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## ■ DESCRIPTION OF THE RADIOGRAPHS

Thoracolumbar junction spine radiographs show reactive sclerosis with anterior wedging and collapse of the T11 and T12 vertebral bodies with marked irregularity of the lower plate of T11 and upper plate of T12 associated with a soft tissue mass around the vertebral bodies affected.

Contrasted spine CT (not presented) demonstrated ill-defined lytic and sclerotic lesions in the T11 and T12 vertebral bodies with destruction of the lower plate of T11 and upper plate of T12 and prevertebral and bilateral paravertebral abscesses with thin smooth peripheral enhancement.

## ■ DIAGNOSIS

Pott disease (tuberculous spondylitis)

## ■ BRIEF OVERVIEW OF THE DISEASE

Tuberculous spondylitis[2]

The musculoskeletal system is involved in only 1%–3% of cases of tuberculosis. However, the resultant bone and joint destruction is the cause of severe morbidity and in cases of spinal involvement can cause severe neurologic sequelae. The disease affects patients of all ages ---although it is rare in the 1st year of life--- and most frequently affects the spinal column, pelvis, hip, and knee.

Spinal TB (Pott spine or Pott disease) remains one of the most common forms of extrapulmonary TB and roughly accounts for 50% of all cases of skeletal TB infection. In 1779, Sir Percival Pott, a British physician, was the first to describe the destruction of disk space and adjacent vertebral bodies primarily in children who developed progressive kyphosis; hence, the condition subsequently became known as Pott disease. Spinal TB is uncommon in the western world, where *Staphylococcus* spp remain the most common cause of vertebral osteomyelitis, but still remains the most common cause in countries with high burden of pulmonary TB. Spinal involvement typically results from hematogenous spread from a pulmonary, genitourinary, or gastrointestinal infection, via either arterial or venous route into the rich vasculature of the vertebral bodies. The destruction characteristically affects the intervertebral disc space and the adjacent vertebral bodies with usually slow and insidious collapse of the anterior elements, resulting in wedge deformity and gibbus formation. Neurologic manifestations are common and often signal the devastating complication of spinal cord involvement (pain, numbness, weakness, paraplegia, quadriplegia, weak, or absent reflexes). Kyphosis is the most common deformity resulting from vertebral body collapse, which can involve any spinal segment, but more commonly affects the lower thoracic spine or upper lumbar region. Imaging findings include bone destruction with osteolytic changes, occasionally in association with bone sclerosis, soft tissue involvement with paraspinal abscess that may present as a mediastinal mass. The presence of calcification within a paraspinal abscess is fairly characteristic of TB infection. Although contrast-

enhanced CT is an excellent imaging modality for the evaluation of the bone and mediastinal disease, MR imaging is the imaging technology of choice for examination of the spine and spinal cord and should be always performed in patients with suspected neurologic involvement.

Diagnosis is often difficult, with an average delay of 16--19 months between the onset of symptoms and reported diagnosis. A history of infection with or exposure to tuberculosis may be present, and evidence of concurrent active intrathoracic tuberculosis is present in less than 50% of cases. In addition, although a positive tuberculin skin test helps support the diagnosis, a negative result should not be considered as evidence excluding it. Indeed, in one series, a false-negative rate of 14% was reported. Only histologic analysis and tissue culture can help confirm the diagnosis.

## ■ IMAGING

### PLAIN RADIOGRAPHS

Plain radiographs are less sensitive for early detection of tuberculous spondylitis; at least 30% to 50% bone destruction is required before osteolytic changes are appreciated. Early changes include ill-defined appearance of endplates with loss of sclerotic margins and irregularity or erosions of endplates. Lytic lesion in the vertebral body typically lacks peripheral sclerosis. Disc involvement is characterized by decreased disc space. Two adjacent vertebral bodies and intervening disc are commonly involved. As the disease progresses, anterior wedging and collapse of vertebral body occurs with resultant characteristic gibbus deformity. Subligamentous spread can cause scalloping of anterior margins of vertebral bodies. Paravertebral soft tissue is seen as displacement of paraspinal lines in thoracic region and outward convexity or ill-defined margins of psoas shadow. Calcification of paraspinal abscess, when seen, is pathognomonic for tuberculous infection.

### ULTRASONOGRAPHY

Ultrasonography is useful in the diagnosis and percutaneous drainage of iliopsoas and paraspinal muscle abscesses.

### COMPUTED TOMOGRAPHY SCAN

CT scan is useful for the evaluation of early bone destruction, pattern of destruction (fragmented bone destruction is more common), and calcification in associated hypodense paraspinal soft tissue (diagnostic of TB; CT is frequently used for guided transpedicular vertebral biopsy for histopathology and for culture/sensitivity evaluation. If multiple contiguous vertebral bodies are collapsed, CT is extremely useful for accurate demonstration of involved vertebral bodies by counting.

### MAGNETIC RESONANCE

MR imaging is the modality of choice for evaluation of tuberculous spondylitis because it detects early marrow and

paraspinal soft tissue changes with multiplanar capabilities and excellent soft tissue contrast resolution. Early changes include focal T2 hyperintense and T1 hypointense bone marrow edema in the anterior part of vertebral body adjacent to endplates with patchy postcontrast enhancement. Gradually, the destruction of the cortex and endplates occurs with resultant subligamentous spread, disc involvement, and contiguous vertebral body involvement. The involved disc

space is reduced in height with abnormal T2 hyperintense signal. Subligamentous spread may affect multiple contiguous vertebrae with preservation of intervening disc spaces. It is associated commonly with paravertebral and epidural collections, which appear T2 hyperintense and T1 hypointense with thin smooth peripheral postcontrast enhancement. Multifocal TB, compression of the spinal cord, abnormal T2 hyperintense signal in the spinal cord, and neural foraminal and neural compromise secondary to epidural collections are excellently demonstrated on MR imaging. The complete extent of iliopsoas and paraspinal abscess can be demonstrated on MR imaging, which can reach up to the proximal thigh. Posterior element involvement is not uncommon. Cross-sectional imaging (CT and MR imaging) is extremely useful in detecting small foci of infection in posterior elements.

#### ■ REFERENCES

1. Burrill J, Williams CJ, Bain G, Conder G, Hine AL, Misra RR. Tuberculosis: A Radiologic Review. *Radiographics* 2007; 22: 1255-73.
2. Restrepo CS, Katre R, Mumbower A. Imaging Manifestations of Thoracic Tuberculosis. *Radiol Clin North Am.* 2016; 54: 453-73.
3. Abhijit A, Raut AA, Naphade PS, Ramakantan R. Imaging Spectrum of Extrathoracic Tuberculosis. *Radiol Clin North Am.* 2016 May;54(3):475-501.

# Answer to Radiographic Quiz

Please answer the following with TRUE or FALSE regarding the salient abnormality.

- \_T\_* Multiple vertebral bodies are involved.
- \_T\_* The intervertebral disc is involved.
- \_T\_* The spinal cord is at risk.
- \_T\_* There is paravertebral extension of the salient pathological process.
- \_T\_* There is evidence of reactive sclerosis with anterior wedging and collapse of the vertebral bodies affected.

