Ultrasound of Soft Tissue Masses

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Disclosures

• None relevant to this presentation

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

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

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

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**
Lipoma: EFOV

Lipoma

Lipoma: Color Doppler

Lipoma: Bilateral Comparison
Liposarcoma

Biceps Mass

Liposarcoma

Biceps Mass

Biceps Mass

Biceps Mass
Suspected Biceps Rupture

Fat Necrosis

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

Cystic Fat Necrosis
Infected Hematoma Hockey Player

Sebaceous (Epidermoid) Cyst

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

Synovial Sarcoma in Popliteal Fossa

PET CT of Lower Extremity
Morel-Lavallee Lesion Aspiration

Morel-Lavallee Lesion 6 Week Follow-Up

“Rule out Foreign Body” in Foot

It’s a Wart!

Large Plantar Wart

Peroneal Neuropathy After MVA
**Peroneal Neuropathy After MVA**

**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

Needle Biopsy: 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

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