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The clinicpathologic features and MRI manifestations of the thoracic lumbar tuberculosis

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ABSTRACT

Objective: To explore the clinicpathologic features and MRI manifestations of the thoracic lumbar tuberculosis by underwenting MRI and pathological examinations. Methods: 34 cases of Thoracic lumbar tuberculosis were collected which underwent MRI examination and confirmed by pathology or treatment of anti-TB drugs, the clinical cure from June 2008 to June 2012 in our hospital. The first MRI was performed on all patients, to determine the MRI findings, and surgical treatment for pathological examination in order to determine the pathological features. Results: 34 patients with 81 vertebral involvements, in which two adjacent vertebral involvement is the common, accounting for 72.25%, vertebral showed uneven long T1, long T2 signal. Intervertebral disc abnormalities accounted for 90.17%, the performance showed long T1, long T2 signal changes in the intervertebral disc damage, often accompanied by disc space narrowing or disappear. Paraspinal abscess accounted for 90.67%, often more than vertebra, up and down across one or more vertebral bodies showed long T1, long T2 signal. The vertebrae were damaged kyphosis or (and) the posterior longitudinal ligament abscess caused by the dural sac and spinal column with pressure accounted for 74.72%. In enhanced scan, vertebrae, intervertebral discs showed heterogeneous enhancement, paraspinal abscess was curved or ring enhancement. The pathological diagnosis may be obvious to confirm the degree of swelling and lesions. Conclusion: By doing the MRI and pathologic examinations, it can determine the clinical and pathological features and MRI findings of spinal tuberculosis patients with Thoracic lumbar spinal tuberculosis, and lay a reliable foundation for the treatment of the subsequent treatment.

Keywords: Thoracic Lumbar Tuberculosis; Magnetic Resonance Imaging; Pathology

1. INTRODUCTION

Spinal tuberculosis is the most common extrapulmonary tuberculosis, which accounts about 65% in Osteoarticular tuberculosis. Among the spinal tuberculosis, thoracic lumbar tuberculosis takes the percentage of 91% [1]. But due to its concealed onste and slow developments with the reason that traditional x-ray and CT do not show early vertebral inflammation and inflammatory changes with spinal meninges and discitis, therefore the clinical misdiagnose rate in relatively high [2,3]. In the past few years, MRI (Magnetic resonance imaging) offered one-new detective method in Thoracic lumbar tuberculosis. To highlight the recognition of the disease, the study tried to identify the clinic pathologic features and the manifestations of MRI by retrospective analysis of 34 cases patients of thoracic lumbar tuberculosis, of which the final diagnosis are all in our hospital. This study follows the procedures and the ethical standards which established by the Hospital Ethics Committee.

2. MATERIAL AND METHODS

2.1. General Information

Criteria for inclusion in this study's participants are: surgical treatment of thoracolumbar spinal tuberculosis patients, preoperative MRI information, and clinical cure of postoperative anti-TB drug therapy. Among the patients that attend our hospital of thoracic and lumbar tuberculosis From June 2008 to June 2012, 34 patients satisfied the above criteria. Of which 19 are males, 15 are females, with ages ranges from 16 years old to 75 years old, and the average age was 41.1. the main clinical manifestations for all the 34 cases are limb weakness, thoracic and lumbar back pain (mainly manifest dull pain or soreness), accompanied by tenderness and percuss pain, of which 4 cases were found with locally soft tissue

masses, 17 cases had tuberculosis intoxication symptoms, course of disease range from 1 month to 15 months. Of the diseased regions, thoracic vertebrae was found to be 8, thoracolumbar was 14 and lumbar was 12, multiple vertebral bone destruction was 28, single vertebral bone destruction was 6, and combined annex bone destruction was 4.

2.2. Research Methods

2.2.1. MRI Examine

For all the patients with MRI examination, GE Signa HDe 1.5 T of superconducting magnetic resonance instrument, and 8 channel phased-array coil of the spine were used. Scanning method and sequence: sagittal fast spin echo (FSE) sequence T1-weighted (T1-weighted image, T1WI), fast recovery fast spin echo (FRFSE) sequence T2-weighted image (T2-weighted image, T2WI), a short time inversion recovery (STIR) sequence T2WI; horizontal axis T1WI FSE sequence and FRFSE T2WI. Slice thickness 4 mm, layers of interval 1 mm. 27 cases accepted Gd-DTPA scanning, dose of 0.1 mmol/Kg, including the sagittal, Coronal and horizontal axis.

2.2.2. Surgical Pathology Diagnosis

All the patients had the surgical pathological diagnosis prior to treatment. The modus operandi was surgery for anterior radical debridement, decompression and autogenous iliac bone interbody bone grafting and anterior internal fixation. Specific methods are as follows: general anesthesia, lateral position, surgical incision from the affected side (if it was double-sided lesions, take the more serious' side). Antibiotics were used as routine prophylactic practice. The therapeutic approach was chosen according to the range of the abscess, vertebral body damage, the position of the dead bones and the adhesion of neighboring organs diagnosed by preoperative MRI. Thoracic tuberculosis was conducted via chest, lumbar TB used reverse eight incision peritoneal from outside into inside, firstly it needed to find the abscess near the vertebral, then suction out the pus liquid, after that the lesions of the full upper and lower normal vertebral body will be exposed, make sure to ligate the vascular between the lesions and the normal upper and lower centrum vertebral body, clear always the necrosis of the granulation organization as well as the died bone and necrosis disc completely, decompress the line vertebral tube, and plant bone inside of the body iliac, fix the anterior cervical. Finally use saline to wash the wound, with 2.0 g streptomycin powder inside along with drainage tube placed and incisions closed. Send the samples for pathological examines and do the Pseudomonas aeruginosa bacteria culture and drug susceptibility tests.

3. RESULT

3.1. MRI Check Results

In 34 patients, 81 vertebral involvement were found with uneven long T1, T2 signal. The two adjacent vertebrae involvement accounted for 72.25%, which is the most common vertebral involvement. Intervertebral disc abnormalities, seen as intervertebral disc damage, accounted for 90.67%, with long T1, T2 signal changing. This often accompanied by stenosis or disappear of intervertebral. Paraspinal abscess accounted for 87.17%, often exceeding vertebral body lesions, across one or more vertebrae, presentation isointensity or long T1 and long T2 signal. Vertebral body damaged kyphosis or (and) abscesses under the posterior longitudinal ligament, resulting in the epidural and spinal cord compression is about 74.72%. Enhanced vertebral, intervertebral discs are uneven strengthened, are curved or circular to strengthen paraspinal abscess, thin walls and uniform.

3.2. Pathological Diagnosis

The results of pathological diagnosis are summarized as follows: The cold abscess formed by vertebral body damage can have two forms: 1) Paraspinal abscess: pus comes next to the vertebral body, either in front, rear or on the side, with commonly seen in front and on sides. Pus could lift periosteum, and spread up and down along the ligament space, which results in erosion of a lot vertebral boneedges. It can also go backward into the spinal canal, and compress the epidural, spinal cord and nerve roots. 2) Flowing abscess: after paraspinal abscess accumulate to a certain amount, it will wear out periosteum with elevated pressure, and flow downward along muscle fascial gap, thus forming abscess away from the focus part. Paraspinal abscesscaused by lumbar lesion would wear outthe periosteum, accumulate within the psoas muscle sheath to forma psoas muscle abscess. Shallow psoas muschle abscess can pass through lumbar fascia tolumbar triangle to form lumbar triangle abscess. Psoas muscle abscess could also flow along the psoas to small rotor of the femur, to form abscess deep in the groin.

4. DISCUSSION

World Health Organization of global tuberculosis report show that in recent years , tuberculosis infection recovered in the globe [4], with the growth of autoimmune diseases and the increase in drug-resistant bacteria, Tuberculosis bacteria like to grow in blood-rich places; and spine vertebral maybe one of the ideal places for mycobacterium tuberculosis to stay. Because spine vertebral is cancellous bone based, and with terminal arteries being its nutrient artery, venous blood flow slow

here. With lumbar mobility being the top one in the entire spine, lumbar vertebrae have the highest incidence in the tuberculosis of bones and joints, and mostly occur in adults [5,6].

The main clinical symptoms of Thoracic and lumbar spinal tuberculosis is pain, local pain at the beginning is not intense, after lesion development of adjacent nerve root which was irritated or oppressed, such as the emergence of intercostal neuralgia in tuberculosis of thoracic; lumbocrural pain caused by irritation or compression of lumbar Plexus in lumbar tuberculosis; the patient may not pay attention to simple bone tuberculosis or synovial tuberculosis until it develops to total joint tuberculosis when pain is worsened. In order to reduce pain, the affected muscle has been in spasticity to protect. When patient's posture changes, especially during sound sleep at night, the pain becomes more intense as the protection of muscle spasms are gone.

Imaging diagnosis of Thoracic and lumbar tuberculosis include X-ray, CT and MRI examinations, in which MRI examination is most prevalent in recent years. In the 34 patients in this study who had MRI examination, were most commonly involvement of two adjacent vertebrae, which about 72.25%. Vertebral body manifested uneven long T1, T2 signal. The exception of Intervertebral disc was 90.67%, and intervertebral disc damage showed long T1, T2 signal, often accompanied by stenosis or disappear of intervertebral. Paraspinal was 87.17%, often exceeding vertebral body lesions, across one or more vertebrae, showed isointensity or long T1 and long T2 signal. Enhanced of vertebral, intervertebral discs were uneven strengthened, and paraspinal abscess were curved or circular to strengthen. So MRI examination could accurately provide Thoracic lumbar tuberculosis's location, scope and severity information. In summary, MRI findings in this study group of Thoracic lumbar tuberculosis are essentially similar with the reports of domestic and foreign literature [7]. The most common symptoms of lumbar tuberculosis are as follows: damage of the bone with the adjacent and intervertebral disc, the stenosis or disappeared of intervertebral space, and the formation of paraspinal abscess, epidural and spinal cord compression. Abscess wall is thin and even strengthening which are tuberculosis' characteristics change. Atypical Thoracic lumbar tuberculosis include: tuberculosis of single vertebrae occur in center or rear; non-continuity multiple vertebral tuberculosis; tuberculosis which vertebral body was damaged but intervertebral disc was in good condition; simple disc TB. The identification of this disease with Pyogenic spondylitis, which clinical symptoms are apparent and urgent with MRI scan signals more uniform than TB and showing center for enhanced or even strengthened. The identification of this disease with bone transfer tumor identification, which occur in more for middle and old-aged onset, has original tumor history, and the damage of bone more performed dissolved bone sexual, also can for into bone sexual, and mixed sexual, multiple vertebral body damage is jumping type distribution. Rear of vertebral body, vertebral bow and the annex are more easily to be suffered, which isn't involvement with disc. Vertebral next soft tissue masses is for knot section shaped, general does not over with the range of vertebral body [8].

Histopathological examination is the traditional method to diagnose the Thoracic lumbar tuberculosis, which has important implications for patient's condition. This study could determine the infection status of Mycobacterium tuberculosis by pathological diagnosis, which plays an important role for analysis and follow-up treatment of patients.

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