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Surgical Prospects On Cervical Tuberculous Lymphdadenitis: A Retrospective Study

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Abstract:
Tuberculosis remains a significant public health concern, particularly in India, where extrapulmonary tuberculosis cases are on the rise. Cervical tuberculous lymphadenitis (TBL) is one of the most common extrapulmonary manifestations of tuberculosis. While medical treatment is the cornerstone of TBL management, surgery is indicated in specific clinical scenarios, such as drug-resistant cases, long-standing TBL, and asymptomatic cervical lymphadenopathy. This case series highlights the importance of early diagnosis and surgical intervention in these specific scenarios. We conducted a retrospective study of 36 patients with cervical lymphadenitis. Surgical intervention was performed in 13 patients, including those with multidrug-resistant tuberculosis, long-term TBL, and asymptomatic cases. Histopathological examination and/or CBNAAT confirmed tuberculosis in all asymptomatic cases. Our findings suggest that surgical intervention plays a crucial role in the diagnosis and management of TBL, particularly in challenging cases. A multidisciplinary approach involving infectious disease specialists, surgeons, and pathologists is essential to ensure accurate diagnosis and treatment. Surgical intervention, when combined with antituberculosis therapy, can effectively treat TBL, minimize complications, and improve patient outcomes.

Key words: *Tuberculous lymphadenitis (TBL), Tuberculosis, Extrapulmonary tuberculosis, Surgical intervention*

Introduction:

Tuberculous lymphadenitis refers to the inflammation of lymph nodes caused by Mycobacterium tuberculosis infection. This form of tuberculosis most commonly affects the lymph nodes in the neck (cervical lymphadenitis) but can occur in other regions as well. The infection typically results from the spread of tuberculosis bacteria through the lymphatic system, leading to the formation of granulomas and caseation necrosis within the lymph nodes [1, 2]. Cervical tuberculous lymphadenitis (TBL) remains one of the most common extrapulmonary manifestations of tuberculosis, particularly in countries with high TB prevalence, such as India. The rise in extrapulmonary tuberculosis cases over recent years has emphasized the importance of early and accurate diagnosis in improving patient outcomes [2, 3]. Symptoms of TBL often include painless swelling of the lymph nodes, which can sometimes form visible lumps or abscesses, and in advanced cases, sinus tracts or Sinus tract formatione. These local symptoms are often accompanied by systemic signs of tuberculosis, such as fatigue, weight loss, low-grade fever, and night sweats [3]. Despite the introduction of effective anti-

tuberculosis therapy, tuberculous lymphadenitis continues to pose significant clinical challenges, especially in cases resistant to medical management or those that present with complications such as abscess formation or Sinus tract formation development [4, 5]. Medical treatment with anti-tuberculosis drugs remains the cornerstone of TBL management, but surgery is reserved for specific cases where medical therapy alone is insufficient or complications arise. Surgical interventions, such as drainage or excision of the affected lymph nodes, are primarily considered when there is significant abscess formation, failure of drug therapy, or a diagnostic need for tissue sampling [5]. Surgical excision helps alleviate symptoms, prevent complications, and provides material for definitive histopathological diagnosis, playing an important role in the overall management of TBL [6].

In patients with large abscesses, persistent lymph node enlargement, or those who do not respond to conventional drug therapy, surgery can offer relief and help to resolve persistent infection. By removing necrotic and infected tissue, surgical excision reduces the bacterial load, promotes healing, and prevents the spread of the infection to surrounding tissues [5]. Furthermore, excisional biopsy obtained during surgery allows for histopathological confirmation of tuberculosis, especially in cases where fine-needle aspiration cytology (FNAC) is inconclusive [6]. The decision to perform surgery is made on a case-by-case basis, considering factors such as the severity of symptoms, the size and location of abscesses, and the patient's response to medical therapy. In cases where lymph node abscesses persist or complications such as Sinus tract formations develop, surgical intervention becomes necessary [5]. Early surgical intervention has been associated with better outcomes in severe cases, particularly in pediatric patients, where deep neck abscesses may pose risks of airway obstruction or major vessel involvement [12]. In conclusion, while medical therapy remains the primary treatment for cervical tuberculous lymphadenitis, surgery plays a vital role in specific clinical scenarios where medical management fails or complications develop. Surgical excision of affected lymph nodes can help alleviate symptoms, prevent further complications, and ensure an accurate diagnosis through histopathological examination. The integration of surgery with anti-tuberculosis drug therapy can improve outcomes, especially in cases that are resistant to conventional treatment.

Methods:

In a retrospective study involving 36 patients with cervical lymphadenitis, clinical data were collected to assess the outcomes of surgical intervention. The primary aim of the study was to evaluate the efficacy of surgery in both diagnostic and curative capacities, especially in challenging cases of extensively drug-resistant tuberculosis (XMDR TB), chronic long-standing TB lymphadenitis, and cases where cervical lymphadenopathy presented as asymptomatic swelling [1, 2]. By analysing this clinical data, the study aimed to provide insights into how surgical interventions could aid in the management of complex tuberculosis manifestations, particularly where medical treatment alone was insufficient [3, 4]. The collected data focused on several key outcomes, including symptom relief, the reduction in disease progression, and the accuracy of histopathological diagnoses obtained through surgical excision. The study found that surgical intervention played a crucial role in cases of XMDR TB and chronic TB lymphadenitis, where medical therapy had limited success. In such cases, excision of affected lymph nodes not only helped alleviate symptoms but also provided tissue for biopsy, allowing for more definitive diagnoses in cases where clinical and radiological findings were inconclusive [5]. Additionally, surgical excision helped prevent further complications such as abscess formation and Sinus tract formation development, which are common in long-standing TB lymphadenitis [6].

The retrospective analysis concluded that surgery remains a valuable tool, particularly in cases where drug resistance or chronic infection limits the effectiveness of pharmacological treatments. By

combining surgical intervention with ongoing medical therapy, clinicians can achieve better outcomes, both diagnostically and curatively, in managing cervical lymphadenitis associated with tuberculosis [5]. This study highlights the importance of considering surgical approaches in specific clinical scenarios, reinforcing the need for individualized patient care in managing complex TB cases.

Figure 1: Swelling over submandibular region

Figure 2: Posterior Tringle Neck swelling

Figure 3: Intra operative picture of cervical lymph nodes

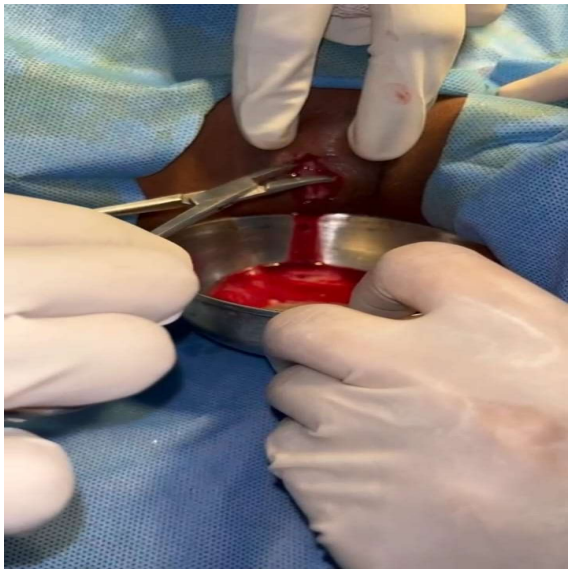

Figure 4: Intra operative picture of incision and drainage

Case Study 1:

A 21-year-old male, a software engineer by profession, presented with a swelling in the right cheek region. On clinical examination, there was a diffuse swelling located in the submandibular region as shown in Figure 1, suggestive of a localized abscess. Given the patient's symptoms and the clinical suspicion of tuberculosis, further evaluation was planned. The patient underwent a surgical procedure where a horizontal incision was made along the lower border of the mandible as shown in Figure 3. Intraoperatively, approximately 50ml of pus was drained from the abscess site. The collected pus was sent for further investigation, including CBNAAT (Cartridge-Based Nucleic Acid Amplification Test), which confirmed the presence of *Mycobacterium tuberculosis*, establishing the diagnosis of TB cervical lymphadenitis. Following the procedure, the patient was started on a regimen of anti-tuberculosis therapy (ATT). The early surgical intervention, combined with ATT, resulted in a marked improvement in the patient's condition. The abscess resolved, and there was no recurrence of swelling or pus formation postoperatively.

This case highlights the importance of surgical intervention in managing TB lymphadenitis, especially when abscess formation occurs. In this patient, the timely surgical drainage not only helped alleviate the symptoms but also facilitated a definitive diagnosis through CBNAAT testing. The use of CBNAAT played a critical role in confirming tuberculosis as the underlying cause, allowing for prompt initiation of appropriate therapy.This case underscores the need for early surgical management in patients presenting with abscesses in TB cervical lymphadenitis. Combining surgical intervention with diagnostic tools like CBNAAT and ATT provides a comprehensive approach that improves patient outcomes and reduces the risk of complications.

Case study 2:

A 35-year-old male presented with a swelling on the lateral aspect of his neck as shown in Figure 2, which had not responded to conventional antibiotics. Despite initial medical management, the swelling persisted, and the patient underwent an incision and drainage procedure as shown in Figure 4. Intraoperatively, the drained fluid was sent for further investigation, and the CBNAAT (Cartridge-Based Nucleic Acid Amplification Test) confirmed the presence of *Mycobacterium tuberculosis*, diagnosing the case as TB cervical lymphadenitis. The patient was subsequently started on anti-tuberculosis therapy (ATT). This case is part of a larger study involving 36 patients diagnosed with TB cervical lymphadenitis. Out of these 36 cases, 13 required surgical intervention due to various factors, including multidrug-resistant tuberculosis (MDR-TB), long-term TB lymphadenitis, asymptomatic cases, and recurrent TB lymphadenitis. In these cases, surgery was deemed necessary either due to the failure of medical management or to provide histopathological confirmation where the diagnosis was unclear. An observational study followed by a retrospective chart review was conducted to evaluate the outcomes of these cases. The study aimed to assess the increase in recovery rates and the reduction in mortality and morbidity following surgical intervention. The findings indicated that early surgical intervention in the 13 cases significantly improved patient outcomes by reducing complications such as abscess formation, Sinus tract formation development, and prolonged illness. This case emphasizes the importance of considering surgical intervention in patients with TB lymphadenitis who are unresponsive to antibiotics or require further diagnostic clarification. By combining surgery with ATT, patients experienced faster recovery and a reduction in the overall burden of the disease, highlighting the role of surgery in managing complex cases of TB lymphadenitis.

Objective:

The primary objective of surgical intervention in TB lymphadenitis is to provide effective treatment, improve the patient's health, and address complications while reducing the risk of spreading the infection. Surgical intervention is typically considered when medical treatments, specifically anti-tuberculosis therapy (ATT), have been exhausted, or in cases where complications such as abscess formation, Sinus tract formation development, or persistent lymph node enlargement occur. The decision to proceed with a surgical approach, such as excision and biopsy or incision and drainage, depends on the patient's condition and the surgeon's evaluation [1, 2]. Surgical intervention is often combined with ATT to ensure comprehensive treatment of tuberculosis lymphadenitis. ATT addresses the infection systemically, while surgery helps resolve localized complications that are resistant to medical treatment alone [3]. The combined approach of surgery and medical therapy is critical, especially in more complicated cases, to ensure a full recovery and to prevent the recurrence or spread of the infection. The decision to pursue surgical intervention in cases of TB cervical lymphadenitis should be made on an individual basis, considering factors such as the extent of the disease, response to medical treatment, and the overall health of the patient [4]. Surgery is generally reserved for cases where abscesses persist, lymph node enlargement is significant, or complications such as Sinus tract formation formation have developed. In such instances, surgery can offer significant relief by removing necrotic and infected tissue, reducing bacterial load, and promoting healing [5]. An additional benefit of surgical intervention is the ability to obtain tissue for histopathological examination. In cases where diagnostic methods such as fine-needle aspiration cytology (FNAC) have been inconclusive, surgical excision allows for definitive diagnosis, guiding further treatment and ensuring the most appropriate management plan [6]. This is particularly important when differential

diagnoses, such as malignancy, must be ruled out. In complex cases, including those involving extensively drug-resistant tuberculosis (XDR TB) or chronic TB lymphadenitis, surgical intervention becomes even more critical. Patients with these conditions often fail to respond adequately to ATT alone, making surgery an essential part of treatment. In such cases, surgical excision or drainage not only alleviates symptoms but also helps prevent the formation of sinus tracts or Sinus tract formations, which can occur when the infection remains uncontrolled [7]. The management of tuberculosis lymphadenitis typically involves a multidisciplinary approach, with collaboration between surgeons, infectious disease specialists, radiologists, and other healthcare professionals [8]. This team-based strategy ensures that both diagnosis and treatment are optimized for the patient's condition, particularly in more complex or drug-resistant cases. Surgeons play a key role in assessing the need for intervention, while infectious disease specialists focus on optimizing ATT to address the systemic infection [9]. In pediatric cases, surgical intervention requires special consideration. Deep neck abscesses in children can pose risks such as airway obstruction or pressure on critical structures. Early surgical intervention in these cases has been associated with improved outcomes by alleviating symptoms quickly and preventing severe complications [10]. Additionally, obtaining tissue through excision allows for a definitive diagnosis, which is particularly important for guiding subsequent treatment in pediatric patients. In inference, although medical therapy remains the primary approach to managing TB lymphadenitis, surgical intervention plays an essential role in cases where medical treatment has failed or complications have developed. The decision to perform surgery should be carefully considered, based on the individual patient's needs. Combining surgery with ATT provides a comprehensive treatment approach, addressing both the local and systemic aspects of the infection. A multidisciplinary approach is critical to achieving optimal patient outcomes, particularly in complex or drug-resistant cases [11].

Results:

Out of 36 patients diagnosed with TB cervical lymphadenitis, 13 underwent surgical intervention over a period of 3 months. These interventions were primarily required in cases of multi-drug-resistant tuberculosis (MDR-TB), long-term TB lymphadenitis, and asymptomatic cases that presented challenges for diagnosis and treatment. Surgical procedures, including excision and drainage, were necessary for these patients, as medical management alone was not sufficient to address the disease or its complications. For asymptomatic cases, where clinical presentation did not reveal obvious signs of tuberculosis, histopathological examination following surgery confirmed the diagnosis of TB lymphadenitis. Additionally, CBNAAT (Cartridge-Based Nucleic Acid Amplification Test) provided a conclusive diagnosis in these cases, confirming the presence of *Mycobacterium tuberculosis*. This combination of surgical intervention and diagnostic testing ensured early detection and proper management of the disease, especially in patients where conventional diagnostic methods had limitations. The 13 patients who received surgical intervention demonstrated decreased morbidity and improved outcomes compared to the group treated solely with anti-tuberculosis therapy (ATT). The early diagnosis and surgical intervention in these patients allowed for the removal of infected tissues, reduced the bacterial load, and promoted faster recovery. This, in turn, resulted in a lower incidence of complications, such as abscess formation and Sinus tract formation development, which are common in untreated or inadequately treated TB lymphadenitis.

Overall, the study highlights the importance of surgical intervention in selected cases of TB cervical lymphadenitis, particularly in MDR-TB, long-term TB lymphadenitis, and asymptomatic patients.

Early surgical intervention, combined with ATT, provided better outcomes, decreased morbidity, and improved the overall prognosis for these patients.

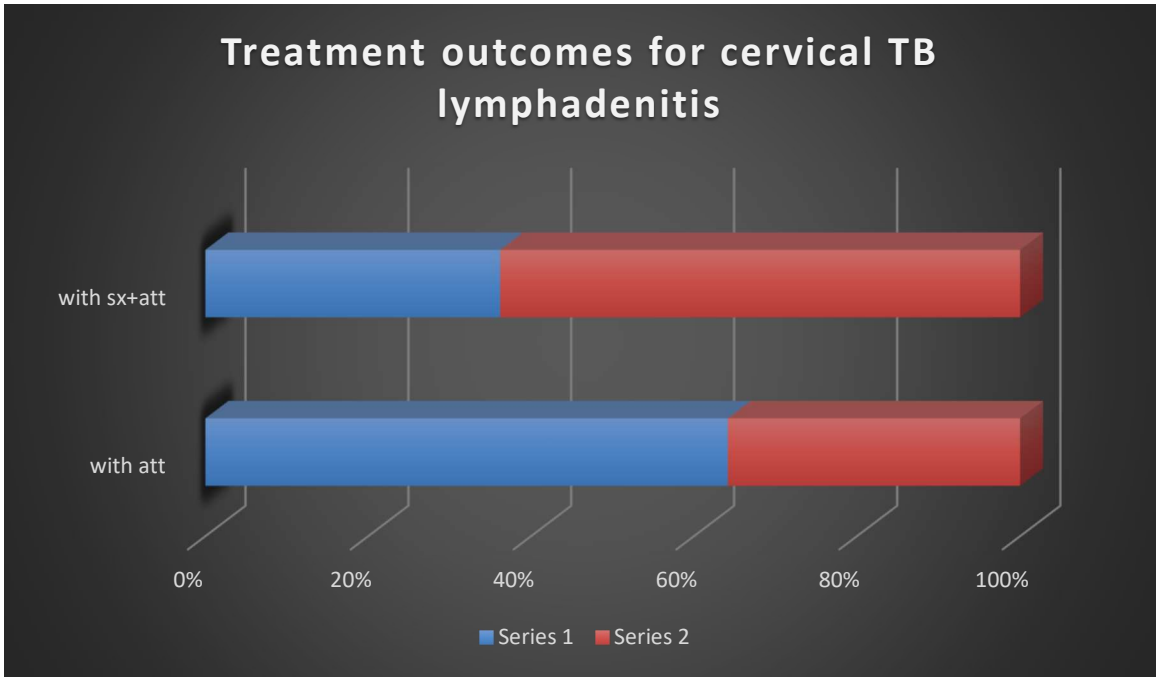

Figure 5: Treatment comparison between ATT alone and ATT with surgery.

Graph Interpretation:

The bar chart according to Figure 5 which illustrates the treatment outcomes for patients with cervical tuberculosis lymphadenitis (TBL), comparing two groups: those treated with anti-tuberculosis therapy (ATT) alone and those who underwent a combination of ATT and surgical intervention. The blue and orange bars represent the percentage of patients showing different recovery outcomes under each treatment method.

In cases where surgery was combined with ATT, there was a significant improvement in recovery outcomes, with approximately 60% of patients achieving better health post-operatively. These results are particularly notable in cases with abscess formation, recurrence, or complications, as well as in asymptomatic patients presenting with enlarged lymph nodes. This suggests that surgical drainage or excision, when used alongside ATT, can effectively address complications that might be resistant to medical treatment alone.

In contrast, patients who were treated with ATT alone showed a recovery rate of about 30%. While ATT remains the cornerstone of TB management, this data highlights the limitations of medical therapy in cases with significant complications, such as abscess formation or when lymphadenopathy persists. The difference in outcomes between the two groups emphasizes the importance of timely surgical intervention, especially in multi-drug-resistant cases or those that fail to respond adequately to ATT.

Discussion:

Surgery is indicated, or in other words, typically reserved for cases where there is a lack of response to medical therapy. In cases of asymptomatic patients, where diagnosis is difficult, or in instances of complications such as abscess formation or sinus formation, it must be drained or excised, respectively,

which aids in resolving the infection. Excision of the affected lymph nodes may be considered, particularly when abscesses complicate the disease [1, 3, 5]. This procedure is typically done through lymph node dissection, which decreases morbidity by allowing early diagnosis and intervention. Early surgical intervention can prevent complications such as cold abscesses and retropharyngeal abscesses, which are critical in preventing further spread and complications of tuberculosis [6, 10, 13].

Postoperative care is vital, as patients are continued on antitubercular drugs (ATT) to ensure complete eradication of the infection [12]. Studies have indicated that postoperative management with ATT significantly reduces the chances of recurrence or complications, particularly in drug-resistant cases [7, 8]. Follow-up care is essential to monitor reoccurrence or the development of new complications [11]. The decision to proceed with surgery is tailored to each patient, depending on the severity of the infection, the risk of complications, and the expected benefits. The benefits of surgery must be weighed against potential risks on a case-by-case basis [2, 4, 14].

Lymph node dissection has been demonstrated to effectively reduce the need for further interventions by ensuring complete removal of the infected tissue and improving diagnostic accuracy through histopathological examination [15, 17, 18]. For pediatric patients, studies have indicated that surgical excision plays a crucial role in resolving nontuberculous mycobacterial lymphadenitis, further validating the use of surgical approaches in complex cases [19, 20]. However, the multidisciplinary approach involving surgeons, infectious disease specialists, and pathologists is essential to ensure the best outcomes [9, 21].

Conclusion:

In conclusion, surgical considerations for cervical tuberculosis lymphadenitis are crucial in managing complex and resistant cases of the disease. While anti-tubercular drug treatment (ATT) remains the cornerstone of therapy, surgery becomes essential in situations where medical management alone is insufficient, such as in cases of abscess formation, recurrence, or persistent lymph node enlargement. Biopsy may also be employed as part of the surgical approach, providing diagnostic clarification when there is suspicion of malignancy or when initial diagnostic methods are inconclusive [1, 2]. A multidisciplinary approach, involving collaboration between surgeons, infectious disease specialists, and pathologists, is key to effective management of cervical TB lymphadenitis [3]. This team-based strategy allows for tailored treatment plans based on the individual needs of the patient, ensuring that both the local and systemic aspects of the infection are addressed. Rigorous monitoring and follow-up after surgery are essential to evaluate the efficacy of treatment, identify potential recurrence, and manage any arising complications [4, 5]. The surgical management of cervical TB lymphadenitis underscores the necessity of a patient-specific strategy. Achieving an optimal balance between the benefits of surgery—such as symptom alleviation, complication prevention, and faster recovery—and medical therapy is vital to managing this form of extrapulmonary tuberculosis effectively [6, 7]. Surgery plays a critical role in difficult-to-treat cases, helping to prevent serious complications like fistula development or abscess formation, and it can significantly improve the resolution of long-standing infections [8, 9]. Ultimately, the integration of surgical intervention with ATT can substantially enhance patient outcomes. In carefully selected cases, surgery provides a comprehensive approach to managing TB lymphadenitis, improving recovery, reducing morbidity, and decreasing the likelihood of recurrence [10].

Conflict of Interest:

The authors declare that there is no conflict of interest regarding the publication of this paper.

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