"I CAN'T FEEL MY LEGS"

A REVIEW OF SPINAL EPIDURAL ABSCESSES

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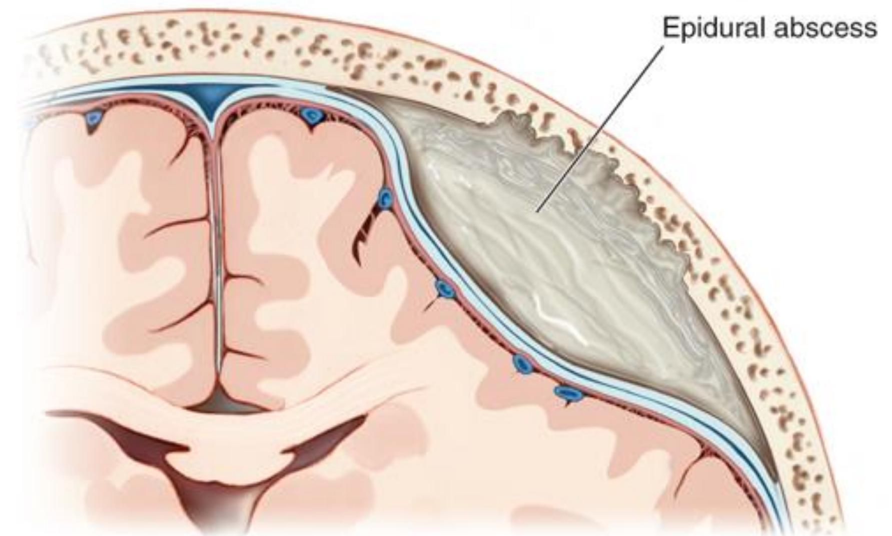
Types

- Intracranial (IEA)
- Spinal epidural abscess (SEA) 9-1
  - Most common thoracolumbar
    - Increased infections prone fat tissue
    - Increased dimensions
    - Highly vascular



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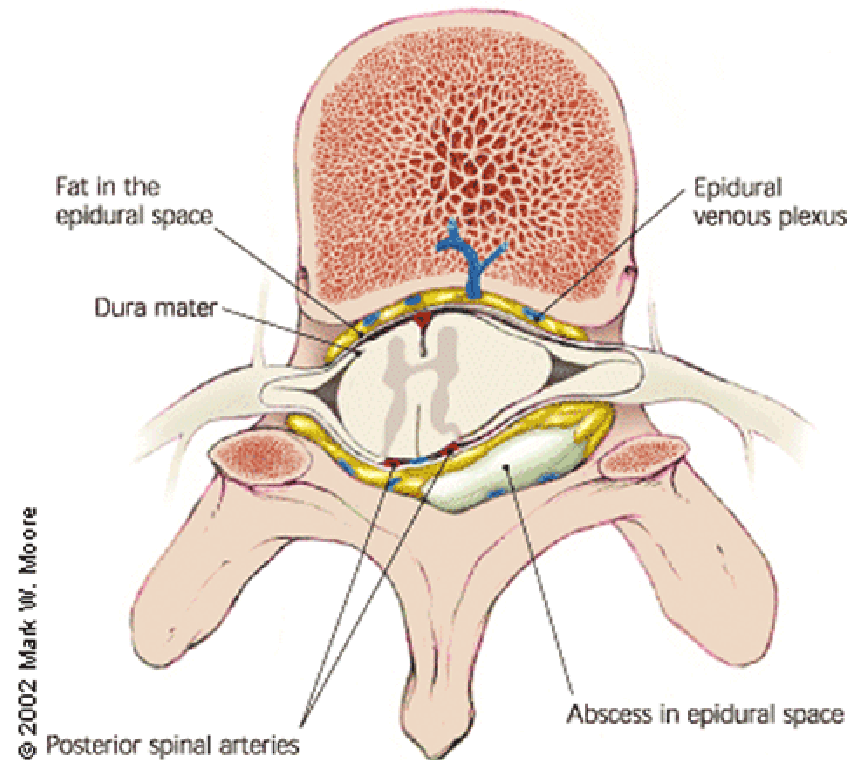
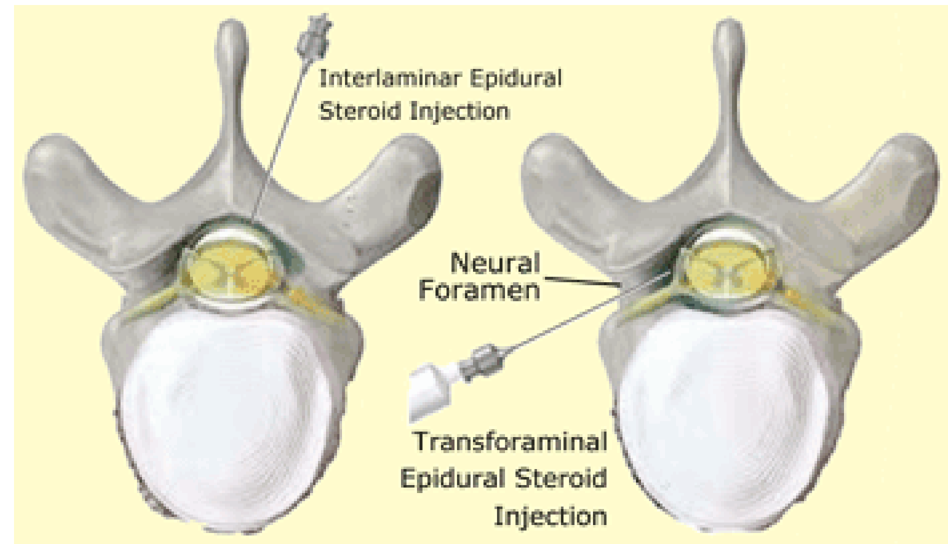
Anatomy

- Epidural
  - Space between dura mater and vertebral wall
  - Anything below the foramen magnum
    - Dura adherent to skull above
  - Multiple levels
    - Vertical space



Pathogenesis

- Hematogenously
  - Bacteria, IVDU
- Extension from infected tissues
  - Diskitis
  - Retro pharyngeal
  - Perinephric
  - Psoas, paraspinal
- Trauma
- Direct inoculation
  - Surgery, epidural anesthetic



Sequela

1) Fever, malaise, back pain

2) Nerve root pain

   Electric shock, radicular pain

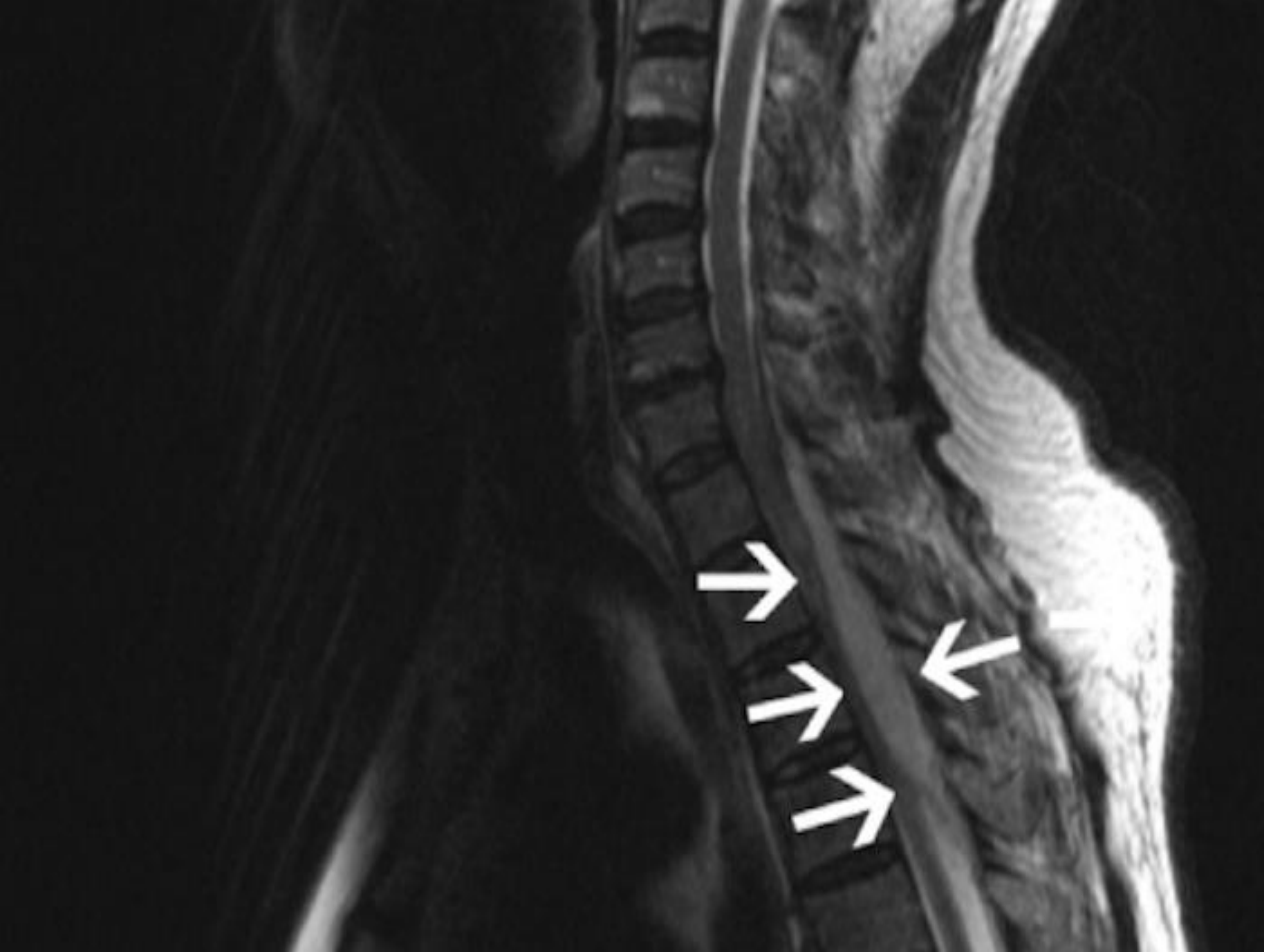
3) Spinal cord dysfunction

   Bowel/ bladder dysfunction, weakness

4) Paralysis

Spinal injury/ Paralysis

- Compression
- Thrombosis, thrombophlebitis
- Arterial disturbance
- Bacterial toxins, inflammation



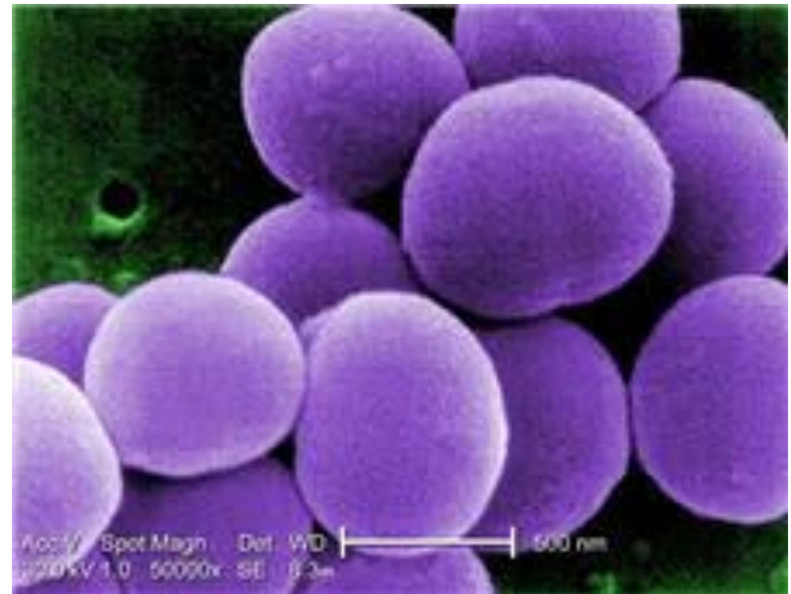
Epidemiology

- .2-2.0 per 10,000 hospital admissions 30 years ago
- Has since doubled
- Up to 7.4 per 10,000 in some studies

Vakili M, Crum-Cianflone NF. Spinal Epidural Abscess: A Series of 101 Cases. Am J Med 2017; 130:1458.

Microbiology

- S. aureus 63%
  - MRSA 25-68%
- Gram negative bacilli 16%
- Streptococci 9 %
- Coagulase negative staph 3%
- Anaerobes 2%
- Others (fungal parasites) 1%
- Tuberculosis in developing countries



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Risk Factors

- Alcoholism
- Bacteremia
- Diabetes
- HIV infection
- Trauma
- Tattooing
- Acupuncture
- Contiguous bony or soft tissue infection
- Spine fractures
- IV drug use

Davis DP, Wold RM, Patel RJ, et al. The clinical presentation and impact of diagnostic delays on emergency department patients with spinal epidural abscess. J Emerg Med 2004; 26:285.

Risk Factors- continued

- Central line placement
- Epidural catheter placement
  - 0.5-3%
    - Short term placement
- Surgery
  - Direct inoculation
  - Hematoma

Davis DP, Wold RM, Patel RJ, et al. The clinical presentation and impact of diagnostic delays on emergency department patients with spinal epidural abscess. J Emerg Med 2004; 26:285.

Diagnosis

Presentation

Classic triad

- 7.9% of patients
- Fever
  - Least common, 33%
    - Unusual, fever with other spinal pathology
- Spine pain
  - 61%
- Neurological deficits
  - 41%

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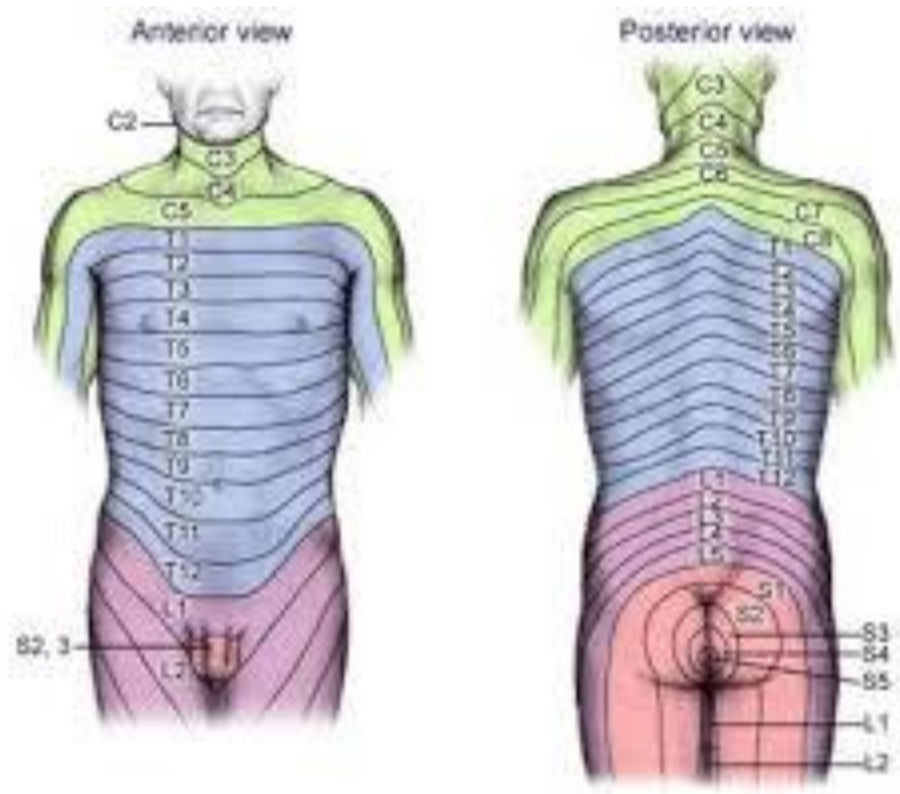
Diagnosis- continued

Physical examination

- Motor exam
- Neurological exam
  - Hoffman's, Clonus
  - Reflexes
  - Sensory levels/dermatomes
- Rectal exam
- Straight leg raise
- Spinal palpation



Diagnosis- continued

Workup

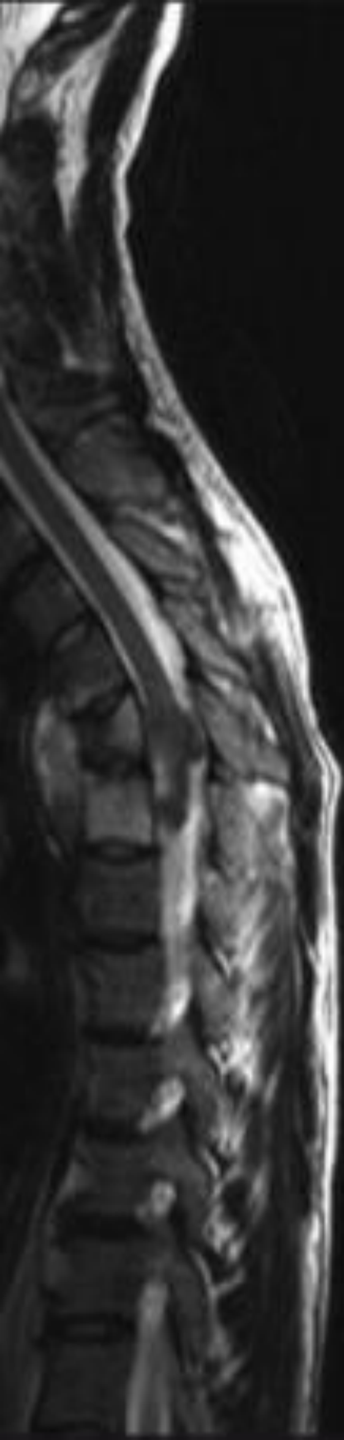
- Laboratory
  - CBC
    - Leukocytosis vs. normal
  - ESR
    - Elevated in 94% in one study
    - C- reactive protein
      - 87%, vs 50% w/o abscess
  - Blood cultures
    - x2
  - CSF
    - Low yield, risk of CSF infection.
  - IR Aspiration

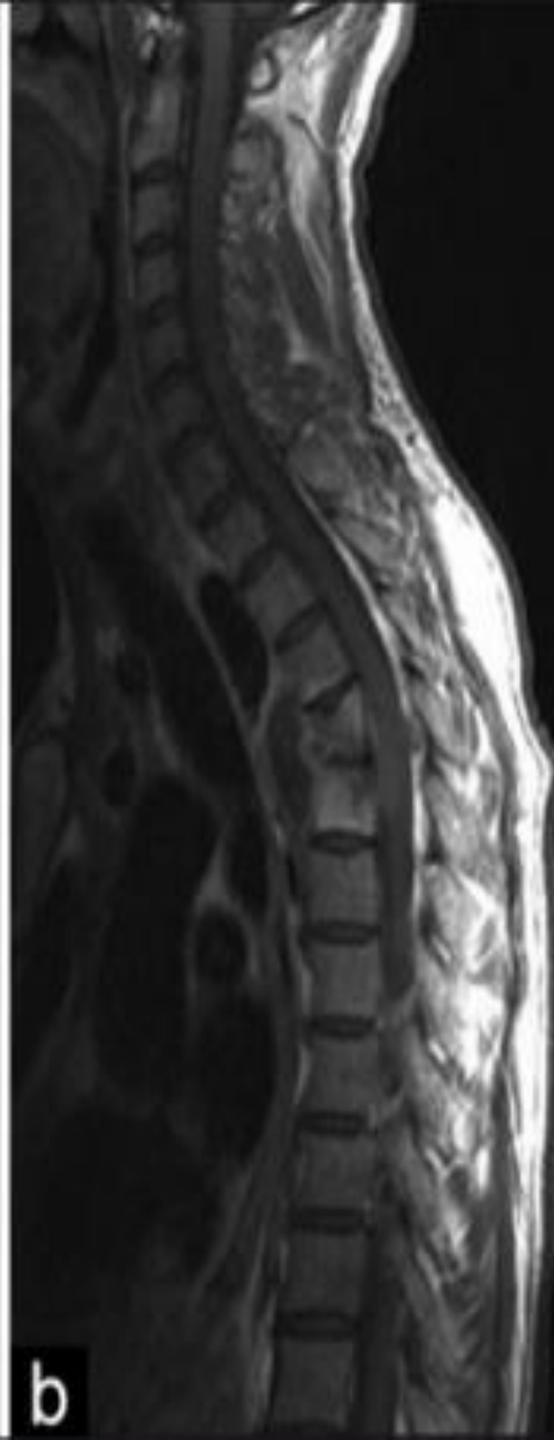
Davis DP, Salazar A, Chan TC, Vilke GM. Prospective evaluation of a clinical decision guideline to diagnose spinal epidural abscess in patients who present to the emergency department with spine pain. J Neurosurg Spine 2011; 14:765.

Diagnosis- continued

Imaging

- MRI w/wo contrast (gadolinium)
  - T2 weighted images, rim enhancement
- Entire spine
  - Even with focal pain/deficits
  - Pain management
    - Anesthesia
- CT w/contrast
  - Unable to get MRI
- CT myelogram
- Plan film
  - Osteonecrosis

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Treatment Team

- Neurosurgery
- Interventional Radiology
- Internal medicine
- Psychiatry
- Infectious disease
- PT/OT, case management
- Orthopedic surgery
- Clinical pharmacy

Medical Management

- Empiric therapy
  - Vancomycin 15-20mg/kg IV 8-12 hours.
    - 15-20mcg/ml
    - Utilization of pharmacy resources
  - Cephalosporin 3rd, 4th generation
    - Ceftriaxone
      - 2g q12hr
    - Cefepine
      - 2g q8hr
    - Ceftazidime
      - 2g Q8hr
    - Cefotaximine
      - 2gm Q6hr
- Targeted antibiotic therapy

Medical Management- Continued

- CNS infiltration
  - Vancomycin poor penetration, blood brain
  - Linezolid
  - Daptomycin
- TB
  - 4 drug combination

Medical Management- Continued

- Duration of treatment
  - 4 to 8 weeks IV abx
- Repeat imaging
  - 2-6 weeks
  - CRP, ESR trends (weekly)
- Daily Physical and Neurological examination

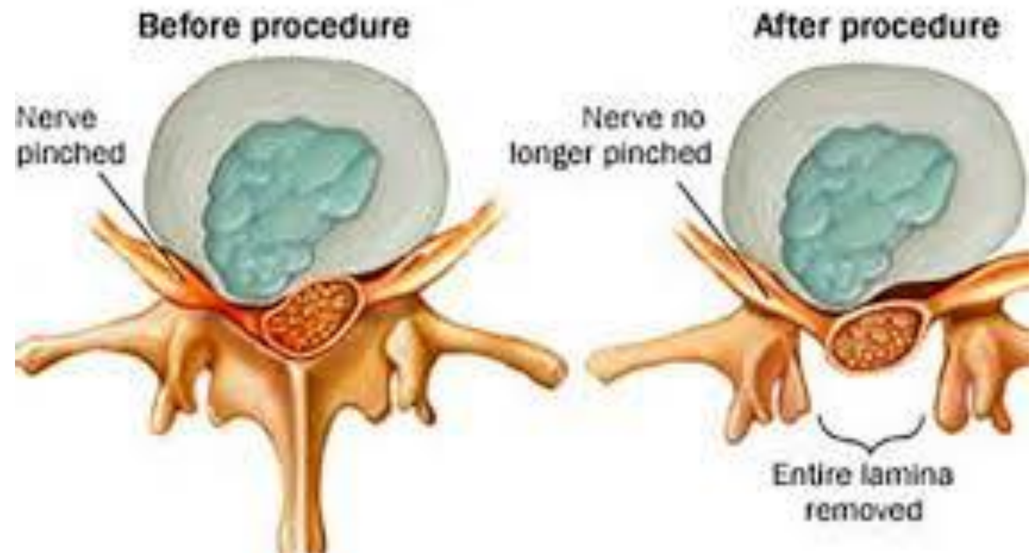
Surgical Management

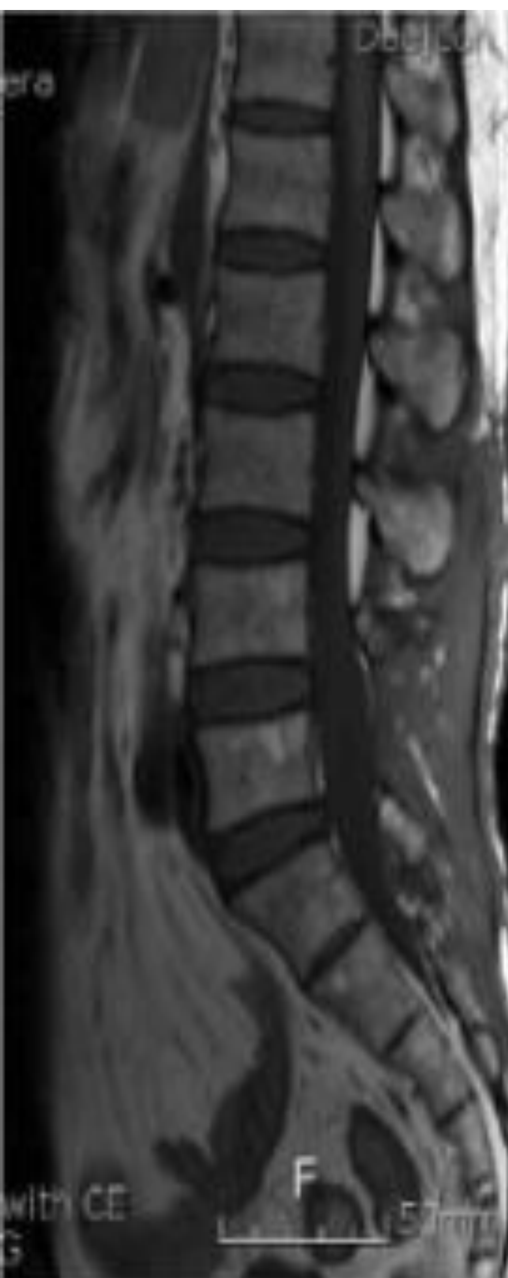
- Neurological deficit
  - Urinary retention
    - Bladder scans, increasing residuals
  - Cauda equina
    - Bowel/bladder incontinence, saddle anesthesia
  - Focal motor deficits
  - Worsening scans
  - Increasing inflammatory markers
  - Large abscess
  - Change in examination

Surgery…

Surgical technique

- Laminectomy
  - Hemi laminectomy
  - Single, multi level
  - Debridement
- w/wo fusion
  - Infected hardware
- Corpectomy

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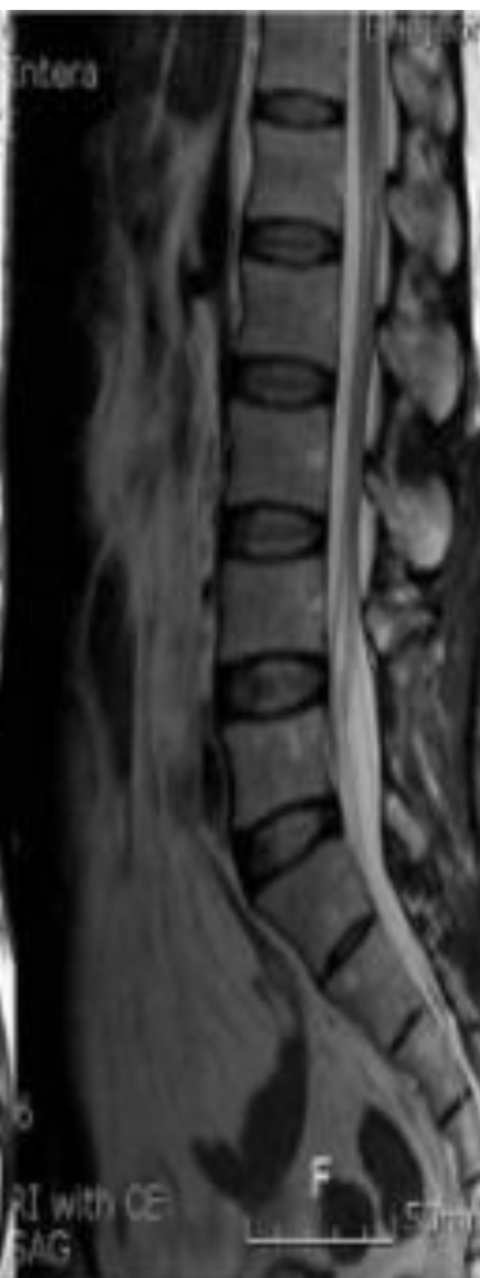
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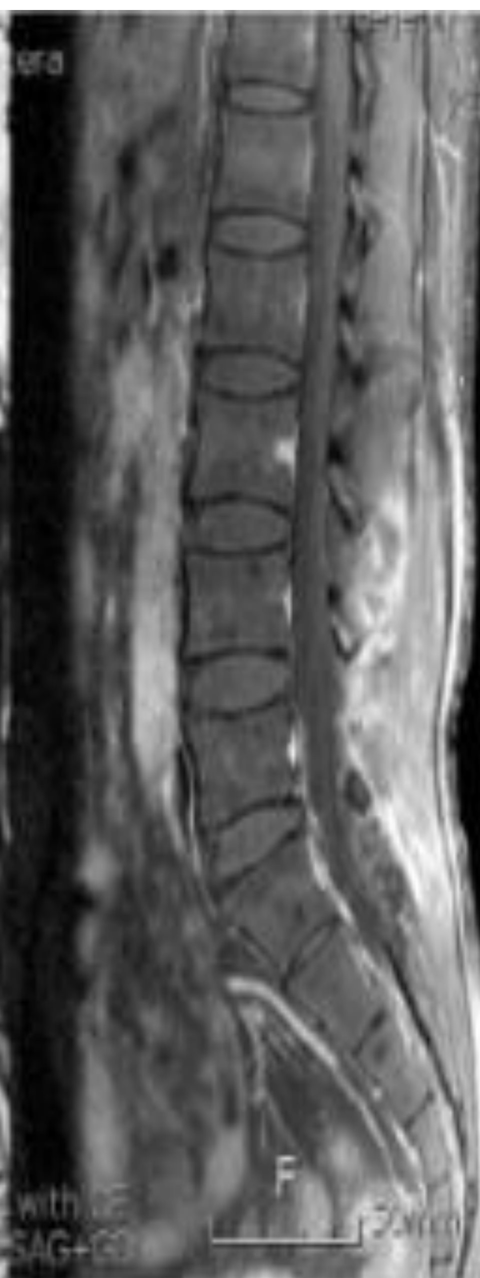
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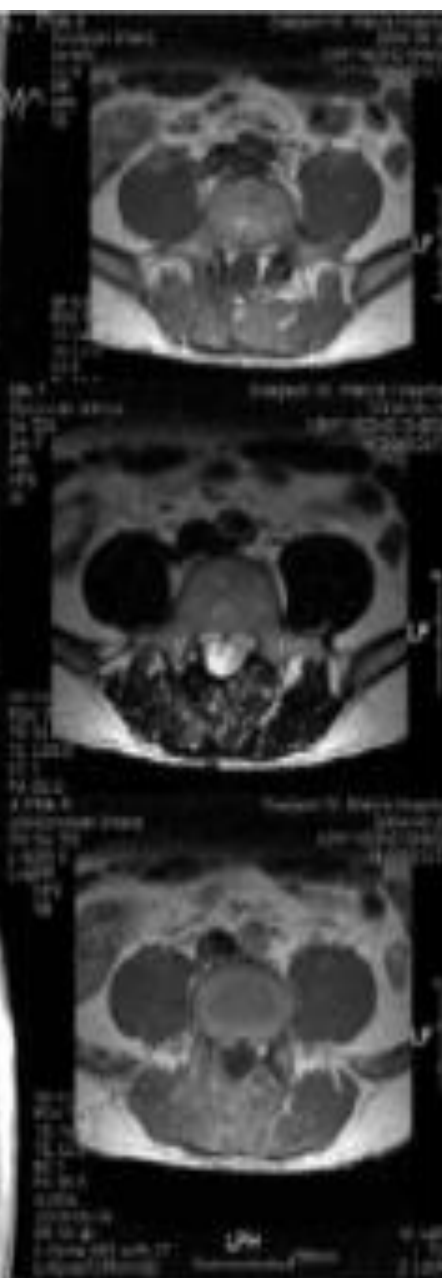

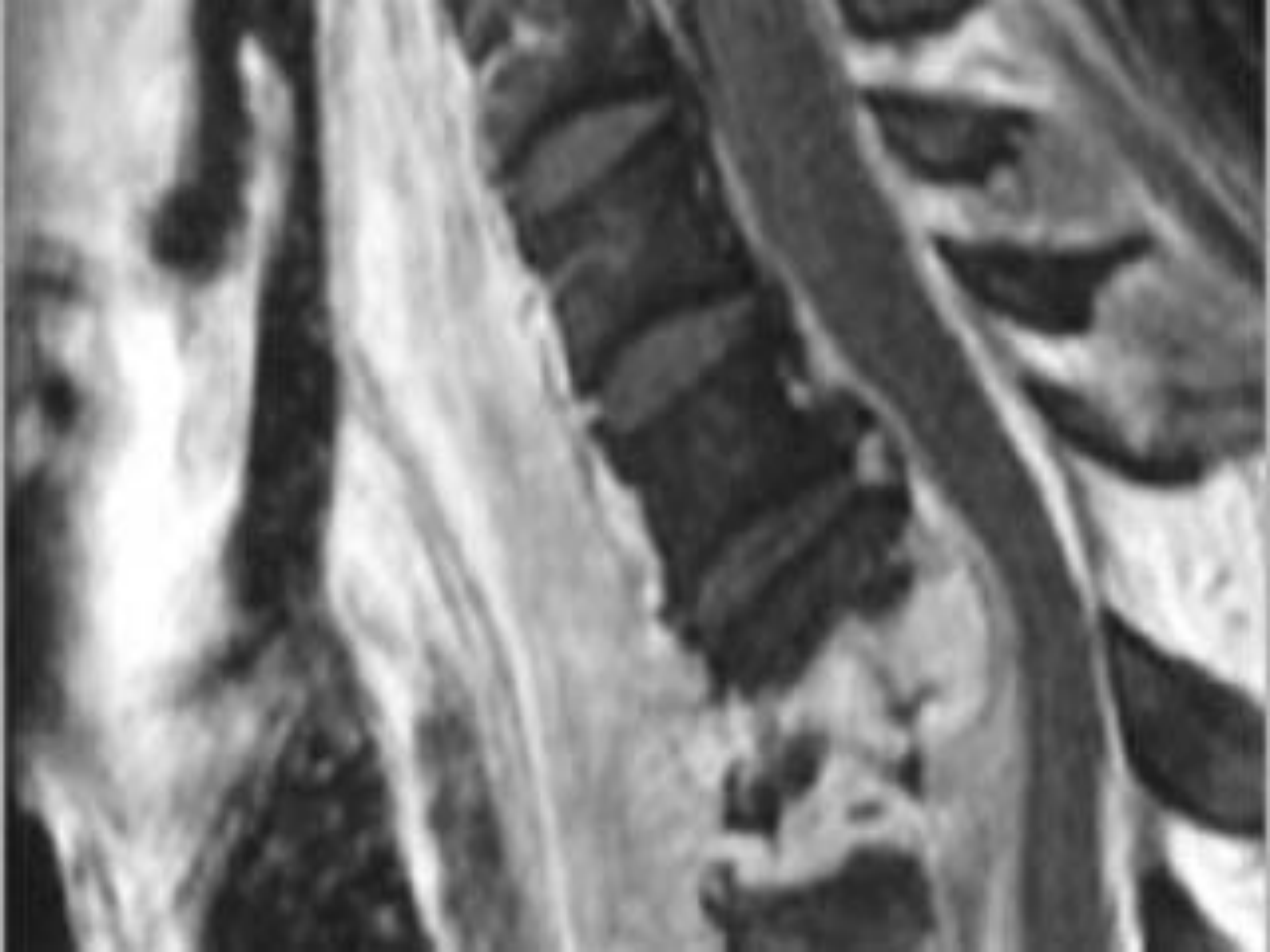

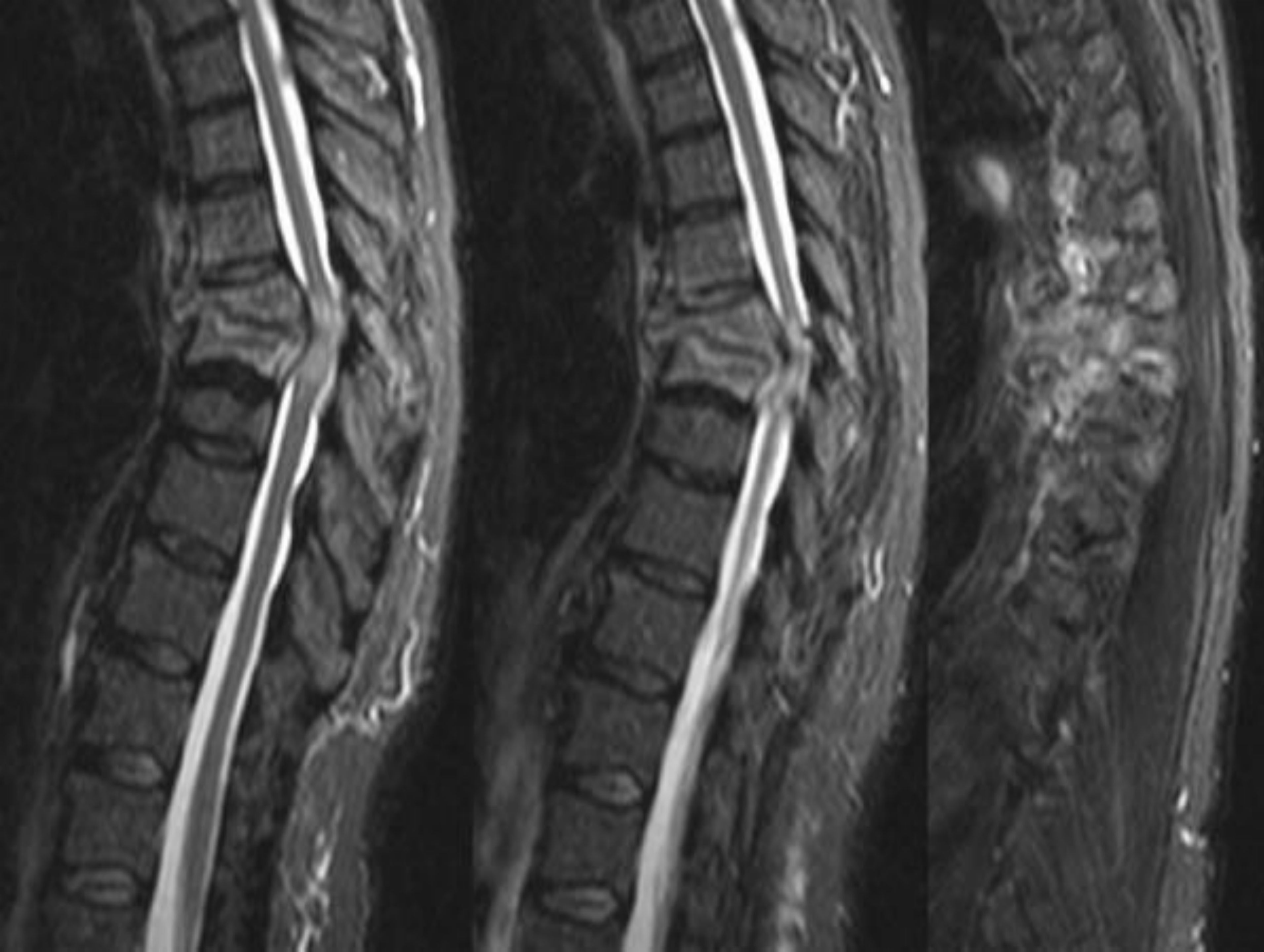

Surgery- Continued

Pathology

- Frank puss
- Granular inflammation tissue
- Osteonecrosis
- Cultures
  - Anaerobic, aerobic, acid fast

Surgery- Continued

- Need for multiple drainages
- Repeat imaging
- Kyphosis
- Bracing
- Drains
- Multiple levels

Outcomes

- Prognosis
  - Irreversible paraplegia 4 to 22 % of patients
    - Unlikely if deficits 24-48 hours prior to decompression
  - Diagnostic delay
- Rehab
- Prolonged hospital stays
- Social issues

Mooney RP, Hockberger RS. Spinal epidural abscess: a rapidly progressive disease. Ann Emerg Med 1987; 16:1168.

Delay in care

- Two studies
  - 63 patients ER visits, (Davis et al)
    - Mean duration symptoms and ER visit/admission
      - 5-9 days
    - Median ED visits 2 (1-8)
      - 98 percent had 1 or more of classic SEA triad
  - 250 patient retrospective VA (Bhais et al)
    - Median time to diagnosis 12 days

Plans to implement

- 5 year study after set guidelines
- Criteria
  - Spine pain
  - Neurological deficits
  - Risk factor assessment with patients with neuro deficits
    - Diabetes, drug use, chronic liver, kidney disease, recent spine procedures, spine fractures, indwelling vascular catheters, other site of infections, immunosuppression.
  - ESR, CRP
  - MRI
  - Diagnostic delays observed in 45-55 patients during 9 years prior
  - 3-31 patients after guidelines

Davis DP, Salazar A, Chan TC, Vilke GM. Prospective evaluation of a clinical decision guideline to diagnose spinal epidural abscess in patients who present to the emergency department with spine pain. J Neurosurg Spine 2011; 14:765.

Takeaways

- Complicated patients
- Standard diagnosis set
- Multi-team approach
- Significant morbidity
- Ability to influence clinical outcomes

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THANK YOU!

Questions/ Comments?

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