Spinal Infections

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I. Pyogenic infection

Aetiology

- **Causative organism:**
  - *Staph. aureus* (most common)
- **Route of infection:**
  - Haematogenous (most common)
  - Iatrogenic during surgery
  - local spread from nearby structures.
- **Predisposing factors:**
  - Depressed immunity due to chronic diseases (diabetes mellitus, Chronic renal failure or liver cirrhosis) or HIV infection.
  - Genitourinary infection is the most common predisposing factor for blood-borne infection.

Pathology

- Blood-borne infection usually starts in the end plate causing suppurative inflammation, tissue necrosis, bony collapse, and spread of the infection into the adjacent intervertebral disc spaces.
- The infection can extend anteriorly to create a paravertebral abscess or posteriorly to cause an epidural abscess.
- Neurological deficits are caused by (1) direct extension of the infection or (2) compression from pathological fracture.

Clinical Picture

- **Symptoms:**
  - **Pain (most common)**
  - Constitutional symptoms: anorexia, malaise, night sweats, intermittent fever, and weight loss.
  - Kyphosis (late)
  - Paralysis (Late)
- **Signs:**
  - Localized tenderness
  - Paraspinal muscle spasm and limitation of motion.
  - Psoas abscess
  - Neurological manifestations: the higher the level, the more the manifestations.
- NB1: Clinical findings in elderly and immunosuppressed individuals may be minimal.
- NB2:Differentiation between pyogenic and caseating infections by physical examination is difficult.

Investigations **(Culture is the surest)**

- **A: Radiological:**
  - ***X ray***
    1. Disc space narrowing,
    2. Vertebral end plat irregularity
    3. Subchondral bone defects and hypertrophic (sclerotic) bone formation.
    4. Paravertebral soft-tissue masses.
    5. Vertebral collapse, kyphosis, and bony ankylosis (late).
  - ***CT***
  - ***MRI***
  - Early and accurate.
  - Low T1 & high T2

- **B: Laboratory:**
  - ↑ ESR (good prognostic)
  - ↑ CRP (good diagnostic)
  - ↑ WBCs (not a god diagnostic tool as may decrease in infants and debilitated patients)
  - Blood culture (may be)
- **C: Biopsy:**
  - Needle or open

D.D

1. Malignancy (1ry or 2ry)
2. infections in nearby structures (psoas muscle, hip joint or abdominal cavit).
3. Pott’s disease

Treatment

- **Nonoperative:**
  - Bed rest and immobilization (cast or brace)
  - Antibiotics (IV for 6 weeks, followed by oral antibiotics till ESR returns to normal), empirical and according to culture and sensitivity.
- **Operative:**
- *Indications:*
  - Failure of conservative treatment
  - Neurological deterioration
  - Excessive bone damage
  - Epidural or big paravertebral abscess
- *Methods*
  - Debridement and fusion (Anterior, posterior or combined)

II. Pott's disease (TB of spine)

- **Incidence**
  - Bone and joint infections = 2% - 3% of all reported cases of TB.
  - Potts's disease = 50% of the bone and joint infections.
  - The thoracolumbar spine is the most commonly infected area.

Aetiology

- **Causative organism:**
  - *Acid fast mycobacterium.*
- **Route of infection:**
  - Haematogenous (2ry TB)
- **Predisposing factors:**
  - Depressed immunity due to chronic diseases (diabetes mellitus, Chronic renal failure or liver cirrhosis) or HIV infection.

Pathology

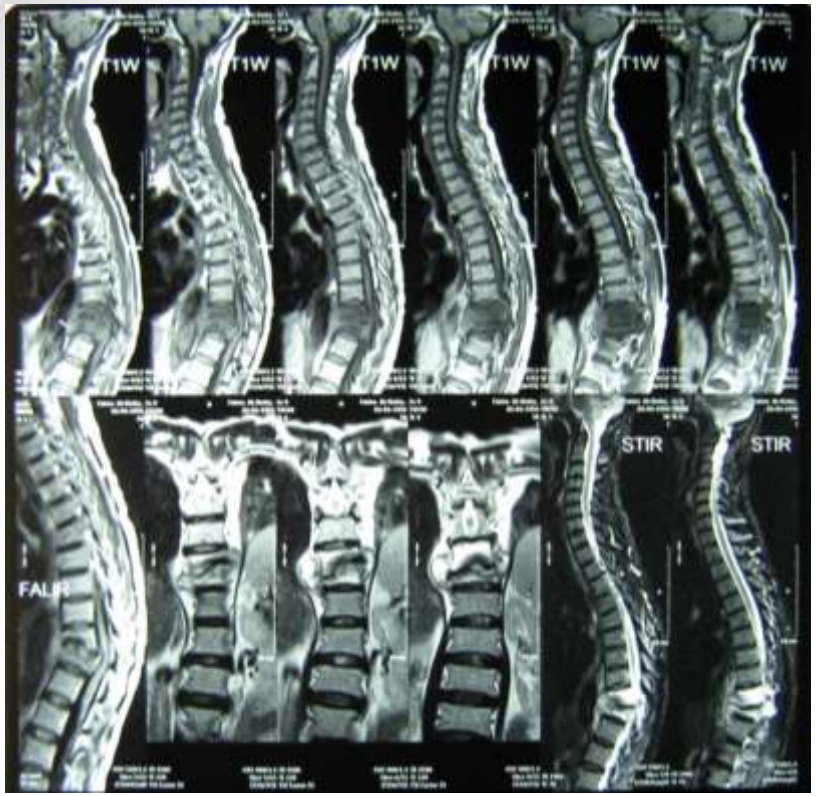
- The infection is characterized by acid fast–positive, caseating granulomas with or without pus.
- Tubercles composed of monocytes and epithelioid cells, forming minute masses with central caseation in the presencen of Langerhans-type giant cells, are typical on microscopic examination..
- Bone destruction without new bone formation
  - Formation of tuberculous granulation tissue
  - No new bone formation due to end arteritis obliterans
- Cold abscess and sinus formation
  - The sinus is lined by tuberculous granulation tissue
- Activity and healing
  - Activity ⇨ *caseation and cold abscess* formation (infiltrating tuberculosis)
  - Healing ⇨*fibrosis with dystrophic calcification* for the central caseous mass (encysted tuberculosis) … ***unsafe***

Clinical Picture

- **Slowly progressive constitutional symptoms** are predominant in the early stages of the disease, including weakness, malaise, night sweats, fever, and weight loss.
- **Pain (late)**
- vertebral collapse, called “concertina collapse” because of its resemblance to an accordion, leading to kyphosis (late) .
- Cervical involvement can cause hoarseness because of recurrent laryngeal nerve paralysis, dysphagia, and respiratory stridor (known as *Millar asthma*).
- **Pott’s Paraplegia:**
  - *Group A (paraplegia with active disease):*
    1. external pressure on the cord
    2. penetration of the dura by infection
  - *Group B (paraplegia of healed disease):*
    1. transection of the cord by a bony ridge
    2. constriction of the cord by granulation and fibrous tissue

Investigations **(Culture is the surest)**

- **A: Radiological:**
  - ***X ray***
    - Affection of 2 or more adjacent vertebrae with intervertebral disc. No bony sclerosis or new bone formation
    - Paravertebral soft-tissue masse
    - Vertebral collapse (late).
  - ***CT:*** characteristic calcification
  - ***MRI***
  - Low T1 & high T2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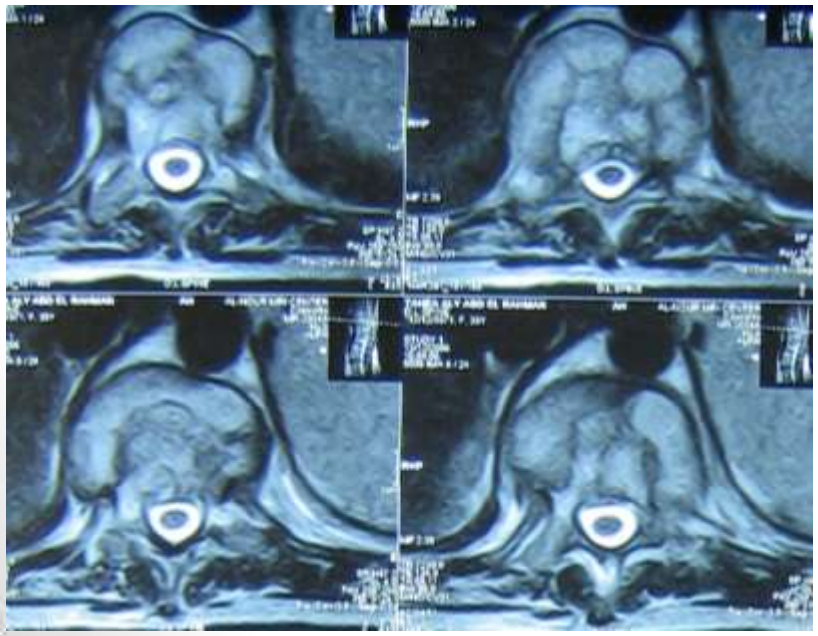

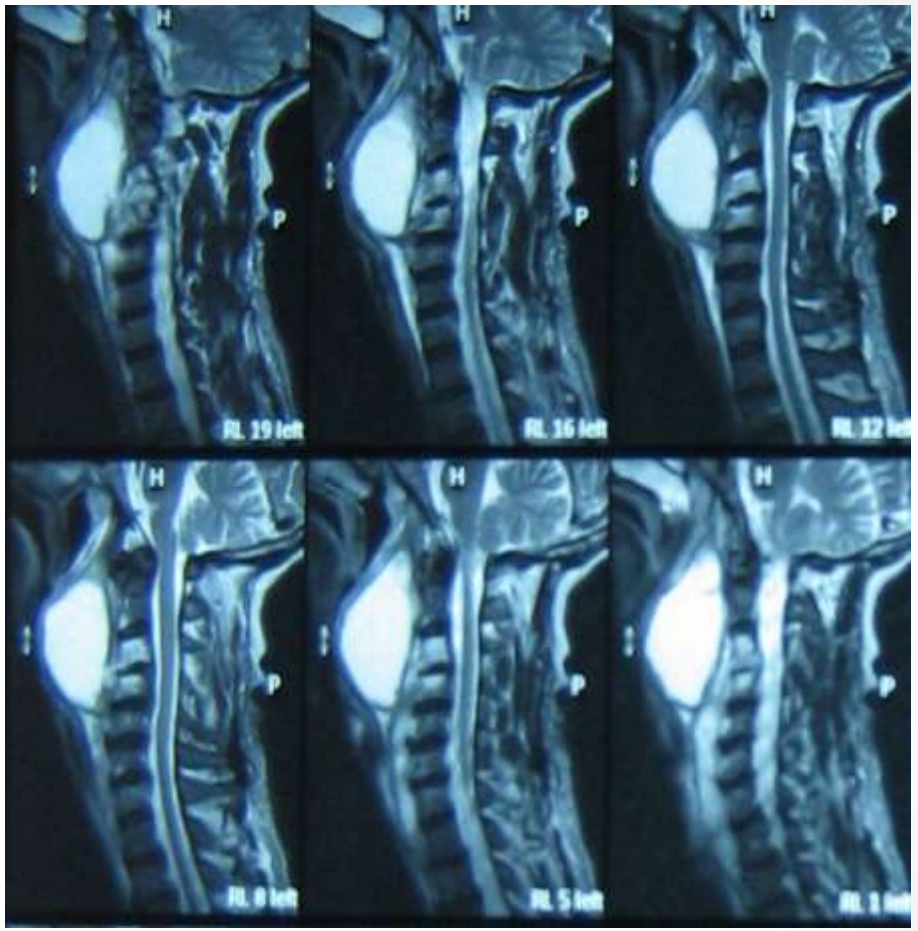
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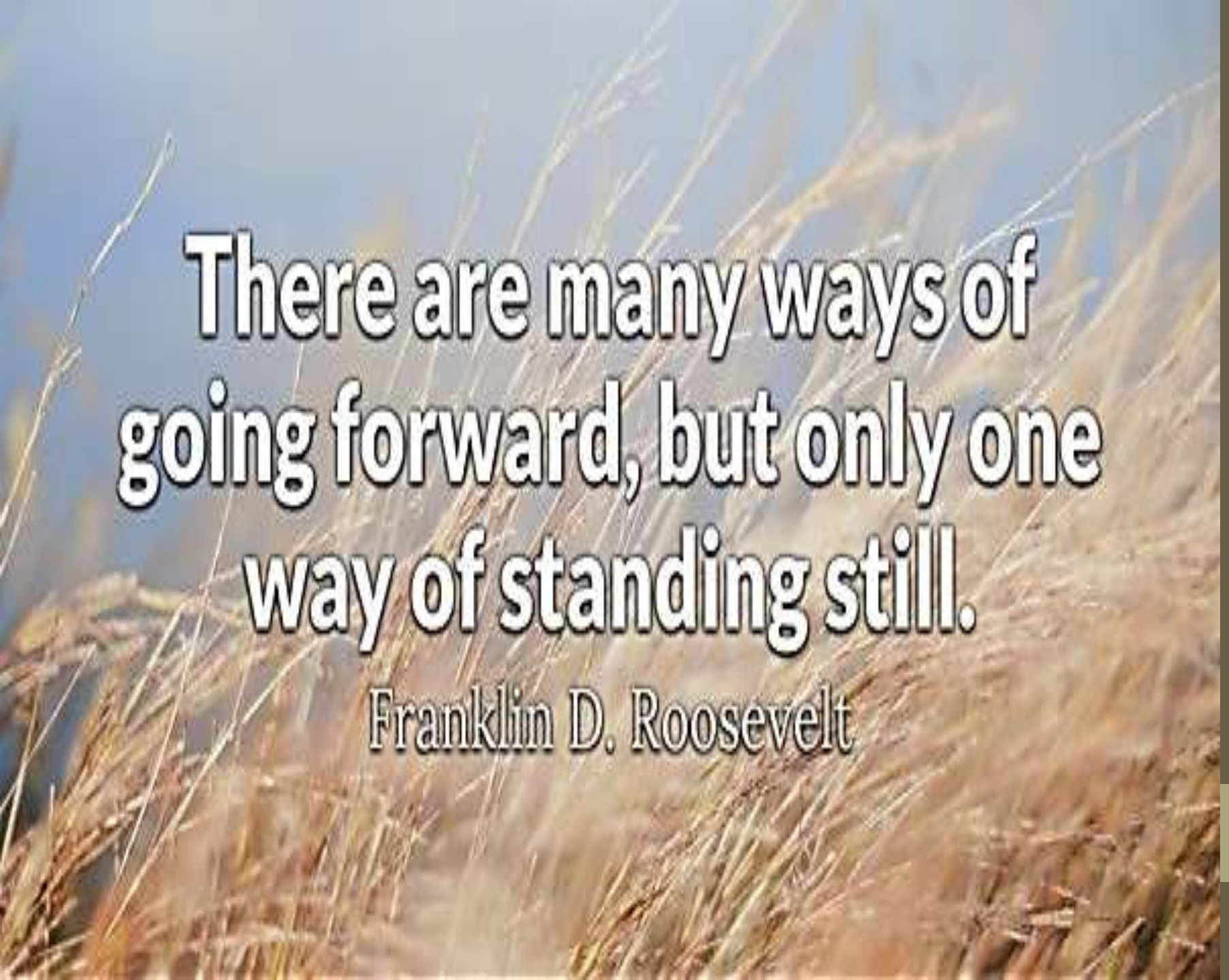
- **B: Laboratory:**
  - Anaemia and hypoproteinemia (chronic illness)
  - ↑ ESR
  - +ve Tuberculin test
- **C: Biopsy:**
  - Needle or open

D.D

1. Malignancy (1ry or 2ry)
2. pyogenic and fungal infections

Treatment

- **Nonoperative:**
  - Bed rest and immobilization (cast or brace) and correction of the general condition.
  - Antituberculous TTT
- NB: Definitive diagnosis by culture is important because of the toxicity of the chemotherapeutic agents and the length of treatment required.
- **Operative:**
- *Indications:*
  - Failure of conservative treatment
  - Neurological deterioration
  - Excessive bone damage
  - Epidural or big paravertebral abscess
- *Methods*
  - Debridement and fusion (Anterior, posterior or combined)


There are many ways of going forward, but only one way of standing still.
Franklin D. Roosevelt