Imaging Presentation Highly Manifested as Tuberculosis in a Case of Spinal Metastatic Carcinoma

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Abstract

Usually the clinical manifestations between spinal tuberculosis (Pott's disease) and metastasis are not characteristic. Nevertheless, their respective imaging presentations are typical and specific, which makes it relatively easier to attain a correct diagnosis. Imaging features of Pott's disease, in general, include narrowing of intervertebral disk space, collapse of vertebral bodies with eventual progression to kyphotic deformity, destruction of the anterior parts of adjacent vertebrae, formation of a large paravertebral abscess, and calcifications or sequestra within the paravertebral abscess.

Spinal tuberculosis is usually endemic, especially in Eastern countries. However, the trend of cancer incidence is also increasing in modern society, which makes it difficult to diagnose spinal osseous lesions. This article presents a case of a 45-year-old man with a 9-month history of low back pain. Both computed tomography and magnetic resonance imaging of the lumbar spine supported the initial diagnosis of spinal tuberculosis. However, pathological examination on the excised specimen resulted in the diagnosis of spinal metastatic adenocarcinoma.

We suggest that a definitive diagnosis of spinal metastasis or tuberculosis should not be based on imaging alone. Instead, more attention should be paid to atypical imaging presentations. In addition, biopsy is usually necessary for final diagnosis.
Spinal tuberculosis is usually endemic in developing countries with poverty and malnutrition and the presence of drug-resistant strains. Tuberculosis is also common in China, and we are experienced in diagnosing tuberculosis spondylitis. However, the cancer incidence is also increasing in modern society, which challenges our diagnosis of spinal osseous lesions. This article presents a case of spinal metastasis whose imaging presentation is so similar to tuberculosis that we made a diagnostic error on it.

**CASE REPORT**

A 45-year-old man presented with a 9-month history of moderate low back pain that had worsened in the last week. There was no history of low-grade fever with evening rise, weight loss, night sweats, or neoplasm. There was no family history of tuberculosis. Physical examination revealed slight percussion pain at the third lumbar vertebra region. Laboratory investigations showed that hemoglobin level, white blood cells count, C-reactive protein, erythrocyte sedimentation rate, and alkaline phosphatase were all within normal range.

Computed tomography (CT) of the chest and lumbar part showed a small foci of pulmonary fibroblast proliferation in the right upper lobe, and there were osteolytic lesions involving the L2 and L3 vertebral bodies sparing the intervertebral space (Figure 1). Magnetic resonance imaging (MRI) of the lumbar spine also demonstrated similar lesion characteristics of L2 and L3 vertebral bodies. Furthermore, a granuloma-like soft tissue appeared under the anterior longitudinal ligament (Figure 2), and the left vertebral pedicle of L3 was involved (Figure 3).

A diagnosis of spinal tuberculosis was initially considered owing to its high prevalence in our country and the absence of tumor history, along with a suspected obsolete pulmonary tuberculous lesion exhibiting in the right upper lobe, and there were osteolytic lesions involving the L2 and L3 vertebral bodies sparing the intervertebral space (Figure 1). Magnetic resonance imaging (MRI) of the lumbar spine also demonstrated similar lesion characteristics of L2 and L3 vertebral bodies. Furthermore, a granuloma-like soft tissue appeared under the anterior longitudinal ligament (Figure 2), and the left vertebral pedicle of L3 was involved (Figure 3).

Radical debridement and reconstruction was performed with bone autograft and internal fixation via transperitoneal approach. Intraoperatively, the subligamentous mass was found to be filled mainly with granulation tissue and some mucus but no abscess or pus. Administration of antituberculous therapy was continuously carried out postoperatively and the patient recovered well. However, pathological examination of the excised specimen indicated the presence of a poorly differentiated adenocarcinoma (Figure 4). Furthermore, culture of mycobacterium tuberculosis and acid-fast bacillus smear were negative. Therefore, the diagnosis of spinal metastatic carcinoma was confirmed.

**DISCUSSION**

Bone is a common site of metastases for many primary malignant tumors, and the spine is the most frequent site for bony metastases. In order of decreasing frequency, carcinomas of the breast, prostate, kidney, and thyroid account for most skeletal metastases, and the first 2 account for >80% of the metastatic skeletal disease. Approximately 12% of patients with cancer present with spinal metastases. Spinal metastases often occur in middle-aged and elderly patients, and the major sites of spinal lesions are the lower thoracic and upper lumbar regions, which is the same as spinal tuberculosis.

As tuberculosis is more common in Eastern countries, surgeons are more inclined to make a diagnosis of spinal tuberculosis rather than tumor metastasis, as in our case. Due to the limited medical history and physical examinations in differ-
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tential diagnosis, we consider a diagnosis mainly depending on the CT and MRI. In this case, the imaging showed typical features of tuberculosis; thus, we insisted that the diagnosis was tuberculous spondylitis, until it was confirmed to be adenocarcinoma by histopathological examination.

The histopathological finding of the excised specimen finally proved our misdiagnosis. Retrospectively, it is likely that the incorrect diagnosis was made by overlooking the lesion of vertebral pedicles. The erosion of the pedicle more often occurs in spinal metastasis in combination with the erosion of the vertebral body. Yusof et al\(^\text{9}\) reported that pedicle involvement in spinal tuberculosis was usually associated with relatively severe vertebral body and disk destruction, wide prevertebral abscess, and severe kyphotic deformity, which manifested at the late stage of the disease. In this case, the left pedicle of L3 vertebra was destructed without severe vertebral body or disk destruction or severe kyphotic deformity. Although it is difficult to detect whether the destruction was the primary metastatic foci or the secondary lesion of L3 vertebral body involvement, such presentations were helpful for differential diagnosis.

While fortunately the misdiagnosis did not lead to devastating consequences, some lessons should be learned from this case. Many imaging modalities—including plain radiographs, nuclear medicine imaging techniques, myelogram, positron emission topography, CT, and MRI—play important roles in evaluating and identifying spinal lesions. Their use is expected to provide nearly 100% sensitivity and specificity. Nevertheless, no single imaging modality can accomplish the goal. A clinician must understand the advantages and disadvantages of different imaging modalities. Moreover, it is necessary to perform some appropriate examinations to establish an accurate diagnosis before any treatment. The CT-guided percutaneous spinal biopsy has been widely used and proven to be a safe, effective, and accurate procedure.\(^\text{11,12}\) Alternately, the skin test of purified protein derivative should be performed prior to making a diagnosis of tuberculosis. It is generally easy to get a strong positive result from a patient with active tuberculosis who is not in a status of poor nutritional health or immunodeficiency.

**REFERENCES**


