). A Previously Unrecognized Granulomatous Variant of Gamma-Delta T-Cell Lymphoma. *Dermatopathology*, *8*(2), 221-228.
20. Geller, S., Myskowski, P. L., & Pulitzer, M. (2018, March). NK/T-cell lymphoma, nasal type, γδ T-cell lymphoma, and CD8-positive epidermotropic T-cell lymphoma—clinical and histopathologic features, differential diagnosis, and treatment. In *Seminars in cutaneous medicine and surgery* (Vol. 37, No. 1, p. 30). NIH Public Access.
21. Khalil, K. F., & Butt, T. (2015). Diagnostic yield of bronchoalveolar lavage gene Xpert in smear-negative and sputum-scarce pulmonary tuberculosis. *J Coll Physicians Surg Pak*, *25*(2), 115-118.
22. Peto, H. M., Pratt, R. H., Harrington, T. A., LoBue, P. A., & Armstrong, L. R. (2009). Epidemiology of extrapulmonary tuberculosis in the United States, 1993–2006. *Clinical Infectious Diseases*, *49*(9), 1350-1357.