Ultrasound of Soft Tissue Masses

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Disclosures

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Educational Objectives

• Following the presentation, participant should be able to:
  – Describe the use of US in the evaluation of superficial soft tissue masses
  – Identify common masses encountered in practice and discuss their differential diagnosis

General Approach to a Suspected Soft Tissue Mass

• Take a thorough history
• If palpable, have patient point to area of interest
• If non-palpable, consult correlative imaging (CT, MRI, etc.)
• Painful or asymptomatic
• Stable or growing

General Approach to a Suspected Soft Tissue Mass

• Potentially pertinent medical history
  – Prior malignancy
  – Trauma
  – Surgery
  – Anticoagulation
  – Systemic diseases

US Approach to Soft Tissue Masses

• Size
  – Measure 3 dimensions
• Echogenicity
  – Hypoechoic
  – Isoechoic
  – Hyperechoic
  – Mixed
US Approach to Soft Tissue Masses

- Borders
  - Well-defined
  - Blends in with surrounding tissues
- Effect on US beam
  - Acoustic enhancement
  - Shadowing

Doppler US Technique

- Minimize depth, place focal zone at level of lesion
- Assess vascularity in and around lesion
  - Color Doppler
  - Power Doppler
  - Spectral Doppler

Normal Soft Tissues

Locate Mass to Compartment(s)

- Skin
- Subcutaneous tissues
- Muscle
- Joints / bursae
- Other MSK

Fatty Masses

- Lipoma
- Liposarcoma
- Asymmetric fat deposition
- Fat necrosis

Lipoma

- Range from hyperechoic to isoechoic to hypoechoic
- May see internal septations
- Difficult to separate from adjacent fat
- Little or no Doppler flow
Fat Necrosis

- Palpable nodule
- May be painful
- Etiology
  - Direct trauma
  - Collagen vascular diseases
  - Medications
**Cystic vs. Solid Mass**

- Gray scale appearance
  - Acoustic enhancement does not mean mass is cystic
- Change with compression?
- Internal Doppler flow
  - If present, excludes fluid collection
  - If absent, still may be solid
US-guided Biopsy

- Grey scale and color Doppler characteristics often nonspecific
- Percutaneous biopsy safe and effective for diagnosis
The “Real Estate” Approach
LOCATION, LOCATION, LOCATION

“Rule out Baker’s Cyst”

PET CT of Lower Extremity

Baker’s Cyst

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Evaluation of Vascular Masses

- MRI for detection and anatomic localization
- US for amount and type of flow
**Lymph Nodes: Benign Features**

- Oval shape
  - Length to AP > 2 (Solbiati)
- Preserved echogenic hilum
- Homogeneous echotexture
- Regular Doppler flow pattern

**Normal Lymph Node**

**Inguinal Lymph Node Metastasis**

**Normal Lymph Node Flow**

**Metastatic Melanoma Flow**
**Periarticular Processes**

- Bursitis
- Ganglion cysts

**Distended Iliopsoas Bursa**

**Wrist Ganglion**

**Wrist Ganglion**

**Muscle Masses**

- Traumatic rupture or herniation
- Hematoma
- Abscess / pyomyositis
- Myositis ossificans
- Neoplasms

“Rule out sarcoma”
18-year-old Lacrosse Player with a Painful Thigh

AIDS Patient with Muscle Pain, Fever
Hypoechoic collection in rectus femoris muscle

Muscular Abscess in AIDS Patient
Power Doppler Confirms Inflammation, Guides Aspiration

Mass in Paraspinal Muscle

Biopsy of Muscle Mass

Conclusion
- US is useful in differential diagnosis of a wide array of soft tissue masses
- Use correlative imaging when necessary
- When in doubt, get tissue diagnosis
- Two virtually useless features
  - Presence of through transmission
  - Shape of Doppler waveform