



## EVALUATION OF THE ROLE OF MRI IN SPINAL TUBERCULOSIS

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### ABSTRACT

**Objective:** To evaluate the role of MRI in assessing the extent of disease in spinal tuberculosis.

**Methodology:** This was a descriptive study conducted at department of Orthopedics Jingzhou Central Hospital from July, 2016 to December, 2017. This study was carried out on 60 cases of tuberculosis spine seen throughout patients and admitted through accident & emergency department. There were 33 Females (55%), 27 male (45%) Age range was 14-36 years. Mean age was 33 years. Clinical features of the patients were noted.

**Results:** Most common symptom was backache in 38 cases (63%). Spinal cord compression was found in 16 cases (26.6%). Most commonly affected level was thoracolumbar spine (45%). Diffuse involvement was rare and only 3 cases (05%) were having more than one level involvement. Plain radiography was the primary imaging modality. MRI was the most valuable investigation. MRI findings of tuberculosis spine were reduced intervertebral disc space (95%) cases. wedge collapse of body 18 (30%), complete destruction of body 12 (20%), paraspinal abscess 24 (40%). Calcification in 18 (30%) and cord compression 16 cases (26.6%).

**Conclusion:** MRI is the most valuable investigation in patients with spinal tuberculosis. It gives information about the extent of disease and hence is used as guide to surgical treatment. MRI is also used during follow up to monitor the response to treatment.

**Key Words:** MRI, Vertabral collapse,

## INTRODUCTION

Tuberculosis is an ancient infection that has plagued humans through out recorded history. It is still very much prevalent today. This infection remains the cause of a higher morbidity and mortality than any other infection in the world especially in the densely populated developing countries.<sup>1</sup>

Tuberculosis is the most common infection in the third world countries. It is commonly pulmonary but extra pulmonary disease is more common in children. About 5- 10% of patients have bone and joint infection.<sup>2</sup> Fifty percent of patients with bone & joint tuberculosis have spinal tuberculosis called potts disease.<sup>2</sup> The infection reaches the spine via respiratory tract or intestine by blood stream. The infection begins from the anterior part of vertebral body, spreads to the disc and causes bone destruction and formation of abscess. Culture and sensitivity is positive in 80% of cases.<sup>3</sup> Abscess spreads beneath the anterior longitudinal ligament and the intervertebral disc is involved with subsequent loss in disc height. As the vertebral bodies collapse into each other, a sharp angulation (or Kyphos) develops. Caseation and cold abscess formation may extend into the neighbouring vertebra or escape into the paravertebral soft tissue. There is major risk of cord damage due to pressure by the abscess, displaced bone or ischaemia from spinal artery thrombosis. This is called potts, paraplegia.<sup>4</sup> Paraplegia may develop in 20 – 25% cases.<sup>2</sup> Tuberculosis is the most common cause of non-traumatic paraplegia in the most parts of world.

According to world Health Organization (WHO), nearly two billion people about 1/3rd of world population have tuberculosis.<sup>5</sup> Annually 6 million become ill with tuberculosis and two million die from disease worldwide<sup>6</sup> (Data from the WHO 2006). This rise has been associated with concomitant rise in bone and joint tuberculosis.<sup>7</sup> In developing countries, TB spine remains a major health problem. This is most common and dangerous form of musculoskeletal tuberculosis.<sup>8-10</sup> Plain film radiography is the primary imaging modality used in every patient of TB spine.<sup>11</sup> MRI is the most valuable method for detecting early disease and is preferred technique to define the activity and extent of infection.<sup>12</sup> It shows not only bony involvement but also the edema and soft tissue swelling. Abscess may be detected or excluded.<sup>12</sup> Subperiosteal edema is readily visible. Serial MRI examinations can be used to assess the response to treatment<sup>13,14</sup> and are very useful in the management of multilevel infection.

MRI features of tuberculous infection are soft tissue edema,<sup>12</sup> paraspinal mass,<sup>15</sup> disc space narrowing, vertebral collapse and destruction followed by Kyphosis. It is difficult to differentiate between tuberculosis and pyogenic spondylitis. Discs are destroyed early with simple infection and later in tuberculosis. Calcification when present indicates tuberculosis.<sup>16</sup>

**Purpose** of the study was to evaluate the role of MRI in assessing the extent of disease. Serial MRI scans were also used to assess the healing of infection.

## METHODOLOGY

This study was carried out in patients admitted in orthopaedic/surgical unit and patients attending the radiology department of District Head Quarter Teaching hospital from July, 2016 to December, 2017. It included total 60 patients. Inclusion criteria were patients of both sexes, age range was 14-46 years, and only diagnosed cases of tuberculosis spondylitis were included. Patients with non-tuberculous spondylitis were excluded. A performa was designed for the study. Diagnosis was based on history, clinical examination and investigations. Investigations included were CBC, ESR, Sputum cytology, X-Ray chest (in all cases to see the evidence of pulmonary tuberculosis). The study was based on MRI of the spine to evaluate the different radiological features of tuberculosis. Plain X-Ray was done in all cases as primary imaging modality.

## RESULTS

This study included total 60 patients. There were 33 female (55%) and 27 male (45%). Age range was 14 to 46. mean age was 33 years. MRI scan showed that most affected level of the spine was lower thoracic and upper lumbar(45%) in 27 cases. Only thoracic spine was involved in 14 cases (23.3%). Lumbar spine in 12 cases (20%). Cervical spine tuberculosis was found in four cases (6.6%). There was diffuse involvement in three cases (5%).

MRI showed narrowing of intervertebral disc space in 95% of cases. Most common symptom was low back pain. Most common sign was local tenderness. Spinal cord compression was seen in 16 cases (26.6%).

MRI scan of spine showed narrowing/ destruction of disc space in 95% of cases. Wedge collapse of body in 30%. Complete destruction of body in 20%. Paraspinal abscess in 40%, calcification in 30% and cord compression in 26.6% of cases.

## DISCUSSION

Tuberculosis of the spine has been common orthopedic and neurological problem until the middle of last century for the developing world. It showed a steady decline in its prevalence in developed countries in 60s & 70s due to effectiveness of public health program and advances in chemotherapy.<sup>14</sup>

Tuberculosis of spine is a most common condition in the developing countries as compared to the developed countries.<sup>17</sup> The reason for differences are illiteracy, poverty, poor hygienic conditions, unbalanced diet, overcrowding, low budget for health and high prevalence of pulmonary tuberculosis. Male dominance and clinical pattern of onset shown in this study is in accordance with observation made by Jalleh R.D.<sup>14</sup> The regional distribution of vertebra is similar to the findings of Bikha Ram,<sup>18</sup> Tulsi S.M.<sup>19</sup> Plain radiography plays an important role in diagnosis of most cases of TB spine.<sup>11</sup> MRI is the most valuable

investigation for diagnosis of early infection.<sup>12</sup> It showed soft tissue swelling along with bony involvement.

MRI was found to be most valuable investigation for assessment and treatment of TB spine.<sup>8</sup> It gives following information to the clinician in patients with TB spine.

1. Site of involvement
2. Paravertebral soft tissue swelling/abscess/disc sequestration
3. Number of vertebra involved
4. Angle of Kyphosis
5. Size of vertebral canal
6. Degree of cord compression
7. Severity of bone disease – wedge collapse/compression fracture.

Although MRI is costly investigation but it gives more information about soft tissue involvement and degree of spinal cord or root compression as compared to plain X-Ray, CT scan.<sup>11,15</sup> It gives information about extent of disease and hence gives guide to treatment. It is helpful in monitoring response to treatment by serial MRI scans.<sup>12</sup>

In early diagnosed cases, conservative treatment by chemotherapy gives good results. Anti tuberculous drugs can reach the tuberculous caseous material and cavities in spine.<sup>20</sup> However if there is severe bone involvement along with cord or root compression, surgical treatment is the only remedy.<sup>21-23</sup>

## CONCLUSION

We conclude that MRI spine is the most valuable investigation for evaluation of spinal tuberculosis. It gives information about extent of involvement of soft tissue as well as bone and helps as staging procedure for planning treatment. It helps in monitoring the response to treatment by serial MRI scans.

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