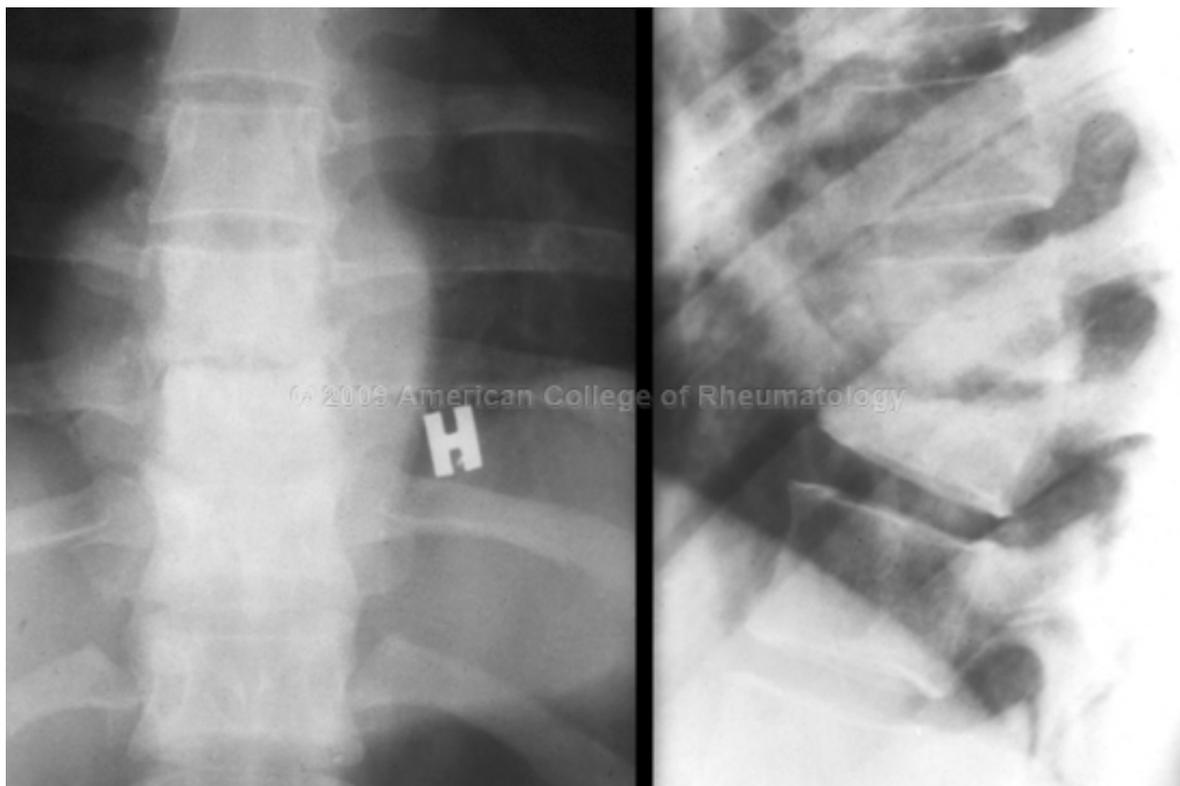


Case 9 30-year-old with backache in the thoracic spine for 3 months



He gives history of weight loss and night sweats.

**Your Diagnosis**

## **Diagnosis Pott's disease, or tuberculous spondylitis**

It is a consequence of the hematogenous spread of *Mycobacterium tuberculosis*. Tuberculosis continues to be the world's most lethal and prevalent infectious disease, with .3 million deaths annually, and spinal tuberculosis accounts for approximately 5% of all tuberculosis cases. An increasing incidence, likely resulting from an aging population, is found in association with acquired immune deficiency syndrome (AIDS) and increased immigration.

The presentation of Pott's disease depends on the stage of the disease, the affected location, and the presence of complications. Pulmonary involvement is typically the primary focus, with secondary involvement causing destruction of the vertebrae and intervertebral disks and gross spinal deformity. In addition, prevertebral and paravertebral abscesses can form.

The traditional treatment approach involved surgical intervention for debridement of the abscess, reconstruction of the deformity, and protection of the neurological elements. With advanced antibiotic regimens, the disease can be controlled and cured prior to the advent of the osteolytic spinal deformity.

### **Pathogenesis**

When *Mycobacterium tuberculosis* involves the spine, an inflammatory process results in the formation of granulomatous lesions affecting the diskovertebral segments. Bone destruction and sclerosis can be seen, as well as osseous fragmentation. Nutrient supply to the disk is impaired from the destruction of the vertebra, and caseous necrosis causes the diskovertebral unit to collapse.

The osseous destruction is progressive, leading to vertebral collapse. Kyphosis [Gibbus] and scoliosis can result. Granulation tissue and abscess formation around the spinal canal can result in neurologic symptoms [Pott's paraplegia]. Tubercular lesions can be present in the thoracic and lumbar spine, with thoracic lesions more often resulting in kyphosis. Spinal tuberculosis remains a potentially crippling disease and is one of the most common worldwide causes of kyphotic deformity.

### **Clinical Presentation**

Clinical features of spinal tuberculosis include an insidious, gradual onset of back pain, local tenderness, and anorexia. Night sweats and fever may also be present. 50% of patients had some element of a neurologic deficit. Thoracic involvement [common site] is associated with more severe sequelae compared with lumbar manifestations; complications include sensory deficits, motor loss, and changes in bowel and bladder function.

The most severe complications of spinal tuberculosis are paraplegia [thoracic spine], tetraplegia [cervical spine involvement], hemiplegia, or monoplegia [lumbar spine]. Paraplegia can result from impingement on the spinal cord due to abscesses, caseous debris, and granulation tissue [causing Early Pott's paraplegia]. Mechanical instability and spinal deformity can result in paraplegia from stretching of the spinal cord, resulting in cord impairment [Delayed Pott's paraplegia]. Although spinal tuberculosis is primarily treated medically, severe complications may require surgical intervention.

### **Diagnostic Imaging**

Tuberculosis of the spine is a relatively indolent process compared with

pyogenic diskitis because *M tuberculosis* does not produce proteases. However, marked destructive changes can occur, particularly with delayed treatment. The features most commonly seen on computed tomography are bone and disk destruction with variable bone production or sequestra formation, multilevel involvement, and paraspinal abscesses that may be large and contain calcifications.



- include entire spine (skip lesions)
- earliest sign is local osteoporosis of two adjacent vertebrae
- later collapse of the adjacent vertebral bodies
- paraspinal soft tissue

Spinal tuberculosis tends to seed the thoracolumbar junction and may extend several vertebral levels away beneath the anterior and posterior longitudinal ligaments. This may result in classic gouging deformities of the anterior vertebral bodies above or below the level of primary involvement.

Magnetic resonance imaging is the choice imaging method due to its planar capabilities and soft tissue contrast resolution. The predominant findings on

magnetic resonance images are hypointensity on T1-weighted sequences, variable signal intensity depending on disease chronicity on T2-weighted sequences, and heterogeneous enhancement of the >1 involved vertebral bodies and disks. Paravertebral involvement may result in abscesses in the paravertebral muscles.



The characteristic gibbus deformity seen is from progressive bone necrosis leading to collapse and wedging in multiple anterior vertebral bodies. Low signal on T1-weighted and variable signal on T2-weighted magnetic resonance images in affected vertebral bodies, delayed disk involvement, and prevertebral and paravertebral or intraosseous abscesses with subligamentous and epidural extension are commonly seen in spinal tuberculosis.

### **Surgical Management**

Multidrug antituberculous chemotherapy, including isoniazid, rifampin, pyrazinamide, and ethambutol, is used to treat tuberculous spondylitis. However, when irreparable damage has occurred in chronic disease, surgical management may become necessary. A kyphotic curve  $>60^\circ$  and curves likely to progress are candidates for surgical correction. Other surgical indications include paravertebral abscess, neurological deficit, lack of improvement or

deterioration, and refractory disease. Surgical treatment consists of a combination of procedures depending on the spinal deformity. Anterior decompression, posterior shortening, bone grafting, and instrumentation for stabilization may be used (Figure 2B).<sup>7</sup> Anterior debridement of tubercular debris is usually necessary because anterior vertebral body involvement is responsible for the collapse of the vertebral bodies, forming a kyphotic curve. Inflexible scoliosis with >25% flexibility and curves >80°, pedicle subtraction osteotomy, and vertebral column resections can be useful to gain correction.<sup>15</sup>

The Smith- Peterson extension osteotomy technique is commonly used for reconstruction of sagittal imbalance in patients with a deformity above the thoracolumbar junction. Total correction over several spinal segments from 20° to 40° is achievable. The Smith- Peterson technique requires multiple osteotomies and the occasional use of anterior osteotomy for effective posterior compression. Vertebral correction osteotomy is beneficial in severely angulated kyphotic thoracic curves and large thoracic scoliosis curves.

Surgery type depends on the need for degrees of correction, the location of the curve, the need for anterior release, the need for anterior or posterior instrumentation for stabilization, and the use of multilevel osteotomies. The Smith-Peterson osteotomy, pedicle subtraction osteotomy, and vertebral body resection are excellent correction procedures; however, significant risks include neurological impairment and blood loss.

## **Conclusion**

Tuberculous spondylitis is a worldwide disease that occurs in up to 5% of all cases of tuberculosis as a consequence of the hematogenous spread of pulmonary *M tuberculosis*. Because of the increasing incidence of tuberculosis in the aging population, patients with AIDS, and recent immigrants, orthopedic surgeons must consider this diagnosis in the event of multilevel spinal in-

involvement or destruction at the thoracolumbar junction with kyphosis. Surgical intervention is required for debridement of vertebral and paravertebral abscesses, reconstruction of the deformity, and protection of the neurological elements.

## Investigations

- CXR (2/3 have abnormal CXRs)
- ESR high; WBC variable
- **Mantoux:** Tuberculin skin test (negative if immunocompromised) PPD
  - 0.1 ml of 1 in 10,000, 1 in 1000 and 1 in 100
  - >10 mm of induration : Test is +ve
  - <5mm means test is -ve
- +ve test: means 1. Active infection 2. previous TB 3. BCG
- In +ve for active TB: 0.1ml of 1 in 10,000 increase induration
- 
- **Biopsy:** Tubercle [granuloma] shows caseation in the centre; Langerhans; Epithelioid cells in the periphery
- **Stain:** Ziehl-Neelsen stain [stained with carbol fuchsin ; washed with H2SO4 and counter stain with Methylene blue
- **Lowenstein Culture:** - requires use of enriched medium and adequate oxygenation; cultures only visible at 2-4 weeks

### TB [Insidious]

- Multiple vertebral
- Paravertebral abscess > epidural
- Disc is relatively spared; [Sequestered]
- MRI: does not show increase signal
- Posterior element involved in 50%
- Kyphosis [anterior destruction]

Fibrous ankylosis

TB

vs

Sep

tic

### Pyogenic [Acute]

- Single level
- Epidural > Paravertebral
- Disc is early to go [Destroyed]
- Shows increase signal
- Only anterior column
- Symmetrical collapse
- Bony ankylosis

infection of the spin

Pott's disease, or tuberculous spondylitis, is a consequence of the hematogenous spread of *Mycobacterium tuberculosis*.<sup>1</sup> Tuberculosis continues to be the world's most lethal and prevalent infectious disease, with .3 million deaths annually, and spinal tuberculosis accounts for approximately 5% of all tuberculosis cases.<sup>2-4</sup> An increasing incidence, likely resulting from an aging population, is found in association with acquired immune deficiency syndrome (AIDS) and increased immigration.

The presentation of Pott's disease depends on the stage of the disease, the affected location, and the presence of complications. Pulmonary involvement is typically the primary focus, with secondary involvement causing destruction of the vertebrae and intervertebral disks and gross spinal deformity. In addition, prevertebral and paravertebral abscesses can form.<sup>5</sup>

The traditional treatment approach involved surgical intervention for debridement of the abscess, reconstruction of the deformity, and protection of the neurological elements. With advanced antibiotic regimens, the disease can be controlled and cured prior to the advent of the osteolytic spinal deformity.<sup>5</sup>

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The osseous destruction is progressive, leading to vertebral collapse. Kyphosis and scoliosis can result. Granulation tissue and abscess formation around the spinal canal can result in neurologic symptoms.<sup>6</sup> Tubercular lesions can be present in the thoracic and lumbar spine, with thoracic lesions more often resulting in kyphosis.<sup>2</sup> Spinal tuberculosis remains a potentially crippling disease and is one of the most common worldwide causes of kyphotic deformity.<sup>7,8</sup>

### **Clinical Presentation**

Clinical features of spinal tuberculosis include an insidious, gradual onset of back pain, local tenderness, and anorexia. Night sweats and fever may also be present. Oguz et al<sup>6</sup> reported that .50% of patients had some element of a neurologic deficit. Thoracic involvement is associated with more severe sequelae compared with lumbar manifestations; complications include sensory deficits, motor loss, and changes in bowel and bladder function. Skin breakdown over severe curves can lead to local and systemic infections.

The most severe complications of spinal tuberculosis are paraplegia, tetraplegia, hemiplegia, or monoplegia.<sup>1</sup> Paraplegia can result from impingement on the spinal cord