Orthopedic Tumors of the Lower Extremity

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Disclosures

• I have no financial disclosures pertinent to this presentation.

Soft Tissue Masses
Soft-tissue Sarcoma

Soft Tissue Tumors
Annual Incidence

- Benign: 3000/million
- Malignant: 20/million (<1%)
- USA: 6000 extremity soft tissue sarcomas/yr
  - 2/3 lower extremity
- STS: < 1% malignancies
Clinical Presentation

• Benign and malignant soft tissue tumors
  Asymptomatic mass
• No systemic symptoms or abnormal labs

Decision Making

• Soft tissue mass
  – Observe
  – Imaging (US or MRI with gado)
  – Biopsy or aspirate
  – Excise (marginal margin)
  – Resect (wide margin)
  – Refer

ACR Appropriateness Criteria; soft-tissue masses
http://www.guideline.gov/content.aspx?id=43873

Soft tissue sarcoma

• Age
  <15 15%
  15-55 45%
  >55 40%
Prognostic variables

- Grade
- Size
- Depth
- Metastases
  - Nodal (3%)
  - Lung
- Histopathology, Molecular markers

Staging

Common Benign Lower Extremity Masses

- Ganglion (foot, ankle; aspirate, excise)
- Giant cell tumor tendon sheath (finger, solid, excise)
- Epidermal inclusion cyst
- Fibroma
- Hemangioma (longstanding, phleboliths, compressible)
- Neurofibroma (longstanding, ?MPNST)
- Prepatellar bursitis (rheumatoid nodule, gout; aspirate, excise)
- Lipoma (homogeneous on MRI)
- DVT

Soft Tissue Sarcoma

Histopathology

- Liposarcoma
- UPS (MFH)
- Others

- Synovial sarcoma
- Fibrosarcoma
- Leiomyosarcoma
- Epithelioid sarcoma
- MPNST
- Rhabdomyosarcoma
Unlikely Malignant

- Fluctuation in size
  - Ganglion
  - Hemangioma
- Present of years/decades
- Small and superficial (1-2 cm)
- Infectious (rapid development, painful, erythematous)

Hand Wrist Foot

- Ganglion
- Giant cell tumor of tendon sheath
- Sarcoma
  - Hand
  - Foot
    - Synovial
    - Epithelioid
    - Observe, aspirate, biopsy, excise

Painful Mass (usually benign)

- DVT
- Abscess
- Myositis ossificans
- Nodular fasciitis
- Ruptured Baker’s cyst
- Aneurysm
Painful Mass
(usually benign)
• Neurofibroma
• Schwannoma
• Angiolipoma
• Glomus tumor
• Hemangioma

Multiple Soft Tissue Masses
(usually benign)
• Neurofibromatosis
• Lipomatosis
• Lymphoma
• Epithelioid sarcoma
  Frequently small, hand

Probably Malignant
• Deep to fascia
• Over 5 cm
• Fixed to bone or soft tissue
• Rapid growth
• Heterogeneous on MRI
History

• ROS
  Prior cancers
  Prior sarcomas
  Gout, infection
  Prior benign tumors
  Radiation therapy

Clinical Scenarios
Periarticular masses:
• Ganglion/Baker’s cyst/meniscal cyst
• PVNS
• Synovial sarcoma
• Synovial chondromatosis
• Tophus
• Bone tumors (benign and malignant)
• Rheumatoid nodules

What’s the point

• Start with a radiograph
Pitfalls
• “It’s a lipoma”
• Diff Dx
  Lipoma
  Atypical lipoma
    well differentiated liposarcoma
  Liposarcoma
    • Myxoid liposarcoma
    • Round cell
    • Pleomorphic
    • Dedifferentiated

Hematoma?
• Not likely in absence of
  Trauma
  Anticoagulation
  Coagulation defect
  Ecchymosis
Initial Impression

• Probably benign
  – Make a specific diagnosis
    Lipoma, ganglion, abscess, gout
• Unsure
• Probably malignant

Probably Benign

• Ganglion, abscess, tophus
  Aspirate
• Observe
• MRI, US for confirmation?

Probably Malignant, Unsure
  – US (fluid: stop here)
  – MRI with gadolinium
Probably Malignant, Unsure

- Labs: Not helpful
- Bone scan: Not helpful
- CT: Not helpful

### MRI

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<th>T-2</th>
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<td>Bright</td>
<td>Homog</td>
<td>Rim enhance Gd</td>
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<td>Int-dark</td>
<td>Int-dark</td>
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<td>(none)</td>
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<tr>
<td>Sarcoma</td>
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<td>Mixed</td>
<td>Heterog</td>
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If symptomatic: refer to VIR (vascular interventional radiology) for aspiration.
Fatty Tumors

Lipoma
- No need to refer, no treatment required

Liposarcoma
- Fibrous septations > 3mm
- Increased vascularity
- Heterogeneous

Hemangioma
- If symptomatic: refer to VIR for embolization, sclerosing
PVNS
Pigmented villonodular synovitis

Hemarthrosis
Treatment: open or arthroscopic synovectomy
Radiation for recurrences

Benign Fibrous Histiocytoma

Soft-tissue Sarcoma
Lymphoma

Soft-tissue Masses

• 2-3 cm, superficial
  - Observe or aspirate
  - Excisional biopsy
• > 3 cm, superficial, any deep mass
  - US, MRI, Incisional or needle biopsy

Biopsy

• FNA
• Needle
  - Office
  - VIR
• Incisional
  - No flaps
  - No dissection
  - Hemostasis
• Excisional
• Longitudinal, small incision
Soft-Tissue Sarcoma Staging Studies

- MRI
- Chest xray
- Chest CT
  - Liposarcoma: abdomen/pelvis

Soft Tissue Sarcoma Treatment

- Surgery
  - Wide resection, clear margins
- Radiation therapy: improves local control
- Chemotherapy?

Bone Lesions
Perspective

- **Osteosarcoma**
  1/10 incidence of STS: 600-1000 cases/yr U.S.
  2-3/yr RI, 2nd decade
- **Ewing Sarcoma**
  1-2/yr RI, 1st and 2nd decade
- **Chondrosarcoma**
  1/yr RI, older adults
- **Enchondroma**
  3% of knee MRI scans
- **Metastatic disease**
  prevalence: 280,000

Conclusions

- Most lesions will be incidental findings
- Metastatic disease more likely than a primary bone sarcoma

Incidental lesions

**Frequently overinterpreted**

- Enchondroma
- Chondrosarcoma
- Subchondral cyst
- Metastatic disease
- Nonossifying fibroma
- Paget’s disease
- Bone island
- Liposclerosing myxofibrous tumor
- Bone infarct
- Metastatic prostate ca
• Bone scans not helpful (usually positive)
• Is it the source of pain?
  Not usually

Worrisome Radiographic Features
• Bone erosion, destruction
• Permeative lytic lesions
• Periosteal reaction
• Soft tissue mass
• Caveat: need 50% loss of bone mass to detect on radiograph
Worrisome Clinical Features

- Night pain
- Constant pain
tumor, infection
- Pain increased by weight bearing
  stress fracture
  impending pathological fracture
  osteoarthritis
  tendonitis
- History of malignancy

Physical Exam

- Poke around, what hurts?
  Tendon, muscle, joint, bone, nerve
- Mass, nodes, skin
- Joint ROM
- Provocative maneuvers
  SLR, rotator cuff impingement, duck walk
- Neuro exam
- Common syndromes
  sciatica, mechanical lbp, hip bursitis, hip and knee OA,
  rotator cuff tendonitis, tennis elbow, CTS
Imaging

- Everyone with bone or joint pain deserves a radiograph (first, not after MRI!!!)
- CT not helpful (exception: osteoid osteoma)
- ? When to order an MRI
  - Indeterminate radiograph
  - Patient does not follow expected clinical course
  - Pain out of proportion
- Challenge: sort out sprains, strains, arthritis from pathology

Nonossifying Fibroma

Giant Cell Tumor
Subchondral cyst

- “Metastatic breast ca”
- PET/CT, MRI

Enchondroma

Enchondroma
Clear cell renal cell carcinoma
Myeloma

Operationally

- Benign
  - Observe (inactive)
  - Treat (active, aggressive, symptomatic)
    - Excise
    - Curettage
- Unsure
  - Additional imaging, labs, biopsy, or consult
- Malignant (obvious, not so obvious)
  - Staging studies (MRI, Bone scan Chest CT)
  - Biopsy
  - Referral?
Benign lesions requiring treatment

- Giant cell tumor
- Aneurysmal bone cyst
- Chondroblastoma
- Eosinophilic granuloma
- Anything truly symptomatic
  bone cysts, enchondroma, NOF, fibrous dysplasia

Treatment of Bone Sarcomas

- Osteosarcoma
  chemotherapy, resection, limb salvage
- Ewing’s sarcoma
  chemotherapy, resection, +/- radiation therapy
- Chondrosarcoma
  Grade I: curettage, cryosurgery, cement
  Grade II, III resection

Treatment of Metastatic Disease

- Radiation therapy, bisphosphonates
- Prophylactic internal fixation or joint replacement
  hip lesions, impending fractures
- Resection
  isolated metastasis renal cell ca
  extensive bone loss
Take Home Points

• Lytic lesions can be anything
  — Benign, malignant, primary, metastatic, infection
• Benign tumors often more obvious than malignant (malignant often subtle)
• Persistent pain, indeterminate imaging: repeat radiographs, more studies, or biopsy