Ultrasound of Soft Tissue Masses

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Disclosures

• Nothing to disclose related to this CME activity

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**

**Localyze 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
Lipoma

Lipoma: Color Doppler

Lipoma: EFOV

Lipoma

Lipoma: Color Doppler
**Fat Necrosis**

- Palpable nodule
- May be painful
- Etiology
  - Direct trauma
  - Collagen vascular diseases
  - Medications

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**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
Fluid Collection
Compression

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

Baker’s Cyst

“Rule out Baker’s Cyst”
PET CT of Lower Extremity

Rhematoid Nodule: Extensor Surface of Elbow

Neurofibroma of Ankle
Stump Neuroma

Evaluation of Vascular Masses

- Amount of flow
- Type: arterial and/or venous
- Distribution: central and/or peripheral
- Power Doppler for increased sensitivity
- Spectral Doppler for confirmation
**Finger Hemangioma**

**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
Muscles

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

18-year-old Lacrosse Player with a Painful Thigh

“Rule out sarcoma”

Mass in Paraspinal Muscle
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