BONES & JOINTS
INFECTION
BONE TUMOURS
IMPORTANT ... SERIOUS CONSEQUENCE
PLEASE...DON’T MISS!!

EARLY DIAGNOSIS & PROPER TREATMENT
HOW??

• AWARE of THEIR EXISTENCE (Knowledge)
• PREPARE for THEIR OCCURRENCE

• A HIGH INDEX of SUSPICION!!

• PLEASE EXAMINE THE PATIENTS!!

• DON’T JUST LOOK AT X-RAYS AFTER TAKING HISTORY
WHEN IN DOUBT

INVESTIGATIONS
  BLOOD TESTS
  X-RAYS
  IMAGING

CONSULT/
SECOND OPINION

ACUTE INFECTION…consider
ASPIRATION

• CBC; ESR; C-reactive protein; Blood culture
tumour markers; Ca+PO4

• ULTRASOUND
  CT
  MRI
  BONE SCAN
BONE & JOINTS INFECTION

• ACUTE vs CHRONIC

• BONE
  OSTEOMYELITIS

• JOINTS
  ARTHRITIS

• SEPTIC or SUPPURATIVE
  (Staph. Aureus; Strept; Haem.Inf)

TUBERCULOUS

Others…fungus;
  creptococcus;
  Atypical Mycobacteria
<table>
<thead>
<tr>
<th>ORGANISM VIRULENCE</th>
<th>VS</th>
<th>HOST RESISTANCE</th>
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<tbody>
<tr>
<td>Steroid</td>
<td></td>
<td>Malignancy</td>
</tr>
<tr>
<td>Malignancy</td>
<td></td>
<td>AIDS</td>
</tr>
<tr>
<td>AIDS</td>
<td></td>
<td>DM</td>
</tr>
<tr>
<td>DM</td>
<td></td>
<td>Renal failure</td>
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<tr>
<td>Renal failure</td>
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<td>Drug addict</td>
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</table>
BONES & JOINT INFECTION

• ENTRY of Organisms

• DIRECT
  . WOUND
  . OPEN FRACTURE
  . OPERATION…incl. ASPIRATION & INJECTION

• INDIRECT
  . VIA BLOOD
ACUTE OSTEOMYELITIS

• USU. A CHILD

• Adults… decreased immunity

• Organisms… STAPH.AUREUS (Strept., gram -ve)

• VIA BLOOD; BONE….METAPHYSIS
Fig. 16.4 Pathophysiology of hematogenous seeding. When under pressure, exudate or abscess can extend through Volkmann’s canal.
Acute Osteomyelitis…

CLINICAL FEATURES

• GENERAL… FEVER, MALAISE
• LOCAL…..PAIN, TENDERNESS, WARMTH
  *DECREASED MOVEMENT

BE CAREFUL in INFANTS, ELDERLY

CHECK FOR SOURCE of INFECTION

MULTIPLE SITES is POSSIBLE
Acute Osteomyelitis....
INVESTIGATIONS

• X-RAYS.... *NORMAL FIRST 10 DAYS
• USS
• BONE SCAN
• MRI....very sensitive
• BLOOD TESTS…CBC, ESR, C-REACTIVE PROTEIN

• ASPIRATE…from Metaphyseal region or adjacent joint
  *sent for smear, Gram stain, culture/st
Acute Osteomyelitis
TREATMENT

• START EARLY!!! TAKE SPECIMENS
  Don’t wait bacteriological confirmation

• 4 IMPORTANT PRINCIPLES
  1. SUPPORTIVE (incl. pain relief)
  2. SPLINTAGE
  3. ANTIBIOTICS
  4. DRAINAGE by OPERATION
    .pus aspirated/no clinical response
Acute Osteomyelitis

COMPLICATIONS

- SEPTICAEMIA
- METASTATIC INFECTIONS (Other sites)
- ARTHRITIS
- ALTERED BONE GROWTH
- Bone destruction…Path.#
- CHRONIC OSTEOMYELITIS
ACUTE SEPTIC ARTHRITIS

• HOW TO REACH JOINTS

• BLOOD

• DIRECT…Wound, injection, operation

• Spread from Ostomyelits
ACUTE SEPTIC ARTHRITIS

PATHOLOGY

Bacteria from blood
Synovitis…effusion
Exudate & Pus
Damage to CARTILAGE… partial/complete
Bone destruction
Acute Septic Arthritis

CLINICAL FEATURES

- INFANTS
  Irritable, refuse to feed, rapid pulse
  So... examine

- CHILDREN
  Fever, pain, * reluctance to move/walk
  Superficial Joint....warmth, swelling
decreased motion

- ADULTS
  Fever, pain ..... 

Beware of ‘silent’ joint infection eg steroids
Acute Septic Arthritis
INVESTIGATIONS

• BLOOD TESTS…CBC, ESR, C-reactive protein
  blood culture
• X-rays….  *early…NORMAL
  late….decreased joint space
• USS…..showing effusion
• ASPIRATION… simple & diagnostic!
Acute Septic Arthritis
TREATMENT

• Early!! To avoid damage to the joint!

• 4 BASIC PRINCIPLES
  1. Supportive
  2. Splintage……REST with traction or splint
  3. Antibiotic……effective and enough
  4. DRAINAGE!!
DRAINAGE

- OPEN DRAINAGE
  - HIP
  - PUS ASPIRATED
  - NO CLINICAL RESPONSE

- KNEE....ARTHROSCOPY

- REPEATED ASPIRATION
  - for older children
  - early arthritis
  - superficial joints
Acute Septic Arthritis
COMPLICATIONS

• CARTILAGE DAMAGE
early OA/ankylosis

• BONE DESTRUCTION
Pathological Fracture
Hip…dislocation

• GROWTH DISTURBANCE
TUMOURS

• SOFT TISSUE TUMOURS
  * BENIGN
  * MALIGNANT

• BONE TUMOURS
  * BENIGN
  * MALIGNANT

For MALIGNANT
> PRIMARY
> SECONDARY (METASTATIC)
# SOFT TISSUE TUMOURS

<table>
<thead>
<tr>
<th>CELL TYPE</th>
<th>BENIGN</th>
<th>MALIGNANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat cell</td>
<td>LIPOMA</td>
<td>LIPOSARCOMA</td>
</tr>
<tr>
<td>Fibrous tissue</td>
<td>FIBROMA</td>
<td>FIBROSARCOMA</td>
</tr>
<tr>
<td>Synovial tissue</td>
<td>Pigmented villonular</td>
<td>Synovial Sarcoma</td>
</tr>
<tr>
<td></td>
<td>synovitis, GCT</td>
<td></td>
</tr>
<tr>
<td>Blood vessels</td>
<td>Haemangioma</td>
<td>NeuroSarcoma</td>
</tr>
<tr>
<td>Nerve</td>
<td>neurolemmoma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>neurofibroma</td>
<td></td>
</tr>
<tr>
<td>Muscles</td>
<td>Rhabdomyoma</td>
<td>Rhabdomyosarcoma</td>
</tr>
</tbody>
</table>
# BONE TUMOURS

<table>
<thead>
<tr>
<th>CELL TYPE</th>
<th>BENIGN</th>
<th>MALIGNANT</th>
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</thead>
<tbody>
<tr>
<td>Bone</td>
<td>Osteoid osteoma</td>
<td>Osteosarcoma</td>
</tr>
<tr>
<td>Cartilage</td>
<td>Chondroma</td>
<td>Chondrosarcoma</td>
</tr>
<tr>
<td>Osteochondroma</td>
<td>Fibroma</td>
<td>Fibrosarcoma</td>
</tr>
<tr>
<td>Fibrous tissue</td>
<td>Haemangioma</td>
<td>Angiosarcoma</td>
</tr>
<tr>
<td>Marrow</td>
<td></td>
<td>Myeloma</td>
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*METASTASIS*
A SUSPECTED BONE TUMOUR

? Is it a tumour (DDx: infection; stress #)

? Is it BENIGN or MALIGNANT

? If it is malignant, is it PRIMARY or SECONDARY

? What type
Bone Tumours

CLINICAL FEATURES

History:
  . Asymptomatic
  . Pain
  . Swelling
  . Pathological fracture
Physical Examination:

Local

*GENERAL…?nerve/blood vessel involvement

?spread

? Primary cancer
Bone Tumours
INVESTIGATIONS

Blood tests

X-RAYS .. Single or multiple
  which bone
  which part
  margin of the lesion ?well defined
  ?cortical destruction
  ?periosteal reaction
  ?calcification
• CT scan
• MRI scan.
  assess Tumour Spread >within Bone
  >into SOFT TISSUE
  >into Joint
  * important for STAGING/TREATMENT

PLAN

PET scan
  ?distant metastasis
  ?primary
Bone Tumour

BIOPSY

Essential for definitive diagnosis
Done after imaging

Large bore Needle / Open Biopsy

NOT a minor procedure
Better leave to specialists
TREATMENT for MALIGNANT BONE TUMOURS

FACTORS

> TYPE of TUMOUR

> GRADING of tumour

> STAGING of tumour

  LOCAL: INTRA-COMPARTMENT or EXTRA-COMPARTMENT

  GENERAL

> PATIENT PROFILE

> ? EXPERTISE

> ? SUPPORTING FACILITIES
TREATMENT for MALIGNANT BONE TUMOUR

Should be treated in TUMOUR CENTRE
LIFE-SAVING is most important

Methods of TREATMENT
1. Surgery….Radical RESECTION or Wide Excision
   (complete compartment)
   AMPUTATION vs LIMB-SAVING

2. CHEMOTHERAPY

3. RT
METASTAIC TUMOUR
TB can still be seen!
Carpal Tunnel Syndrome

- Pain/Parasthesia
- Morning Stiffness
- Weakness
- ?Work Compensation
Factors Involved in the Pathogenesis of Carpal Tunnel Syndrome

Anatomy

Decrease in Size of Carpal Tunnel
- Bony abnormalities of the carpal bones
- Acromegaly
- Flexion or extension of wrist

Increase in Contents of Canal
- Forearm and wrist fractures (Colles fracture, scaphoid fracture)
- Dislocations and subluxations (scapho-hamate articulation, lunate volar dislocation)
- Posttraumatic arthritis (osteophytes)
- Musculotendinous variants
- Aberrant muscles (tumoral, palmaris longus, palmaris profundus)
- Local tumors (neuroma, lipoma, multiple myeloma, ganglion cysts)
- Persistent medial artery (thrombosed or patent)
- Hypertrophic synovium
- Hematoma (hemophilia, anticoagulation therapy, trauma)

Physiology

Neuropathic Conditions
- Diabetes mellitus
- Alcoholism
- Double-crush syndrome
- Exposure to industrial solvents

Inflammatory Conditions
- Rheumatoid arthritis
- Gout
- Nonspecific tenosynovitis
- Infection

Alterations of Fluid Balance
- Pregnancy
- Menopause
- Eclampsia
- Thyroid disorders (especially hypothyroidism)
- Renal failure
- Long-term hemodialysis
- Raynaud disease
- Obesity
- Lupus erythematosus
- Scleroderma
- Amyloidosis
- Paget disease

External Forces
- Vibration
- Direct pressure
CARPAL TUNNEL SYNDROME

• CLINICAL TESTS
  1. PHALEN’S TEST (WRIST FLEXION)
  2. NERVE PERCUSSION TEST
  3. PRESSURE TEST

CHECK FOR THENAR WEAKNESS/WASTING
TREATMENT

• SPLINT
• MODIFICATION of ACTIVITIES
• STEROID INJECTION…Avoid nerve damage

• Operation.. When conservative Rx fails
  Thenar weakness/wasting
Release distal 1/2 to 2/3 of transverse carpal ligament completely before making a final pass to release the remainder of the ligament. This prevents fat located superficial to the proximal portion of the ligament from dropping into the wound and compromising the surgeon’s endoscopic view of the extent of the ligament division.
HALLUX VALGUS
Fig. 78-19 Modified McBride procedure. A and B, Adductor hallucis is exposed and released (see text).
BONE PROCEDURE

- Be careful not to loosen all the proximal attachments of the capsule on the bone.
- In addition, to preserve vascularity to the capital fragment, do not strip tissues.