SPINAL INFECTION

OSTEOMYELITIS

Risk factors
Diabetes, Dialysis, Drug addicts
UTI, Chest infection, skin infection
older debilitated patients
immune-compromised patient [HIV]

Clinical
70% arise from UTI, chronically ill, elderly adults.
Males are affected more often than females
Lumbar spine is commonly involved and thoraco-lumbar region is the second common site.

Rule of 6
60% Staph Aureus
60% secondary to other infection like UTI
60% in the lumbar spine
60% blood culture is positive
Tc + Indium together 60% specific
Common 6th decade

Causative organisms
Staph aureus is most common [50%] but MRSA is on the increase
Gram negatives (E coli, Pseudomonas, Proteus)= UTI & anaerobes [Diabetes]
Strep viridans: May cause indolent infection in immune-compromised
Brucellae: Occupational
Candida, coccidiomycosis, Pseudomonas (in immune-compromised)
TB in developing countries (commonest site is T10)
Salmonella infection more common in patient with Sickle cell anemia
Pathogenesis

Arterial seeding or venous spread [Batson's complex]
The organisms settle in the in metaphyseal region
Toxins cause thrombosis, infarct, abscess, blocks nutrition
Purulent material may break out of cortex: Paravertebral or epidural abscess.
Weakening of the bone may cause vertebral collapse causing Kyphus or Gibbus

Clinical

Often a significant delay in diagnosis (6-12 weeks)
Insidious course, with back pain developing over 1-3 months
Triad of fever[50%], back pain [100%], and tenderness
Rule out also bacterial endocarditis tuberculosis
Weight loss
Neurology:[10%]

X ray

2 weeks - disc space narrowing [cf. late in TB compared to septic discitis]]
2-4 wks – Paravertebral shadow .
6 weeks - erosion vertebral body endplate; osteolysis
8 weeks - reactive sclerosis due to trabecular collapse
12 weeks - new bone formation is noted
6-12 months – Ankylosis

Note: Disc destruction usually not present in neoplasm.
Examine Paravertebral soft tissues - retropharyngeal & psoas contours.
MRI

Gold Standard

Very sensitive and specific

- 96% Sensitivity; 94% specificity and 92% accuracy

Gadolinium enhances sensitivity

- Low in T1 and High signal on T2
- There is loss of the normal intranuclear cleft
  [note: TB will not show increase in T2]

Blood

FBC: TC may be normal,

ESR, CRP = usually very high

MSU

Bacteriologic diagnosis essential before antibiotics unless it is life threatening infection:

- Blood cultures: 60% positive if patient is febrile
- Percutaneous CT guided needle biopsy - positive in 80%
- An open biopsy: through a Posterior approach [through the pedicle] is indicated

sometimes

ASO Titre for anti-staph. Titres for endocarditis; Tuberculin skin tests for TB

Treatment

1. Identify organism: Percutaneous or open biopsy
2. IV antibiotics for 2 weeks [Clinically better and Blood screen towards normal] then oral for 3 months.
3. Rest; Orthosis TLSO, Nutrition
4. ESR/CRP used to follow treatment effects (gallium scans can also be used)

Good Prognostic signs

Age less than 60 years

Normal immune status
Decreasing ESR
Staph aureus infection

**Surgery**

**Indications**
- Tissue diagnosis not obtained by CT guided biopsy
- Progressive neurology
- Mechanical instability
- Paraspinal or epidural abscess
- Failure of response to medical treatment

**Surgery**

Anterior decompression, strut graft.
With or without anterior fixation, if required additional posterior stabilization.

**Anterior Approaches to the spine**
- Cervical: anterior approach from the left side
- Thoracic: R sided thoracotomy
- Thoraco- lumbar: Left sided: Diaphragm reflection [thoracotomy-laparotomy approach]
- Lumbar: Retroperitoneal: approach from left

**Alternative**
1. Vascularised bone graft: faster incorporation
2. Titanium mesh with autogenous graft 2 wks after initial debridement
DISCITIS [JUVENILE]

Age: Primarily in younger patients. 2-6 yrs
  Male and female equally involved
Site: Lumbar spine is most common location. [L4-5 disc in 40%]

Pathogenesis: usually self-limiting infection. Inflammation of the intervertebral disc or probably autoimmune (Bianco)

Disc circulation in adults and children
In children the vessels penetrate end plate and supplies disc
In adults the vessels do not penetrate end plate
Therefore: primary disc infection is common in children and in adults disc involvement is usually secondary to infection of the end plate

Clinical
1. Unlike osteomyelitis, there are usually no systemic symptoms (children are typically afebrile)
2. child typically complains of back pain and refuses to flex the spine
3. May also complain of hip or abdominal pain and may refuse to stand or walk
4. Tenderness over the spine, Paravertebral muscle spasm, loss of normal lumbar lordosis, limitation of spine motion.

Investigations
WBC is usually normal
ESR elevated > 40 mm/hour
Blood culture: When positive, most common S. aureus.

X-rays
May appear normal early on.
Disc-space narrowing
Irregularity involving adjacent vertebral end-plates
Later - in adult disc space usually goes on to fusion
  where as in child disc space is usually restored
Biopsy

Biopsy is indicated only for children who fail to respond to non-operative management, and for older children and adolescents in whom a different organism may be suspected or if TB or tumor is suspected.

Bone Scan

Increased uptake of isotope in infected disc space - may be useful in early diagnosis of discitis.

There are false –ve’s

MRI: Gold Standard

MRI is more sensitive than bone scans in early discitis

Treatment

Controversial: Infective or inflammatory

Bed rest

Immobilization and casting is uniformly recommended

Controversial: ? Empirical systemic antibiotics

Kingsiella Kingi may be the culprit. Difficult to culture

Some give antibiotic only in patients failed to respond to brace and rest

Most treat: IV Fluclox or cephalosporin as Discitis is now accepted to be a bacterial infection of the disc space

Reported healing without antibiotics: due to good immune system

Present trend: IV Fluclox for 1-2 wks until blood parameters are better and then a course of oral for 3-4 weeks.

Rarely Surgery: Mere presence of MRI abscess is not indication for surgery. However, when abscess present: any subtle neurology or no clinical improvement with antibiotics is an indication for drainage

Follow up: Partial reconstitution of the disk height occurs

Sometimes: vertebra magna
TB SPINE

Spine is the most common site of skeletal TB [60%]
Thoracic spine most commonly involved (lumbar for osteomyelitis and discitis)

Common part in the vertebra: 3 sites
  commonest: Paradiscal
    Anterior
    Central

Unlike Pyogenic: TB spine can involve multiple vertebra

Clinical
Subacute presentation
Fever, night sweats, anorexia, and weight loss
Neurology: Early and late Potts paraplegia
Gibbus or Kyphosis deformity of thew spine
Chest examination
Bowel and bladder

X ray
Paravertebral abcess more common than epidural abscess [cf. septic discitis]
Early in the disease, the disc is relatively spared [cf. pyogenic]

MRI
Doest not show increase signal
Posterior element involved in 50%
Fibrous ankylosis [cf. pyogenic, bony Ankylosis is common]
Shows increase signal

Pott's Paraplegia
Causes: Abscess ; sequestra ;kyphosis

Chest X Ray  (2/3 have abnormal CXRs)
ESR is very high

**Mantoux test is positive**

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

**Biopsy**

Tubercle [granuloma]

1. Caseation in the centre
2. Langerhan’s cells
3. Epitheloid cells,
4. lymphocytes

**Stain**

Ziehl-Neelsen stain

I stained with carbol fuschin

II then washed with H2SO4

III counter stain with Methylene blue

**Lowenstien Culture**

It requires use of enriched medium and adequate oxygenation; cultures only visible at 2-4 weeks
Treatment

1. Antituberculous drugs are the main stay of treatment. May require for 1 year
   Drugs used: RIPES - Rifampicin, Isoniazid, Pyrazinamide, Ethambutol, Spectinomycin

2. Spinal orthosis to prevent deformity

3. Surgical Indications
   - Large abscess
   - Neurology
   - Instability
   - No response to medical therapy

Hong Kong Procedure
   - Adjuvant chemotherapy beginning 10 days before surgery is essential
   - Radical anterior debridement [fusion can be achieved by simple debridement]
   - 90% recovery of neurology
EPIDURAL ABSCESS

More common in immunocompromised: Malignancy, Diabetes, Alcohol abuse

Rapid deterioration may occur; Intense Radicular pain, Paralysis over 72 to 96 hours,
Mortality rate 12%

Thoracic spine most common

X ray: Look for End plate irregularity
  Disc height
  Osteoporosis
  Soft tissue shadow
  Presence of gas: Anaerobic
  Note: Disc space narrowing is quicker in pyogenic than tuberculosis

Bone scan: Tc and Gallium
  Indium 111 scan: poor sensitivity in vertebral osteomyelitis

CT: Bone destruction

MRI: Investigation of choice: 96% sensitivity and specificity

Treatment
Antibiotic 2- Weeks of IV antibiotics + 3 months of oral.
Observation Subtle Neurology: careful observation.
  Any increase in neurology, urgent surgical decompression.
  Approach Abscess dorsal to the sac laminectomy [commoner
  Or Anterior abscess: anterior decompression

Poor prognostic factors
Rapidly progressing paralysis
Complete paralysis
Neurological deficits for > 36 hours : unlikely to improve with surgery