

Case Report



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Conflict of Interest

The authors have no financial conflicts of interest.

Spinal Cord Injury From Tuberculous Spondylitis Misdiagnosed as Metastatic Spinal Tumor and Bacterial Spondylitis: A Case Report & Literature Review

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ABSTRACT

Tuberculous (TB) spondylitis, also known as Pott's disease, was first described by Percivall Pott in 1779. The diagnosis of TB spondylitis is often delayed because of the non-specific nature of the infection, which can lead to severe consequences. Differential diagnosis is especially critical in cancer patients undergoing chemotherapy who present with lymph node or bone metastasis. We present the case of a 76-year-old female with advanced gastric cancer, who was initially suspected of having a metastatic spinal tumor and bacterial spondylitis. The patient presented with lower limb paralysis and was diagnosed with metastatic cancer, resulting in a loss of hope for recovery. However, following the subsequent diagnosis of TB spondylitis and multiple surgical interventions, the patient achieved complete remission and significant improvement, ultimately regaining the ability to walk independently. This case highlights the importance of accurate diagnosis and timely intervention in cases where the initial presentations may mimic metastatic disease.

Keywords: Tuberculosis; Metastasis; Spondylitis; Spinal cord compression

INTRODUCTION

Tuberculous (TB) spondylitis, also known as Pott's disease, was first described by Percivall Pott in 1779.¹³⁾ The causative agent is the *Mycobacterium tuberculosis* complex bacillus. Evidence of TB spondylitis has even been observed in mummies with spinal deformities dating back to 9000 BC, making TB one of the oldest known infectious diseases.¹²⁾

Worldwide, an estimated 2 billion people are infected with TB. Although the exact incidence of TB spondylitis is unknown, it is reported that approximately 10% of patients with active pulmonary TB have skeletal TB, of which around half are cases of TB spondylitis.³⁾

Informed Consent

Written informed consent was waived by the Institutional Review Board.

Ethics Approval

Approval was obtained from the Chung-Ang University Hospital Institutional Review Board (IRB No. 2411-022-19551).

TB infection is prevalent in developing countries with low socioeconomic status and vulnerable health conditions, whereas infection rates are relatively lower in developed countries with advanced healthcare systems and effective anti-tuberculosis medications.¹⁰⁾

Risk factors include immune-compromised status, old age, diabetes, cancer, smoking, alcoholism, and overcrowded living conditions (e.g., prisons or homeless shelters).¹⁾

In cases of TB spondylitis, diagnosis is often delayed due to the non-specific nature of the infection, which can lead to severe consequences. Differential diagnosis for TB is particularly important in cancer patients receiving chemotherapy who present with lymph node or bone metastasis.⁶⁾

In this report, we present the case of a patient with advanced gastric cancer (AGC), initially suspected of having a metastatic spinal tumor and bacterial spondylitis, who was ultimately diagnosed and treated for TB spondylitis.

CASE REPORT

A 76-year-old female with a history of partial gastrectomy for AGC performed four years prior was admitted to the hematology-oncology department of our hospital for thoracic spine pain that had persisted for six months. Bone scan and positron emission tomography/computed tomography (PET/CT) indicated relapsed AGC with T10 spinal metastasis and lymph node metastasis, and she subsequently received chemotherapy and radiation therapy. Then, her lower extremity weakness progressed to grade III-IV, and a consultation with our department was requested. CT and magnetic resonance imaging (MRI) performed at the time showed metastatic tumors at the T9, T10, and T11 vertebrae with spinal cord compression (**FIGURE 1**).

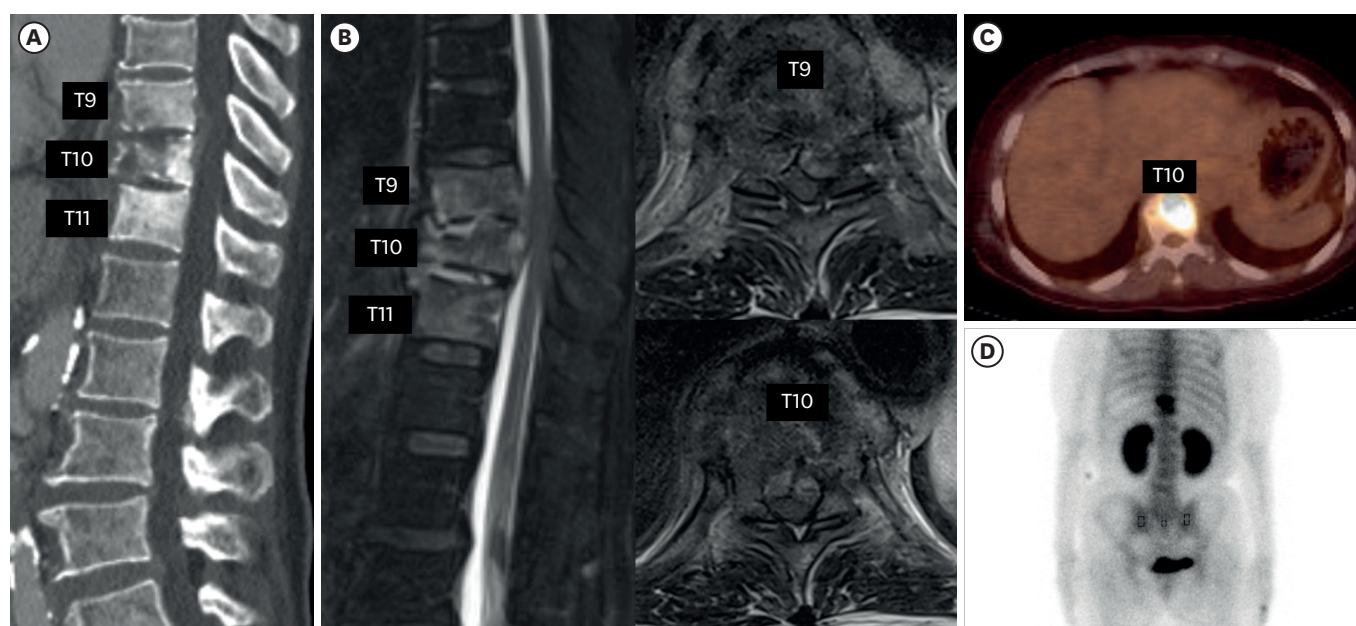


FIGURE 1. Initial imaging studies suggestive of metastatic lesions. (A) Contrast-enhanced findings are observed in T9, T10, and T11 on computed tomography imaging, with bone destruction noted at T9 and T10. (B) Magnetic resonance imaging shows severe cord compression caused by a mass at the T9 and T10 levels of the thoracic spine. (C) Positron emission tomography/computed tomography reveals a hypermetabolic lesion at T10, as well as additional hypermetabolic lesions in the aortocaval and portocaval lymph nodes. (D) Bone scan shows hot uptake at T9, T10, and T11.

On May 30, 2019, laminectomy and pedicle screw fixation at T9-T10-T11 were scheduled. However, yellowish pus was observed in the epidural space during surgery, leading to the decision to perform only the laminectomy without screw fixation, followed by pus culture and TB polymerase chain reaction (PCR). No specific bacteria and TB were identified. After consulting with the infectious disease department, the patient was diagnosed with bacterial spondylitis and treated with antibiotics (vancomycin and ciprofloxacin) for six weeks, and her C-reactive protein (CRP) level decreased from 30.56 mg/L preoperatively to 0.81 mg/L. Her lower extremity weakness improved to at least grade IV, and she was transferred to the rehabilitation department.

Two weeks after the transfer, her lower extremity weakness worsened to grade II, and her CRP level increased to 105.82 mg/L. A follow-up MRI revealed collapse of the T9, T10, and T11 vertebrae and severe spinal cord compression due to an abscess (**FIGURE 2**). Consequently, on July 23, 2019, she underwent posterior decompression and screw fixation at T7-T8-T9-T10-T11, followed by a T9, T10, and T11 corpectomy and T8-T12 interbody fusion on August 8, 2019 (**FIGURE 3**). During surgery, culture, histopathology, and TB PCR test were taken from bone, soft tissue, and pus in the surgical field. Finally, TB spondylitis was confirmed through positive PCR results and histopathology, and she was treated with a four-drug anti-tuberculosis regimen for one year.

The patient gradually improved with concurrent rehabilitation and regained the ability to walk independently. Four years postoperatively, CT imaging showed no issues with the instrumentation, and she continues to lead a normal daily life (**FIGURE 4**).



FIGURE 2. Magnetic resonance imaging taken after worsening of lower extremity weakness. The T2-weighted image shows further compression of the T9 and T10 vertebral bodies with severe cord compression due to an enlarged mass. The T1 contrast-enhanced image demonstrates overall enhancement along the mass.

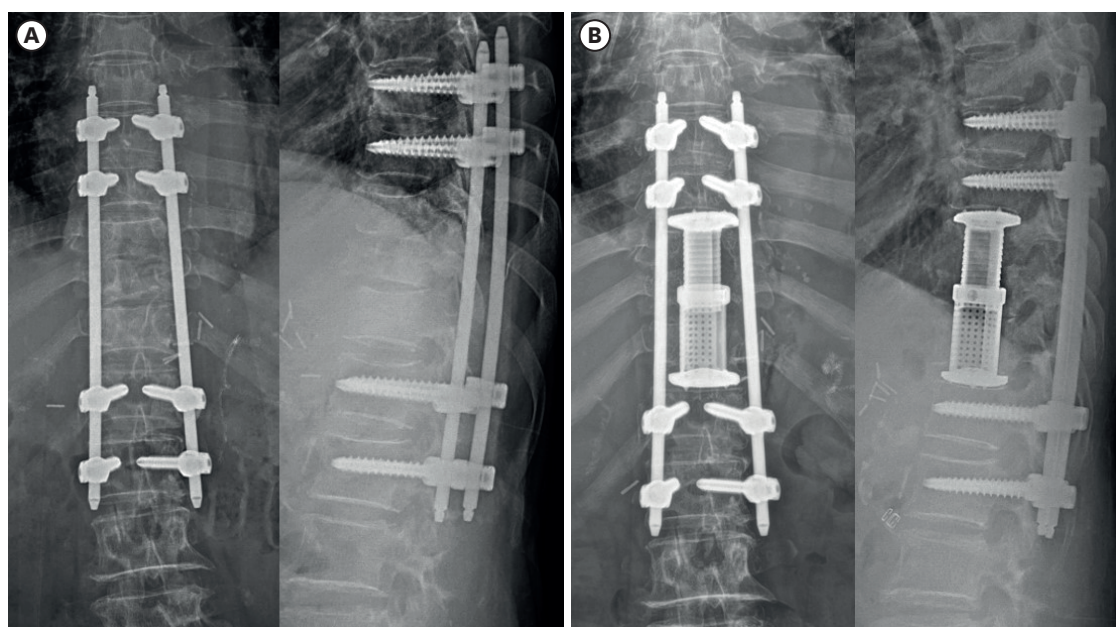


FIGURE 3. Two surgeries leading to the diagnosis of TB spondylitis. (A) Additional decompression surgery and screw fixation were performed, during which portions of the mass and vertebral body were removed for histopathology, culture, and polymerase chain reaction testing. (B) After confirming TB spondylitis, a T9, T10, and T11 corpectomy was performed, followed by fusion surgery with an expandable cage. TB: tuberculous.

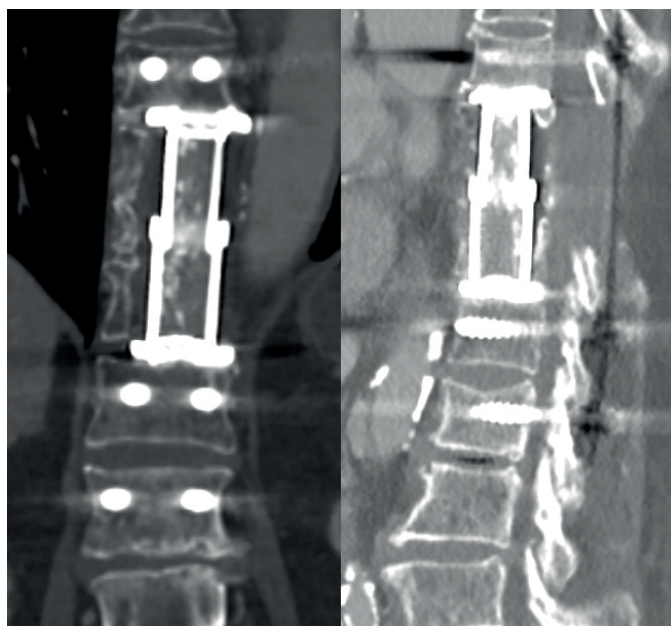


FIGURE 4. CT imaging four years postoperatively. Abdominal CT taken four years post-surgery shows that the surgical site is well-fused, with no evidence of screw loosening. The mass that had invaded the spinal canal is no longer observed. CT: computed tomography.

DISCUSSION

Non-respiratory TB can occur in isolation or in combination with respiratory TB.²⁾ Therefore, skeletal TB infection cannot be ruled out even in the absence of chest infection signs.²⁾

Clinical symptoms of TB spondylitis include back pain, mild fever, and weight loss, although these are present in fewer than 40% of cases.^{7,11)} This makes accurate diagnosis of TB spondylitis challenging, with misdiagnoses reported in up to 41% of cases.⁸⁾ In such cases, clinical intuition and experience play a major role in determining diagnosis and treatment.²⁾

In this patient's case, she was not infected with HIV, had weight loss but no fever, and pulmonary TB was not observed on chest X-ray or CT. There was no history of TB treatment. Since the spine lesions were observed in a patient under treatment for AGC, weight loss was more likely attributed to cancer, making metastatic spine tumor more plausible than TB spondylitis. The absence of fever could also have been due to NSAID use for chronic back pain, potentially masking the symptom. Cancer is a risk factor for TB, and in such high-risk patients, clinical intuition and experience are crucial in considering TB spondylitis even in the absence of TB symptoms.

Among radiological diagnostic tools, bone scan is effective in showing skeletal involvement but limited in accurately differentiating between infection and metastasis.⁴⁾ PET/CT can distinguish normal cells from malignant cells based on metabolic differences; however, TB may also present as a hypermetabolic lesion, making it difficult to differentiate from metastasis.^{5,14)} In this patient, CT, MRI, bone scan, and PET/CT led to a diagnosis of AGC metastasis by radiologists, resulting in chemotherapy and radiation therapy. This highlights the limitations of imaging alone in distinguishing between TB spondylitis and metastasis.

The gold standard diagnostic test for TB spondylitis is tissue diagnosis, which requires culture, histopathology, and PCR from tissue samples.^{3,7)} Studies on diabetic foot infections have shown that sampling not only pus but also soft tissue and bone provided more relevant diagnostic and therapeutic information.⁹⁾ In this case, no significant bacteria were detected in the first culture and PCR, which only sampled pus. However, the second surgery confirmed TB through culture, PCR, and histopathology from pus and bone samples. Therefore, in suspected cases of TB or bacterial infections, sampling surrounding tissue in addition to pus is likely beneficial for diagnosis and treatment.

While misdiagnosis or delayed diagnosis in TB spondylitis patients can lead to fatal symptoms or complications, this case demonstrates that even with misdiagnosis and worsening neurological symptoms, a confirmed TB diagnosis and appropriate treatment can yield positive outcomes.

CONCLUSION

In cases of TB spondylitis occurring in patients undergoing cancer treatment, it is challenging to make an early diagnosis when symptoms are non-specific. For a definitive diagnosis, culture, histopathology, and PCR testing from pus and tissue samples are essential. With early diagnosis and timely treatment guided by clinical intuition and experience, a favorable prognosis can be expected.

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