Lumbar Actinomycosis: A Case Report

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Actinomycetes are normal commensal microflora that live in the mouth, gut and female genitalia. Actinomycetes are gram-positive filamentous bacteria rather than fungi, as is sometimes assumed [1]. The first case of actinomycosis in a human was reported by Lebert in 1857 [1]. Despite the frequency of actinomycosis, spinal actinomycosis is rarely encountered. In this report we describe the computed tomography (CT) and magnetic resonance (MR) imaging findings of a patient who suffered from spinal actinomycosis along with a paraspinal abscess.

Case Report

A 51-year-old male presented with a 6-week history of back pain, fever, night sweats and weight loss (10 kg). The lumbar and abdominal CT scans taken at an outpatient clinic prior to admission to our hospital showed an inflammatory lesion on the lumbar spine; the patient was subsequently referred to our hospital. He had no history of major surgery or trauma. Upon admission to the hospital, the physical examination resulted only in non-specific findings, except for tenderness at the right costovertebral angle (CVA). A complete blood cell count showed a white blood cell (WBC) count of 19,200/μL (85.6% neutrophils), a hemoglobin level of 9.0 mg/dL, a hematocrit of 29.1% and a platelet count of 746,000/μL; the erythrocyte sedimentation rate (ESR) was 84 mm/h. The creatinine level was 1.0 mg/dL and the alkaline phosphatase level was 123 IU/L (normal: < 119 IU/L).
The radiography of the lumbar spine was normal. The spinal CT from the outpatient clinic showed cortical erosion in the right lateral margin of the L1 vertebral body (Fig. 1A). A contrast-enhanced abdominal CT scan showed the paraspinal mass as homogeneous enhancement in the bulging psoas muscle tissue at the level of L1 (Fig. 1B). The mass crossed the perirenal fascia and extended to the posterior aspect of the renal capsule. A 99mTc-DPD bone scan revealed intense uptake in the right lateral side of L1 (Fig. 2). MR imaging was performed with a GE 1.5T Signa MR scanner. The T1-weighted images revealed a low to intermediate signal intensity lesion in the paraspinal mass (Fig. 3A). The T2-weighted images showed high signal intensity in the medial half of the mass and low signal intensity in the lateral half of the mass, and irregular thickening was depicted in the right perirenal fascia extending to the posterior renal capsule (Fig. 3B). The contrast-enhanced T1-weighted images showed relatively homogeneous enhancement, but the medial part of the mass showed decreased enhancement (Fig. 3C). The coronal T2 weighted images demonstrated an elongated paraspinal abscess along the psoas muscle and a high signal intensity lesion on the right lateral side of L1 that spared the intervertebral space (Fig. 3D).

The initial differential diagnosis included tuberculous spondylitis, pyogenic spondylitis, fungal infection and lymphoma based on the involvement of the spine and psoas muscle.

The patient underwent a bone marrow biopsy for assessing the possibility of lymphoma or another hematological disease, but the biopsy was negative for malignant cells. Several trials of needle biopsy and aspiration failed to document a pathogen. A surgical biopsy was performed, and the specimens were obtained from the paraspinal mass around the L1 vertebral body. Microscopic analysis confirmed the presence of actinomycosis, which showed the radiating filaments of actinomyces surrounded by an infiltration of inflammatory cells and granulation tissue (Fig. 4).

Discussion

Actinomycosis is an uncommon disease caused by the Actinomyces species, which are gram-positive anaerobic bacteria that are normal inhabitants of the oral cavity and the respiratory and digestive tracts [2]. Among these species, A. israelii is the predominant human pathogen. In tissues, the bacteria aggregate into microcolonies and they grow in a radial configuration, with the peripheral layer of organisms having club-shaped ends [3]. These microcolonies form characteristic sulfur...
The disease can spread to the surrounding tissues and it will infrequently disseminate hematogenously, giving rise to distant septic metastases \( (4) \). The infection can also reach and cross the diaphragm by direct invasion. The cervicofacial, thoracic and abdominal regions are the usual sites of involvement \( (3, 5) \). Cervicofacial actinomycosis is the most common form of clinical manifestation. Spinal actinomycosis is unusual and it makes up less than 5% of all the infected sites \( (6) \).

Although the radiological findings are not specific, actinomycosis can show some distinct features that stand in contrast to other pyogenic infections. Actinomycosis shows destructive changes and this causes the affected bones to have the radiographic appearance of saw-toothed borders and a honey-combed archi-
tecture, and the disease progresses slowly (6, 7). Previous reports have also indicated that spinal actinomycosis has the tendency to spare the intervertebral disc space (6, 7). As this case illustrates, although the inflammatory lesion involved nearly half of the circumference of the vertebral body, no signal change in the intervertebral discs was seen on the MR images.

The infection in the present case contiguously extended to the renal capsule, crossing posterior to the pararenal fascia. This infiltrative nature has been previously described in the cervicofacial and abdominopelvic regions (2, 5) and this infiltrative nature may be due to the proteolytic enzymes of the organism [5].

Actinomycosis appears as a solid mass with moderate, relatively homogeneous enhancement on CT imaging (5, 8), and the T1- and T2-weighted MR images show an intermediate signal intensity associated with moderate contrast enhancement (2). These CT and MR imaging characteristics may reflect the histological features of abundant granulation and fibrous tissue in the sites infected with actinomycosis (2, 5) and this may be related to the chronic course of the disease, which results from the delayed diagnosis and treatment and the frequent misinterpretation of findings as evidence of malignant disease (5). The paraspinal abscess in our study mainly showed homogenous enhancement, but it also revealed small areas of decreased enhancement on the contrast-enhanced T1-weighted images, which may be attributed to supplicative necrosis [Fig. 3C] [2].

As in the present case, the radionuclide uptake on 99 mTc MDP bone scans can represent the spinal involvement before obvious radiological changes have occurred [6].

Culturing actinomycosis is difficult because the bacteria are slow-growing, anaerobic microorganisms that proliferate in culture for less than 50% of all cases (3, 9); consequently, the diagnosis often relies on the histological identification of sulfur granules and gram-positive central filamentous bacteria in tissues [8].

The differential diagnosis for spinal actinomycosis includes tuberculosis spondylitis, fungal infection and lymphoma. An initial diagnosis of tuberculosis in this case was made due to the history of slow disease progression and the involvement of the psoas muscle with destructive changes in a vertebral body, as seen on the CT and MR imaging. However, tuberculosis can be distinguished from actinomycosis because tuberculous abscesses usually show well-demarcated marginal enhancement on the contrast enhanced CT or MR imaging and this involves the intervertebral spaces. Fungal infections also have the propensity to spare the intervertebral space, as in actinomycosis (10), but fungal infections usually occur in immunocompromised patients. Lymphoma shows homogeneous enhancement on the contrast-enhanced CT or MR imaging. Lymphoma can be distinguished from actinomycosis because lymphoma shows multiple sites of involvement and it is accompanied with lymphadenopathy. In contrast to lymphoma, actinomycosis usually does not spread via the lymphatic system because of the size of the bacterium; regional lymphadenopathy is uncommon or it develops late (9). No evidence of paravertebral lymphadenopathy was found in this case.

In summary, although the radiological findings of spinal actinomycosis are non-specific, actinomycosis should be considered in the differential diagnosis of a relatively homogeneously enhancing soft tissue mass that spares the intervertebral space and crosses the anatomical fascia on the CT or MR imaging.

References


Min Hee Lee, et al : Lumbar Actinomycosis
요추 방선균증: 증례 보고

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이민희∙차장규∙추은주2∙정경천3∙박재성∙박성일∙백상현∙이혜경

방선균은 선행의 혐기성 그람양성균으로 농양, 조직섬유증 및 배농동 등을 형성하는 전신감염이나 국재성 화농성 감염을 유발하나 척추 감염은 매우 드물다. 이 질환은 비특이적인 방사선학적 소견과 느린 진행양상으로 인해 진단이 늦어질 수 있다. 저자들은 점진적으로 악화하는 하부요통과 발열을 주소로 내원한 51세 남자환자에서 시행된 전산화단층촬영과 자기공명영상에서 1번 요추 주위의 종괴와 추체의 골파괴를 발견하였다. 조직학적 검사 결과 추추의 방선균증으로 확진된 1예를 경험하였기에 문헌 고찰과 함께 보고한다.