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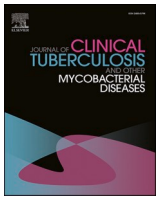

Lymph node dissection effectively shortens the course of anti-tuberculosis treatment

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ABSTRACT

Objective: To evaluate the clinical efficacy of postoperative ultra-short-course chemotherapy in treating cervical lymph node tuberculosis in the Wuhan region.

Methods: Follow-up of patients in the surgery and non-surgery group after discharge, evaluating the number of cervical lymph nodes during the administration of antituberculosis drugs.

Results: The age of the patients in the surgical therapy group ranged from 6 to 83 years old with an average age of 45 and a standard deviation of 20. The number of cervical lymph nodes in the patients ranged from 1.61 to 8.15. The average antituberculosis treatment duration before surgery for patients in the surgical group was 98.02 days, while for patients in the non-surgical group it was 96.13 days. The average length of hospital stay for patients receiving surgical treatment was 12.76 days, while for patients receiving non-surgical treatment it was 8.74 days. The average antituberculosis treatment duration after discharge for patients in the surgical group was 205 days, with a standard deviation of 42.39, while for patients in the non-surgical group it was 372 days, with a standard deviation of 71.54. The T-test results for antituberculosis treatment during hospitalization and after discharge were 98.3x10-10 and 5.02x10-67, respectively.

Conclusion: After surgical treatment of cervical lymph node tuberculosis, the effectiveness of a 4–6 month short-course chemotherapy in Wuhan region is not weaker than the effectiveness of a conventional 6–9 month drug treatment.

Dear Editor,

We have read with great interest a recent study of Pei-Jean I. Feng regarding Trends in tuberculosis clinicians' adoption of short-course regimens for latent tuberculosis infection [1]. They identified a trend towards adoption of shorter regimens [1]. At present, medicine therapy remains the main treatment for all patients in lymph node tuberculosis, but the work show the value of surgery in some indications [2]. Due to the significant impact on patients' lives caused by long-term use of anti-tuberculosis drugs, along with the side effects of the medication leading to decreased appetite and financial burden, it would be greatly beneficial for patients if there were methods to shorten the duration of anti-tuberculosis drug treatment as much as possible [3]. In a similar study, we have further found out that a surgical treatment method can completely remove lymph node tuberculosis with accompanying infection in the neck, while effectively shortening the course of anti-tuberculosis treatment.

Although cervical lymph node tuberculosis (CLTB) is not spread after treatment with medical anti-tuberculosis drugs [4], the disease is prone to complications such as purulent infection, long-term sinus, and skin necrosis [5]. Tuberculosis treatment requires combination therapy and long-term treatment, and these drugs are associated with various side effects, which may lead to a high incidence of serious illnesses, including decreased appetite, deafness, liver dysfunction, decreased vision, decreased hearing, and in some cases even death [3,6]. In our research in the Wuhan region, we found that surgical removal of cervical lymph node tuberculosis can effectively shorten the duration of anti-tuberculosis drug treatment. Patients who do not undergo surgical treatment must receive a longer duration of anti-tuberculosis drug treatment compared to patients who undergo surgery.

From January 2018 to August 2021, a total of 1201 suspected lymph node tuberculosis (LNTB) patients were treated in Wuhan Pulmonary Hospital from January 2018 to August 2022, with 993 being clinically diagnosed with cervical lymph node tuberculosis and 208 being diagnosed with tuberculosis in other parts of the lymph nodes. Among these 993 patients, 399 were cervical lymph node tuberculosis patients complicated with concurrent pulmonary tuberculosis. However, these 399 patients were not included in the final study as the course of treatment for pulmonary tuberculosis affects the overall duration of anti-tuberculosis drug treatment. Additionally, 76 patients were complicated with osseous tuberculosis, and 158 patients had tuberculosis in other parts of the body. Among the 993 patients, 360 had cervical lymph node tuberculosis, based on patient preferences and surgical indications, 91 patients received only anti-tuberculosis drug treatment, while 269 patients underwent surgery treatment. In the surgical group, 262 patients underwent functional cervical lymph node dissection, 4 patients underwent abscess excision and drainage, and 3 patients underwent lymph node biopsy. Information on patients' clinical outcomes (cured or follow-up after discharge) and basic characteristics, including age, gender, anti-tuberculosis treatment time prior to surgery, hospital stay, post-operative anti-tuberculosis treatment time, and cervical lymph nodes color Doppler ultrasonography examination results one month to six months after surgery, was gathered.

Table 1 described the data distribution. Age range of patients was from 2 to 83 years old, with an average age of 38 and a standard

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Table 1
Summary table of the patient characteristics.

	Total	Surgery	Non-surgery
Age, years			
Range	2–83	2–75	6–83
Mean (SD)	38(16)	36(14)	45(20)
Gender (%)			
Male	29.44 %	31.01 %	2.00 %
Female	70.56 %	68.99 %	98.00 %
The number of lymph nodes			
1 month	8.15(2.87)	1.00(0.91)	4.57(1.12)
2 months	1.84(1.77)	0.86(0.84)	4.46(1.07)
3 months	1.72(1.75)	0.77(0.83)	4.32(1.11)
4 months	1.61(1.73)	0.69(0.7)	4.17(1.16)
The time of anti-tuberculosis treatment after discharge			
Range	1–24	1.41–12	1–24
Mean (SD)	244.8(86.1)	205.34(42.39)	372.72(71.54)

deviation of 20. The surgical treatment group's patients had an age range of 2 to 75 years old, with an average age of 38 and a standard deviation of 16. The non-surgical treatment group's patients had an age range of 6 to 83 years old, with an average age of 45 and a standard deviation of 20. In this paper, 360 HNTB patients were collected, of whom 258 were treated with surgery and 66 were not treated with surgery during their hospital stay. The quantitative analysis of lymph nodes was tracked using color Doppler ultrasonography for one month, two months, three months, and four months. The average anti-tuberculosis time for patients treated with surgery was 98.02 days and for patients not treated with surgery was 96.13 days before admission to the hospital. During the hospital stay, the average anti-tuberculosis time was 12.76 days for surgical patients and 8.74 days for those without surgical treatment. After leaving the hospital, the average anti-tuberculosis time was 205 days with a standard deviation of 42.39 for surgical treatment patients and 372 days with a standard deviation of 71.54 for those without surgical treatment. In this study, the surgical treatment group and non-surgical treatment group were analyzed using an alternative hypothesis *t*-test method with anti-tuberculosis treatment time as the variable. *T*-test result during and after hospitalization was $98.3 \times 10\text{-}10$ and $5.02 \times 10\text{-}67$, respectively. Based on these results, it was discovered that there was a significant difference in anti-tuberculosis treatment time between the surgical treatment group and non-surgical treatment group after hospitalization. Furthermore, the patients in the surgical treatment group had a much lower average treatment time (205 days with standard deviation 42.39) compared to the non-surgical treatment group (average 372 days with standard deviation 71.54). The primary endpoint was the number of lymph nodes on color Doppler ultrasonography of the neck 4 months after discharge. Regular evaluation was performed by the patient at the hospital after being discharged since it was necessary to continue taking anti-tuberculosis medications.

The time of anti-tuberculosis drug treatment could be effectively shortened by the surgical removal of cervical lymph node tuberculosis. Our study found that functional cervical lymph node dissection can reduce the duration of oral anti-tuberculosis drug treatment while still achieving satisfactory therapeutic effects. We do not deny that there are corresponding risks with surgery, such as the aesthetics of the surgical incision on the neck skin and the risk of damage to cervical blood vessels and nerves [7]. At present, drug therapy is still the main treatment for cervical lymph node tuberculosis. We have provided a new approach to reduce the duration of drug treatment for patients. Compared to the current treatment plan, it undoubtedly increases the risk of surgery [7], which requires clinical surgeons with rich experience and familiarity with anatomical structures to minimize the risk as much as possible. However, at the same time, this treatment can reduce the duration of drug side effects for patients, improve their quality of life, especially for patients who cannot tolerate long-term medication.

Currently, this surgery is being performed at Wuhan Pulmonary Hospital in central China, and the patients' conditions are being closely monitored. We will continue to monitor the postoperative conditions of the patients in the long term. Additionally, the surgical approach still needs further development and customization, incorporating more clinical characteristics, so that it can be practically applied in other research teams or hospitals. Furthermore, compared to long-term treatment of lymph node tuberculosis with medication alone, surgery requires more multicenter studies, clinical data, and long-term follow-up studies to evaluate its safety and effectiveness. It is also important to establish standardized surgical procedures and training plans to ensure consistent surgical outcomes and reduce the incidence of complications [8]. As the research progresses, functional cervical lymph node dissection may become a valuable tool for treating infectious diseases such as tuberculosis. It has the potential to significantly reduce the burden of long-term medication and improve patient outcomes, especially in resource-limited environments where access to medications is limited, for patients who cannot tolerate long-term anti-tuberculosis drug treatment, and for some drug-resistant patients, including those with poor response to medication treatment. The possibilities of this surgery are limitless, and seeing its revolutionary potential in the treatment of tuberculosis is exciting.

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2. Ethics approval

The ethics committee of Wuhan Pulmonary Hospital (2022-61) reviewed and approved the study protocol. All participants gave written informed consents before enrollment. Patient records and information were de-identified prior to analysis.

All procedures in this study were carried out in accordance with relevant laws and institutional guidelines and were approved by an ethics committee. Informed consent was obtained from patients, and privacy rights were always observed.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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