Radiology Differential Diagnosis

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Bone Forming Tumors
• Osteoid Osteoma
• Osteoblastoma
• Osteochondroma
• Osteosarcoma
• Blastic Mets
• Paget’s

Cartilage Forming Tumors
• Enchondroma
• Osteochondroma
• Chondromyxoid fibroma
• Chondroblastoma
• Chondrosarcoma

3rd List
• Infection
• Mets, myeloma
• Fibrous dysplasia
• Nonossifying fibroma
• LC Histiocytosis
• GCT
• ABC
• Simple Cyst
• Stress fx
• Round Cell Tumor
• Metabolic condition
Matrix Formation

• None (Lytic)

• Calcified Matrix
  – Cartilage
  – Bone
  – Other
Margin – width of interface with adjacent medullary bone.

Geographic 1mm.

Motheaten 2-4mm.

Permeative 1-4cm.
Periosteal Reactions

- Benign
- Aggressive with Codman Triangles
- Aggressive Onion Skin
- Aggressive Hair on End or Sunburst
Periosteal Reaction

• Does Not Occur If:
  – The tumor is not out in the periosteum
    • Giant Cell Tumor
  – The periosteum does not recognize the tumor cells as foreign
    • Lymphoma
Osteoid Osteoma

• Small lytic nidus with surrounding sclerosis, constant pain relieved by NSAIDS

• Prostaglandin secretion

• MRI-edema, Best seen on CT scan
20 y/o with constant pain
32 y/o with Constant Leg Pain
Osteoblastoma

- Lytic lesion
- Painful
- Posterior elements of the spine
Osteochondroma

- Grows out from the medullary canal
- Cortex of the bone becomes cortex of the lesion
- Never sits on an intact cortex
- Malignant if cartilage cap is thicker than 2.5 cm in adults
Osteosarcoma

- Age 10 to 30, second peak in Paget’s
- Usually metaphyseal
- Permeative margin with cortical destruction and soft tissue extension
- Osteoblastic, chondroblastic, fibroblastic, telanectatic (secondary ABC)
Osteosarcoma
Periosteal Osteosarcoma
Osteosarcoma
Parosteal osteosarcoma

- Posterior Distal femur
- Slightly older age group
- Crawls along the surface of the bone
- Difficulty invading the medullary canal
35 y/o with Knee Pain
Parosteal Osteosarcoma
Blastic Mets

• 90% of prostate mets are blastic
• LS Spine via Batson’s plexus
• Breast may be mixed
Pagets Disease

- Uncoupled resorption-formation
- Spectrum of associated radiographic findings
- Pain: stress fracture vs. malignant transformation
Enchondroma

- Stippled calcification
- Does nothing bad to the bone
- Not painful
- Always hot on bone scan
Enchondroma
Enchondroma
Enchondroma
Enchondroma
Enchondroma
Chondrosarcoma

- Intrallesional lysis
- Endosteal scalloping
- Cortical thinning/expansion
- pain
Chondrosarcoma in Enchondroma
Chondrosarcoma
Chondrosarcoma
Chondromyxoid fibroma

- Large benign looking lytic lesion
- Proximal tibia
- Young adults (20-40)
- Painful
13 y/o with Knee Pain
Periosteal chondroma

- Benign cartilage tumor on the surface
- Periosteal scalloping
- May be painful
Periosteal Chondroma
Chondroblastoma

- Lytic lesion in the epiphysis of a child
- Painful
- Significant surrounding edema
- Mimics infection
Chondroblastoma
16 y/o with Shoulder Pain
Infection

• Mimics everything
• Poorly marginated
• Significant edema
Osteomyelitis
Lytic Mets

• Most common aggressive lesion in older adults
• Soft issue mass suggests sarcoma but occurs with kidney, lung
• Usually multiple
Plasmacytoma/myeloma

- Punched out lytic lesions in bone
- May mimic osteoporosis
- Very lytic within the lesion
Fibrous dysplasia

- In the diff dx of every benign lesion
- Long lesion in a long bone
- Ground glass deformity
- May be polyostotic
- May be small and mimic NOF
30 y/o with Hip Pain
18 y/o with Leg Pain
LC Histiocytosis

- Intra-medullary lytic lesion in a child
- Poorly marginated
- Periosteal reaction
- Very inflammatory
- Painful
12 y/o with Hip Pain
Giant Cell Tumor of Bone

- Juxta-articular
- Lytic Lesion
- Moth Eaten Margin
- Cortical Thinning or Erosion
- No Periosteal Reaction
Giant Cell Tumor
Unicameral bone cyst

- Full width lytic lesion
- Cortical thinning
- No periosteal reaction
- Slight expansion
- Proximal Humerus
Simple Bone Cyst (?? ABC)
Calcaneal UBC
Aneurysmal bone cyst

- Eccentric lytic lesion
- Very aneurysmal
- Fluid/fluid levels
- May be primary or secondary to vascular tumors
20 y/o with Elbow Pain
Lymphoma

- Marrow replacement
- Permeative, not destructive
- Minimal bone changes
- Late soft tissue extension
- Minimal periosteal reaction
Ewing’s Sarcoma

- Children and young adults
- Diaphyseal
- Onion skin periosteal reaction
- Large soft tissue mass
- 11/22, CD99, Ews-fli
Ewing’s Sarcoma
20 y/o with Leg Pain
18 y/o with Elbow Pain
Adamantinoma

- Young adults
- Soap bubble sclerotic lesion of the anterior cortex of the shaft of the tibia
- Biphasic (epithelial/mesenchymal)
Lesions in the Anterior Cortex of the Tibial Shaft

• Adamantinoma

• Cortical Fibrous Dysplasia
Adamantinoma
30 y/o with Leg Pain
Chordoma

- Notochord remnant tumor
- Midline
- Sacrum and O/C junction
- Anterior extension
60 y/o with Low Back Pain
Bone infarct

• Well marginated
• “Coast of Maine” contour with peripheral ossification
• May have surrounding edema if acute
Hemangioma

- Maintenance of vertical trabeculae
- “Jail house” vertebrae
- Polka dots on axial CT
50 y/o with Low Back Pain
Intraosseous Lipoma

- Sclerotic border
- Fat density asymptomatic incidental finding
Bone Island

- Cortical bone in the medullary canal
- Well marginated
Tumoral calcinosis

• Amorphous calcium in soft tissues
• Associated with renal failure
Thank You