Osteoarticular Tuberculosis: Challenges in Diagnosis

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Country coordinator, Bone and Joint Decade (BJD), Kenya.
ASSUMPTIONS IN PREPARING THE TALK

- AUDIENCE IS PREDOMINANTLY PHYSICIANS

- SINCE THE TALK IS IN THE MORNING, THE AUDIENCE IS PHYSICALLY STRONG AND MENTALLY ALERT

- TALK WILL BE MORE QUALITATIVE AND WILL STRESS KEY CONCEPTS
Incidence of TB

- World population: 6 billion
- Latent TB: 2 billion
- Incidence of TB: 144 / 100,000 (Global)
  205 / 100,000 (Africa)
introduction

- TB cases have risen due to HIV infection
- Extra pulmonary TB on the rise (now 16-18% compared to 7.8% in 1964)
- Osteoarticular involvement is 1-3%
Who is at Risk factors

- Alcoholics
- HIV-positive patients
- Immigrants from endemic countries
- Drug abusers
- Elderly
- Immunosuppressed patients
Dissemination of TB to bone and joint

- Haematogenous Spread
- Lymphatic spread from distant focus
- Contagious spread from infected areas
TB ARTHRITIS (CLINICAL PRESENTATIONS)

- Spinal TB
- Peripheral TB
  - Monoarthritis
  - Polyarthritis
  - Oligoarticular (Poncets Disease)
- Soft tissue TB
- Reactive Arthritis 2o to BCG
- Arthritis due to Tropical Mycobacteria
- Faceitis / Polyarthritis due to anti TB therapy
- TB associated to Collagen Disease
Risk of Infection in Rheumatic Diseases

- Conflicting reports
- Most studies show greater risk in RA / SLE
- Types of infection include UTI, respiratory, skin and septic arthritis
Infections and DMARDS

- High dose MTX – clearly immunosuppressive
- Low dose MTX – decreases Ig production, cytokine secretion, cell mediated immunity and neutrophil function
- Opportunistic infections reported
- Leucopaenia not a feature
- Any stage of treatment
- Overall risk is small
Corticosteroids and Infection

- Inhibit neutrophil migration
- Adherence to vascular endothelium decrease
- Monocyte antimicrobial activity decrease
- Impaired lymphocyte activation, cytokine stimulation and Ig production
- Risk of infection increases with steroids, higher dose, longer duration
Commonly involved bones/joints

- **Spine (Pott’s Disease)**
  - 50% of cases
  - Frequently in thoracolumbar spine

- **Peripheral joints**
  - Weight bearing joint
    - Hip, knee, ankle
  - Mono articular
  - 30% of cases
Commonly involved bones/joints

- Osteomyelitis
- Dactylitis
- Tenosynovitis
- Bursitis
- Poncet’s disease
Spinal Tuberculosis

- Involves anterior vertebral border and disc
- Progresses to disc narrowing, vertebral collapse and kyphosis
- Complications:
  - Psoas abscess
  - Sinus tract formation
  - Neurologic compromise
- Sacroiliac joint rarely involved (unilateral if it occurs)
Spinal Tuberculosis: presentation

- Back pain
- Spasm
- Local tendernessness
- Kyphosis
- Cord compression
- Mycotic aneurysm of aorta
### Diagnostic Criteria for Inclusion in Study of Spinal TB (STB) (Pott’s Disease) 50 Cases

<table>
<thead>
<tr>
<th></th>
<th>No. of Patients</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definite:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical picture(+) ; PPD(+) &gt; 10 mm; Spinal X ray(+) ; <em>M. Tuberculosis</em> demonstrated by stain or culture of biopsy of spinal lesion.</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td><strong>Probable:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical picture(+) ; PPD(+) &gt; 10 mm; Spinal X ray(+) ; evidence of TB elsewhere.</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td><strong>Possible:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical picture(+) ; Spinal X ray(+)</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>
Frequency and location on spinal lesions in POTT'S disease

50 cases

<table>
<thead>
<tr>
<th>Location</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Dorsal</td>
<td>26</td>
<td>52%</td>
</tr>
<tr>
<td>Dorsal-Lumbar</td>
<td>12</td>
<td>24%</td>
</tr>
<tr>
<td>Lumbar</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>Lumbo-Sacral</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>
Wedge collapse
T6-T7
Thoracolumbar Xray
Thoracolumbar x ray

Fusiform opaque mass over the thoracic spine
Wedge collapse of T11 - T12

THORACOLUMBAR radiograph
Peripheral joints: presentation

- Hip: pain in the thigh, groin or knee; limp, muscle atrophy
- Knee: insidious pain, swelling, limp, stiffness,
- Hand / wrist: carpal tunnel syndrome, swelling, pain
### Diagnostic Criteria for Inclusion in Study of Peripheral TB Arthritis (PTBA), 13 Cases

<table>
<thead>
<tr>
<th>Definite:</th>
<th>No. of Patients</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical picture(+) ; PPD(+) &gt; 10 mm;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint X ray(+) ; <em>M. Tuberculosis</em> demonstrated by stain or culture in synovial fluid or synovial membrane.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synovial fluid Ziehl-Neelsen’s stain (+)</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Synovial fluid culture (+)</td>
<td>2</td>
<td>15.3</td>
</tr>
<tr>
<td>Synovial membrane Kinyu stain (+)</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>Synovial membrane culture (+)</td>
<td>1</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>10</strong></td>
<td><strong>77</strong></td>
</tr>
</tbody>
</table>

| Probable:                                           |                 |         |
| Clinical picture(+) \; PPD(+) > 10 mm;              |                 |         |
| Joint X ray(+) \; Synovial biopsy(+) (granulomas & caseum); and evidence of TB elsewhere. | 3               | 23      |
| **Total**                                            | **13**          | **100** |
0-5. Joint distribution in peripheral tuberculosis arthritis.
Osteomyelitis

- pain,
- Lytic lesions on radiograph
- Dactylitis

Constitutional symptoms often are not present
Case 219.

Tubercular dactylitis.
Poncet’s disease

- Acute polyarthritis (? Reactive) in patients with visceral or pulmonary tuberculosis
- Tuberculous organisms are not cultured from involved joints
- Commonly involves knees, ankles and elbows
Osteoarticular tuberculosis: diagnosis

- Demonstration of mycobacterium tuberculosis in tissue or synovial fluid

Diagnostic yield:
- Synovial fluid smear 20%
- Synovial fluid culture 80%
- Synovial biopsy and culture > 90%
Osteoarticular tuberculosis: diagnosis

- **Synovial fluid analysis:**
  - Elevated proteins
  - Low glucose in 60%
  - Variable cell counts (10,000-20,000) mostly polymorphonuclear cells

- **Synovial membrane biopsy:** caseating granulomas

- **Osteomyelitis:** needle biopsy reveals granulomas (± caseating necrosis)
Osteoarticular tuberculosis: diagnosis

- Purified protein derivative (PPD) skin testing:
  - Positive in virtually all patients
  - Difficult to interpret if anergy is present
# TB ARTHRITIS LABORATORY

<table>
<thead>
<tr>
<th></th>
<th>RANGE</th>
<th>MEDIAN</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESR</strong></td>
<td>18 - 65</td>
<td>42</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td><strong>WBC</strong></td>
<td>4,6 - 13,4</td>
<td>8,5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PPD (+) &gt; 10MM</strong></td>
<td></td>
<td></td>
<td>3/4</td>
<td>75</td>
</tr>
<tr>
<td><strong>CHEST X RAY ABNORMAL</strong></td>
<td></td>
<td></td>
<td>7</td>
<td>54</td>
</tr>
</tbody>
</table>
Osteoarticular tuberculosis: Radiographic features

- Spine:
  - Narrowing of joint space with vertebral collapse
  - Anterior vertebral scalloping
  - Extensive vertebral destruction with relative preservation of disc space
Osteoarticular tuberculosis: Radiographic features

- Peripheral joint
  - Destructive lesions near joints with little periosteal reaction
  - Soft-tissue swelling and osteopenia
  - Subchondral erosions
  - Joint destruction (late finding)
“Atypical” mycobacteria

- Propensity to involve tendons and joints of the hands
- 50% affect hands
- 20% affect knees
- Polyarticular disease much less
“Atypical” mycobacteria

- **Mycobacterium avium-intracellulare (MAI)**
  - Systemic mycobacterial infection in 25% of AIDS patients
  - Tenosynovitis, bursitis, and osteomyelitis
- **Mycobacterium kansasii**
  - Tenosynovitis, bursitis, and osteomyelitis
- **Mycobacterium marinum**
  - Tenosynovitis of hands and wrists (typical)
  - Bursitis, and osteomyelitis
Atypical” mycobacteria: predisposing conditions

- Prior surgery or trauma
- Intra-articular steroid injection
- Open wounds in the hands or fingers
- Immunosuppression
Treatment of Osteoarticular TB

- Derived from therapy of pulmonary disease
- Most therapy as in pulmonary disease
- Some authors recommend long term therapy (1-2 years)
- Surgery to debried abscess in extensive bone involvement to hasten recovery
- Regimens commonly involve RHZE
In life as in football,
You won't go far unless
you know where the
goal posts are

Arnold H Glasgow
<table>
<thead>
<tr>
<th>Essential drug (abbreviation)</th>
<th>Recommended dosage (dose range) in mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily</td>
</tr>
<tr>
<td>isoniazid (H)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>(4–6)</td>
</tr>
<tr>
<td>rifampicin (R)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>(8–12)</td>
</tr>
<tr>
<td>pyrazinamide (Z)</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>(20–30)</td>
</tr>
<tr>
<td>streptomycin (S)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(12–18)</td>
</tr>
<tr>
<td>ethambutol (E)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>(15–20)</td>
</tr>
<tr>
<td>thioacetazone&lt;sup&gt;b&lt;/sup&gt; (T)</td>
<td>2.5</td>
</tr>
<tr>
<td>SIDE-EFFECTS</td>
<td>DRUG(S) PROBABLY RESPONSIBLE</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Anorexia, nausea, abdominal pain</td>
<td>Pyrazinamide, rifampicin</td>
</tr>
<tr>
<td>Joint pains</td>
<td>Pyrazinamide</td>
</tr>
<tr>
<td>Burning sensation in the feet</td>
<td>Isoniazid</td>
</tr>
<tr>
<td>Orange/red urine</td>
<td>Rifampicin</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td></td>
</tr>
<tr>
<td>Itching, skin rash</td>
<td>Thioacetazone (S, H, R, Z)</td>
</tr>
<tr>
<td>Deafness (no wax on auroscopy)</td>
<td>Streptomycin</td>
</tr>
<tr>
<td>Dizziness (vertigo and nystagmus)</td>
<td>Streptomycin</td>
</tr>
<tr>
<td>Jaundice (other causes excluded) hepatitis</td>
<td>Isoniazid, pyrazinamide, rifampicin</td>
</tr>
<tr>
<td>Confusion (suspect drug-induced acute liver failure if jaundice present)</td>
<td>Most anti-TB drugs</td>
</tr>
<tr>
<td>Visual impairment (other causes excluded)</td>
<td>Ethambutol</td>
</tr>
<tr>
<td>Shock, purpura, acute renal failure</td>
<td>Rifampicin</td>
</tr>
</tbody>
</table>
RESERVE ANTITUBERCULOSIS DRUGS

AMINOGLYCOSIDES
1. Kanamycin and amikacin
2. Capreomycin (polypeptide)

THIOAMIDES
1. Ethionamide
2. Protionamide

FLUROQUINOLONES
1. Ofloxacin
2. Ciprofloxacin

CYCLOSERINE (AND TERIZIDONE)

P-AMINOSALICYCLIC (PAS)
EXTENSIVELY DRUG-RESISTANT TB (XTR-TB)

- Resistant to isoniazid and Rifampin, any fluroquinolone and at least one of the 3 injectable 2nd line drugs:
  - Amikacin
  - Kenamicyn
  - Capreomycin

XTR TB + HIV = LETAL

CDC ATLANTA Ga. March 2006
You have reached the pinnacle of success as soon as you become uninterested in money, compliments, or publicity.

O. A. Battista
AFLAR: African League of Associations for Rheumatology

- 4th regional Rheumatology symposium and workshops:
- 6th AFLAR Congress, Algiers, Algeria; May 2011
  (Details to be announced soon)
THE END
Shukran

- 전 감사합니다 (Korean)
- 謝謝 (Chinese)
- Thank you (English)
- 謝謝 (Japanese)
- Asante (Kiswahili)
- Erokamano (Dholuo)
- Gracias (Spanish)
- Merci (French)