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

Malignant Melanoma: Impact of Superficial US on Management

PURPOSE: To evaluate the impact of superficial ultrasonography (US) on clinical management of melanomas. The frequency of cutaneous malignant melanoma has increased markedly in recent years. Although the sensitivity of US includes one must and
US Approach to Soft Tissue Masses

- **Size**
  - Measure 3 dimensions
- **Echogenicity**
  - Hypoechoic
  - Isoechoic
  - Hyperechoic
  - Mixed

**Cystic vs. Solid Mass**

- **Gray scale appearance**
  - Anechoic structures most likely cystic, but internal echoes common
  - Acoustic enhancement does not mean mass is cystic
- **Change with compression?**

**Doppler US Technique**

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

**US Approach to Soft Tissue Masses**

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

**Cystic vs. Solid Mass**

- **Internal Doppler flow**
  - If present, excludes fluid collection
  - If absent, still may be solid

**Normal Soft Tissues**
Localize 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
Fat Necrosis

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

Cystic Fat Necrosis
Fluid Collection

Compression

Sebaceous (Epidermoid) Cyst

Epidermoid Cyst: “Pseudotestis Pattern”
J Ultrasound Med 2011; 30:11-17

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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
Rheumatoid Nodule:
Extensor Surface of Elbow

Monthly Pain After C-Section

“Rule out Foreign Body”
in Foot

It’s a Wart!

Large Plantar Wart
Neurofibroma of Ankle

Stump Neuroma

Evaluation of Vascular Masses

- MRI for detection and anatomic localization
- US for amount and type of flow
Palpable Finger Mass 25 Year Old Woman

Finger Vascular Malformation
Vascular Malformation: One-Year Follow-Up

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
Benign or Malignant?

Metastatic Bladder Ca

Periarticular Processes

• Bursitis
• Ganglion cysts

Distended Iliopsoas Bursa

Wrist Ganglion

Wrist Ganglion
**Muscle Masses**

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

**Normal Quad Muscles**

**“Rule out sarcoma”**

**Palpable Calf Mass**

**Internal Muscle Hernia**

**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 unhelpful features
  - Presence of through transmission
  - Shape of Doppler waveform