INTRODUCTION

Spine is the predilection for metastasis and tuberculosis process. The prevalence of spinal metastasis is a common occurrence for primary malignancy. Spinal tuberculosis is also endemic in developing countries. When the clinical feature is nowhere to be found, the manifestation of spinal tuberculosis and metastasis mimic each other. As a result, the differentiation of both processes is difficult based on clinical examination alone. Back pain is a common complaint for patients with spinal tuberculosis or metastasis. However, its management is different, and preoperative diagnosis is important to determine the optimal management procedure.

Vertebral fracture, soft tissue mass, and spinal canal involvement lead to spreading pain, paresthesia, extremity paralysis, and other features caused by peripheral nerve and spinal cord compression. Spinal tuberculosis infection and metastasis may show vertebral body destruction and paraspinal mass detected on supporting examination. The lesion can be solitary or multiple. Common features of spinal tuberculosis infection on supporting exams are vertebral body destruction, intervertebral disc compression, and paraspinal abscess. Similar features are also found in spinal metastasis, rarely involving the intervertebral disc. Typical tuberculosis lesions can make the diagnosis easier, however, most patients come during the development stage. In other words, tuberculosis abscess has yet to form or involve the intervertebral disc.

The features on the magnetic resonance imaging (MRI) give us benefit to diagnose vertebral lesions. Contrast administration, signal intensity changes, peritumoral...
CASE REPORT

The whole spine MRI showed tuberculous spondylitis. On the sagittal plane, T1WI (A) and T2WI (B) showed the collapse of the T9 vertebral body and erosion of the anterior T8 and T10 vertebral body. Paravertebral abscess at the level of T7 to T12 vertebrae showed homogeneous contrast enhancement. On the axial plane, T1WI (C), T2WI (D), FS (E), and coronal plane T1WI (F), the abscess spread through left vertebrae T7 transverse process and right T8-T9, right T10 lamina vertebrae, right posterior rib 8th and 9th, and epidural space leading to moderate spinal canal stenosis at T8-T10 vertebral level.

CASE PRESENTATION

The first case was a 24-year-old female with back pain in the past two months. The pain became severe and spread to both legs. On physical examination, midline tenderness at the level of T8 to T10 was found. The whole spine MRI (Figure 1A and 1B) showed kyphotic deformity on thoracic vertebrae, collapse T9 vertebral body, and erosion on the anterior T8 and T10 vertebral body. A subligamentous abscess (Figure 1C-1F) at T7 to T12 vertebrae was visualized as hypointense on T1WI, hyperintense on T2WI and STIR, and heterogenous contrast enhancement on abscess wall, spreading to the transverse process of left T7 vertebrae and right T8-T9 vertebrae, right vertebral lamina of T10, posterior right rib 8th and 9th, and epidural space, leading to moderate spinal canal stenosis at the level T8 to T10 and compressed aorta to the anterior. The patient was then performed with debridement, stabilization, and fusion. A lymph node and muscle biopsy were performed revealing chronic suppurative inflammation with a caseous necrotic area, referring to tuberculosis.

The second case was a 39-year-old female with back pain and weakness in both legs in the last 3 months. The patient never had a history of tuberculosis infection or medication. On physical examination, spinal deformity and lower extremity weakness were found. Whole spine MRI (Figure 2A and 2B) revealed thoracic kyphotic deformity with T10 vertebral body compression, T9 inferior endplate destruction, and bone marrow changes on T6-T11 vertebral body. Paravertebral soft tissue mass (Figure 2C-2F) also found in the bilateral anterior aspect of vertebral body T6 to T11, spreading to the epidural and foraminal canal at the level of T9 to T10, causing severe spinal canal and foraminal canal compression, along with spinal cord compression causing edema and bilateral nerve root compression. On contrast administration, there was rim contrast enhancement (F).
hypointense on T1WI, hyperintense on T2 and STIR, and rim contrast enhancement. These images were supporting features for tuberculosis spondylitis. Debridement, stabilization, fusion, and biopsy of lymph nodes and muscles were conducted. Biopsy showed chronic granulomatous inflammation referring to tuberculosis. The patient was hospitalized for seven days and went home with improvement.

The third case was a 51-year-old female who complained of waist pain for the last two months. Whole spine MRI (Figure 3A and 3B) revealed spine metastasis in the form of vertebral body compression T8 and T9 with bone marrow replacement on the body, spinous process, and pedicle of cervical, thoracic, and lumbar vertebrae. Soft tissue mass (Figure 3C-3E) on the posterior aspect of vertebrae expanded to the intradural extramedullary and compressed the spinal cord, leading to severe stenosis of the spinal canal and bilateral neural foramina. The lesion at the T12 level also indents to the epidural space. Hyperintensity of epidural space at the T4 to T10 level was also found suggesting a metastasis process.

The fourth case was a 58-year-old male who complained low back pain since the last five months. Lumbosacral MRI (Figure 4) showed collapse with signal intensity changes of L3 vertebral body and bone marrow replacement of T4, T10, L3-L5, S1 vertebral body, left L3 laminae and L3 vertebral lesion expanded to epidural and causing spinal canal stenosis. The previous bone survey revealed pathological fracture of L4 vertebral body. CT-scan of the thorax showed lung mass with heterogenous density, spiculate margin, in posterobasal segment of right lung inferior lobe, along with obstructive pneumonitis and fibrosis. Lymph node enlargement was also found at upper paratracheal, subcarinal, and subaortic. Other features were right pleural effusion and destroyed left posterior rib suggesting metastasis process.

DISCUSSION

Whole spine MRI in the first case showed T9 vertebral body destruction and the intervertebral disc T8-T9 and T9-T10, and erosion of right anterolateral vertebral T8 and T10, causing gibbus deformity. These features are characteristic of spondylodiscitis tuberculosis with predilection on thoracolumbar vertebrae, destruction or compression of the anterior aspect vertebral body causing kyphotic deformity. The infection of M. tuberculosis occurs on the longitudinal ligament, involving one or multilevel vertebral body. The intervertebral disc is rarely involved in tuberculosis spondylitis due to lack of vascularization to the intervertebral disc. Similar features were also found in the second case, in which the whole spine MRI showed compression on T10
vertebral body with inferior endplate T9 destruction. Change of intensity in T2WI is caused by bone marrow replacement by exudates and hyperemia. On contrast enhancement, the infected vertebral body is shown by increased signal intensity, differentiating them may be found. Paravertebral abscess, in this case, is at the bilateral T6-T11 vertebral body, expanding to the epidural and bilateral foraminal canal, causing bilateral nerve root compression, expanding to the epidural and bilateral foraminal canal.9

Spine metastasis imaging involves the posterior vertebrae, especially the pedicle. The early spread of spine metastasis begins from the vertebral body to the pedicle. This spread occurs through the peduncular artery and venous plexus of Batson.9,10 Spine metastasis is frequently found in patients with prostatic and breast cancer. A whole spine MRI of the third case found T8 and T9 vertebral body compression with bone marrow replacement of cervical, thoracic, and lumbar vertebral body, thoracic and lumbar spinal process, thoracic bilateral and pedicle, bilateral posterior thoracic ribs. The fourth case showed the L3 vertebral body fracture with bone marrow changes on the L4 vertebral body.11 The spine metastasis in the fourth case is supported by the presence of lung carcinoma. Approximately 31% of spinal metastasis is a primary process of lung carcinoma, frequently presented as osteolytic lesions.12

Bone destruction caused by metastasis is frequently caused by osteoclast activation rather than destruction caused by tumor cells.9 Cells from the primary location will migrate through the neovascularization process in the vascular membrane, producing proteolytic enzymes disrupting the membrane. Chemotactic factors, RANK ligands, and the cells stimulate osteoclast activity to resorb the bone. Growth and survival of metastasis cells progressively destructed the cancellous and cortical bone.9,13

CONCLUSION

Tuberculous spondylitis and spinal metastasis have similar clinical signs and symptoms. Although clinical history is the key determinant of diagnosis, most patients came due to back pain, paresthesia, and paralysis without information on previous disease. MRI can assist in identifying the pattern between the two. While tuberculous spondylitis shows anterior, central, posterior, and lateral locations, metastasis mostly involves the posterior aspect of vertebrae including bones, epidural, leptomeninges, and bone marrow.

RESEARCH ETHICS

The writing of this manuscript has obtained written informed consent from the patients based on the publication ethics rules of the COPE and ICMJE guidelines.

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All authors make the same contribution in this case series, from the stage of case finding, reading of case radiology results, and clinical outcomes obtained, which are presented in this manuscript.

CONFLICT OF INTEREST

The authors report no conflict of interest in writing this case series.

REFERENCES