Orthopaedic Pathology

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Bone and Soft Tissue Pathology is not as difficult as it appears

• The key to understanding
  – Appreciate trends
  – Pattern recognition
  – Importance of radiographic differential
Bone Forming Tumor

• Bone
  – Reactive (Osteoblastic Rimming)
  – Neoplastic (No Osteoblastic Rimming)
  • Stroma
    – Benign Spindle Cell Stroma
    – Malignant Spindle Cell Stroma
Bone Forming

• 1\textsuperscript{st} Pattern – reactive woven bone & benign spindle cell stroma

• 2\textsuperscript{nd} Pattern – neoplastic woven bone & benign spindle cell stroma

• 3\textsuperscript{rd} Pattern – neoplastic woven bone & malignant spindle cell stroma
Reactive Woven Bone
Showing Osteoblastic Rimming
Histologically Benign Appearing Bone Tumors

- Osteoid Osteoma
- Osteoblastoma
- Fibrous Dysplasia
- Parosteal Osteosarcoma
Neoplastic Woven Bone & Benign Spindle Cell Stroma
Histologically Malignant Appearing Bone Tumor

- Osteosarcoma
Neoplastic Woven Bone & Malignant Spindle Cell Stroma
Malignant Spindle Cell Stroma
Cartilage Forming Tumors

• 1st Pattern - enchondroma ➔ L.G.C ➔ H.G.C.
• 2nd Pattern – chondroblastoma
• 3rd Pattern – chondromyxoid fibroma
Low Grade Cartilage
Chondrosarcoma
Chondroblastoma
Chondromyxoid Fibroma
**Soft Tissue Sarcoma Patterns**

1. Liposarcoma – malignant fat cells & lipoblasts
2. Fibrosarcoma – herring bone
3. Synovial Sarcoma – villous nodular
4. Myxo-Fibro Sarcoma – most others
Liposarcoma
Liposarcoma
Fibrosarcoma
Fibrosarcoma
Biphasic Synovial Sarcoma
Biphasic Synovial Sarcoma
Myxo-Fibro Sarcoma
Round Cell Infiltrate

1. Infection
2. LC Histiocytosis
3. Inflammatory condition
4. Primary Round Cell tumor
5. Small cell met adeno CA
Round Cell Tumors

Children
1. Ewings – uniform round cells
2. Neuroblastoma – uniform round cells with pseudo – rosettes

Adults
1. Plasmacytoma – uniform sheets of plasma cells
2. Lymphoma/Small Round Cell CA – everything else
Plasma Cells
Plasma Cells
Lymphoma / Met
Ewings Sarcoma
Neuroblastoma
Neuroblastoma
Systematic Approach

• The key to understanding
  – Appreciate trends
  – Pattern recognition
  – Importance of radiographic differential

• In a few short minutes we have reviewed most of the basic patterns of bone and soft tissue pathology

• Add to the above a recognition of individual lesions and suddenly this is not such a difficult topic
Individual Lesions
20 y/o with constant pain
32 y/o with Constant Leg Pain
Osteoid Osteoma
25 y/o with neck pain
25 y/o with neck pain
Osteoblastoma
25 y/o with Left Hip Pain
Osteosarcoma
28 y/o with Knee Pain
28 y/o with Knee Pain
Parosteal Osteosarcoma
40 y/o with Elbow Pain
Center of Lesion
Closer to Outer Edge
Periphery of Lesion

Myositis Ossificans
30 y/o with Hip Pain
Fibrous Dysplasia
17 y/o with Left Arm Pain
Diaphyseal Permeative Lesion
Histologic Findings

Osteosarcoma
Allograft Reconstruction
Incidental Finding – 40 y/o
Histologic Findings in Low Grade Cartilage Tumors

- Increased cellularity
- Plump Nuclei
- More than one cell per lacunae
- More than one nucleus per cell
- Cells outside lacunae
Enchondroma / LG Cartilage Lesion
60 y/o with Hip Pain
Chondrosarcoma
Hallmarks of Chondrosarcoma

• Intralesional lysis
• Endosteal Scallopining
• Cortical Thinning or Expansion
• Pain
16 y/o with Shoulder Pain
Chondroblastoma
Lytic Lesion in the Epiphysis of a Child

- Chondroblastoma
- Infection
13 y/o with Knee Pain
20 y/o with Leg Pain
Chondromyxoid Fibroma
40 y/o with Wrist Pain
Giant Cell Tumor
Giant Cell Tumor of Bone

- Juxta-articular
- Lytic Lesion
- Moth Eaten Margin
- Cortical Thinning or Erosion
- No Periosteal Reaction
18 y/o with Leg Pain
Non-Ossifying Fibroma
14 y/o with Arm Pain
Unicameral (Simple) Bone Cyst
20 y/o with Elbow Pain
Aneurysmal Bone Cyst
12 y/o with Hip Pain
20 y/o with Leg Pain
Ewing’s Sarcoma
50 y/o with Wrist Pain
Lymphoma
60 y/o with Hip Pain
Plasmacytoma / Myeloma
10 y/o with Arm Pain
Metastatic Neuroblastoma
50 y/o with Low Back Pain
Hemangioma
60 y/o with Low Back Pain
Physiliferous Cells
Closely Mimics Chondrosarcoma
40 y/o with Elbow Mass
Biphasic Synovial Sarcoma
30 y/o with Leg Pain
Adamantinoma
Lesions in the Anterior Cortex of the Tibial Shaft

- Adamantinoma
- Cortical Fibrous Dysplasia
18 y/o with Elbow Pain
Ewing’s Sarcoma
Allograft Reconstruction
35 y/o with Knee Pain
Parosteal Osteosarcoma
Thank You