

## Non-Surgical Treatment of a Case of Skipped Multisegmental Spinal Tuberculosis with Tuberculous Pleurisy

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### Keywords:

Anti-tuberculosis chemotherapy; Non-surgical treatment; Skipped multisegmental spinal tuberculosis; Tuberculous pleurisy

### Abbreviations:

VAS: visual analogue scale; CT :Computed Tomography; MRI = Magnetic Resonance Imaging; T: Thoracic vertebra; NSAIDs :Nonsteroidal Anti-inflammatory Drugs; VAS: visual analogue scal; ESR: erythrocyte sedimentation rate; PPD: Tuberculin purified protein derivative

## 1. Abstract

### Objectives

We report a case of skipped multisegmental spinal tuberculosis with tuberculous pleurisy treated with non-surgical management. We discuss the literature, trying to shine a light on the non-surgical treatment.

### Patients

The patient is a 40-year-old woman who presented with chest and back pain for one year, aggravated with dyspnea for ten days. The diagnosis is spinal tuberculosis and bilateral tuberculous pleural effusion.

### Methods

Avoiding weight-bearing, strengthening nutrition, avoiding fatigue, rest and standard chemotherapy by isoniazid 300mg, rifampicin 450mg, pyrazinamide 750mg, ethambutol 750mg once a day for three months, the chemotherapy regimen was changed to isoniazid 300mg, rifampicin 450mg, Pyrazinamide 750mg, continue to take daily medication for 15 months.

### Results

Healing was achieved after she was treated.

### Conclusions

This case suggests that non-surgical treatments of comprehensive

treatment through a combination of chemotherapy, rest and nutritional support can provide a good prognosis to a multi-segment spinal tuberculosis with tuberculous pleurisy.

## 2. Introduction

Patients with skipped multisegmental spinal tuberculosis concurrent with tuberculous pleurisy and pleural effusion are in a highly stressed state. Their immune resistance is low, and the risks associated with surgical treatment are of serious concern, sometimes with devastating consequences [1]. However, spinal tuberculosis with severe secondary neurological symptoms is treated with a combination of drug therapy and surgery [2]. The earliest treatment for spinal tuberculosis is drug treatment alone, even spinal tuberculosis with secondary neurological symptoms can achieve satisfactory results through conservative treatment, and most patients' neurological function can be restored. Only a small number of patients require surgical nerve decompression to restore function [3-5]. Reports of skipped multisegmental spinal tuberculosis with pleural effusion being treated with non-surgical management are rare in recent years. Should patients of skipped multi-segment spinal tuberculosis concurrent with tuberculous pleurisy and pleural effusion be treated without surgery? This is a successful case.

## 3. Case Report

A 40-year-old woman presented with chest and back pain for one year, aggravated with dyspnea for ten days. She had been expe-

riencing back pain after suffering a back sprain one year ago, alongside bilateral chest and rib pain. NSAIDs did not improve the condition. Repeated chest X-ray examinations are negative. She reported a history of low fever and night sweats. Ten days before admission, she had worsened back pain accompanied by chest tightness and shortness of breath. She didn't have tuberculosis history. On admission, she had a pulse rate of 113 beats/min and a respiratory rate of 24 breaths/min. She also reported a VAS score of 6 points (10-point VAS scale). Additional physical examination noted dull noises on percussion of the left lower lung and weakened left lung breath sounds on auscultation. Meanwhile, she had tenderness and percussion pain between the spinous processes of the T7-9 vertebrae.

### Laboratory Inspection

The first routine laboratory examinations found were negative. The ESR was 33.0mm/h. Liver and kidney functions were also normal. The patient was positive on the PPD test.

### Imaging Examination

A chest X-ray and CT scan revealed bilateral pleural effusion and left upper lobe inflammation. X-ray showed a fusiform paravertebral shadow with a widened mediastinal shadow (Figures 1). CT scans showed T2 and T7-9 vertebral body destruction, as well as paravertebral abscesses. MRIs revealed a total of nine vertebrae involved: T2, T4-9, T12, and L1. Findings included T5-8 vertebral body destruction, paravertebral fusiform abscess formation, and T7/T9 vertebral body height reduction (Figures 2).



**Figure 1.** X-rays of the thoracic spine showed swelling of paravertebral fusiform and widening of mediastinum, and no clear lesions of the spine were found.



**Figure 2.** MRI revealed that a total of 9 vertebrae were involved in T2/4-9/12/L1, including T5-8 vertebral body destruction, abscess formation, paravertebral fusiform abscess formation, T7/9 vertebral body height reduction, mild kyphosis, Cobb Angle 23°.

### Diagnosis

spinal tuberculosis and bilateral tuberculous pleural effusion

### Treatment Plan and Follow-Up

Closed thoracic drainage was performed to improve the patient's respiratory function. Acid-fast staining inspection of the drainage fluid was negative. The patient maintained her original activities, avoided weight-bearing, ate nutritious food, avoided fatigue and rest. She was given isoniazid 300mg, rifampicin 450mg, pyrazinamide 750mg, and ethambutol 750mg to take once a day for the duration of chemotherapy treatment. One week later, the drainage tube was removed. We instructed to change her drug treatment plan based on the review after three months. The total course of chemotherapy was expected to be 18 months. Liver function and erythrocyte sedimentation rates were monitored every month. Outpatient follow-up was scheduled at 1, 3, 6, 9, and 12 months and once every six months after that. The improvement of clinical symptoms and signs was observed: VAS score for pain monitoring and imaging examinations to observe the changes in kyphotic deformity and the extent of lesion healing. Her ESR had dropped. Meanwhile, her back pain was relieved three months later. The drugs were changed to isoniazid 300mg, rifampicin 450mg, pyrazinamide 750mg daily for 15 months. The patient tolerated the drugs well. At the last review, her weight had increased by 20kg. She could participate in manual labor without pressure and percussion pain in her back. X-ray showed that the fusiform swelling had disappeared, and the mediastinum had become normal (Fig-

ure 3). CT scans showed vertebral bone fusion, absorption of the paravertebral abscess, and thickening of the paravertebral tissue. MRIs revealed the absorption of the paravertebral abscess. The spine bone signal had returned to normal, and the height of the T7 and T9 vertebral bodies had decreased when compared to the first examination with MRIs (Figure 4).



**Figure 3.** X-ray of the thoracic spine showed that the fusiform swelling disappeared, and the mediastinum image returned to normal.



**Figure 4.** MRI revealed that the paravertebral abscess was absorbed, the spine bone signal returned to normal, the height of the T7/9 vertebral body was reduced.

#### 4. Discussion

Tuberculous pleural effusion in Spinal tuberculosis patients without pulmonary tuberculosis are complicated and tough to treat. Such patients are in a highly stressed state with low immune resistance and high risks of complications arising from surgical treatment. Conservative treatment is mostly advocated for this type of tuberculosis [1]. The earliest treatment for spinal tuberculosis is drug treatment alone, whereas indications for surgery now are expanded while lesion removal and spine surgical reconstruction became the main treatment for spinal tuberculosis. With the increased concern over surgical complications and the emergence of drug-resistant tuberculosis, research has focused on both surgery and non-surgical treatments over the past twenty years [3, 4]. Even spinal tuberculosis with secondary neurological symptoms can achieve satisfactory results through conservative treatment, and most patients' neurological function can be restored. Only a small number of patients require surgical nerve decompression to restore function [3, 5]. There have been a few reports of conservative treatment for skipped spinal tuberculosis with more than five segments [3]. What would amount to a conservative approach to the treatment of spinal tuberculosis?

#### The Conservative Treatment Plan Can be Summarized as Follows

1. Limit weight-bearing activities: For patients who can move independently at the time of diagnosis, they can continue to perform the same activities during the treatment period. However, weight-bearing and strenuous activities need to be strictly limited. Patients who are already bed-ridden keep until the pain is relieved and the nerve function improves, after which they can gradually move and walk. Weight-bearing activities should still be strictly limited until recovery [3, 5, 6].

2. Supportive treatment: The patients' general condition is closely related to the prognosis. Nutritional support is essential to improve their overall condition. High-protein, high-calorie, and vitamin-rich foods were recommended. Patients with severe anemia and hypoalbuminemia can be given multiple small transfusions of fresh blood(200ml), plasma and albumin. Patients with a poor appetite can be given intravenous supplements of high-nutrient solutions [7].

3. Systemic chemotherapy regimen: The first-line treatment for spinal tuberculosis has been chemotherapy. Due to the special structure and growth mode of Mycobacterium tuberculosis, the effect of single-drug treatment is very poor [8]. The treatment regimen recommended by the WHO is as follows: isoniazid (5mg/kg in adults, 10-20mg/kg in children, maximum dose 300mg/d), rifampicin (15mg/kg, maximum dose 600mg/d), pyrazinamide (15mg/kg, maximum 2g/d), ethambutol (15-25mg/kg, maximum 2g/d) on intensive treatment for two months, then stop pyrazinamide and continue with isoniazid and rifampicin only for four

months (2HRZE 4HR) [3, 5, 9]. There is no strict consensus on the required duration of anti-tuberculosis treatments, but standard vice ranges from 12 to 27 months. This varies based on the patient's response to treatment, the time to the disappearance of clinical symptoms, and the comprehensive assessment of the disappearance of laboratory and radiological lesions [3, 7, 9]. In recent years, it has been found that the concentration of anti-tuberculosis drugs in bone tissue is much higher than the minimum inhibitory concentration. Therefore, a short-term intermittent chemotherapy program lasting six or nine months was proposed as an alternative [10-12]. However, if the patient shows no improvement upon clinical or radiological examination after the above-mentioned conservative treatment, there is a risk that new lesions will appear. The expansion of cold abscesses or the aggravation of bone destruction three to five months after the start of chemotherapy should be highly suspected as a drug-resistant case. Patients resistant to both isoniazid and rifampicin will need to have at least one injection drug (streptomycin, capreomycin, or both), and the remaining drugs chosen from cycloserine, ciprofloxacin, and para-aminosalicylic acid. However, the toxicity of these drugs is enhanced, and liver and kidney function need to be closely monitored during the course of treatment [10].

For multisegmental spinal tuberculosis such as that seen in this patient, inappropriate treatment will only lead to serious complications, which will affect the quality of life. Standard chemotherapy regimens for bone and joint tuberculosis recognized by the Chinese academic community are a combination of two treatment programs: an intensive treatment with isoniazid, rifampicin, pyrazinamide, ethambutol or streptomycin for three months (HRZE3); and isoniazid, rifampicin, pyrazinamide for 9-15 months (HRZ15) course of treatment reaching 12-18 months. The clinical application of this regimen is widely used in China, and its curative effect has been definitively confirmed [13].

This case is a skipped thoracic and lumbar tuberculosis involving nine segments, concurrent with tuberculous pleurisy. Therefore, to obtain a good prognosis as much as possible, we used a conservative regimen of HRZE3-HRZ15. The clinical and radiological symptoms gradually improved and the patient obtained a good prognosis.

## 5. Conclusion

In conclusion, the treatment of spinal tuberculosis still mainly conservative treatment, supplemented with surgery. Conservative treatment through a combination of anti-tuberculosis treatment, rest, and nutritional support can provide a good prognosis. The successful cure of this case strongly supports the view.

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