Hip and Groin Ultrasound

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Objectives:

• Understand regional anatomy
• Familiar with common pathology and ultrasound appearances
• Recognize the importance of dynamic imaging
Goals:
- Sonographic technique
- Normal anatomy
- MR imaging correlation
- Pathology

Pathology:
- Joint abnormalities
- Soft tissue infection
- Muscle and tendon injury
- Snapping hip syndrome
- Peripheral nerve abnormalities
- Masses

Hip: anterior recess
- Anterior + posterior layers
  - Fibrous tissue + minute layer of synovium
  - Hyperechoic
  - Each 2 - 4 mm thick

Radiology 1999; 210:499
Hip Effusion:

- Separation of anterior and posterior layers\(^1\)
- Capsule distention at femoral neck > 7 mm or difference of 1 mm from opposite side\(^2\)
- Extension & abduction improves visualization\(^3\)
- Do not internally rotate hip: capsule thickens

\(^1\)Radiology 1999; 210:449
\(^2\)Scand J Rheumatology 1989; 18:113
\(^3\)Acta Radiologica 1997; 38:867

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Hip Joint: septic effusion

Long Axis

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Hip Joint: aseptic effusion

Sagittal
Hip Joint: aseptic effusion

Hip Effusion:
- Cannot predict infection by ultrasound
- Negative power color Doppler does not exclude infection*
- Guided aspiration

* AJR 1998; 206:731

Hip Joint
- Anterior recess
- Longitudinal to femoral neck
Pitfall: synovitis

- Anterior and posterior layers of anterior capsule should not be misinterpreted as synovitis
- Transient synovitis:
  - Joint effusion
  - Synovial thickening too small to see

*Radiology* 1999; 210:499
Hip Labrum

- Normal:
  - Hyperechoic, triangular
- Degeneration: hypoechoic
- Tear:
  - Anechoic cleft
  - Most common anterior
  - Possible paralabral cyst
  - Sensitivity 44%, specificity 75%*

*Acta Radiologica 2007; 9:1004

Labral tear & paralabral cyst

Femoroacetabular Impingement:

- Pincer-type: deep acetabulum
- Cam-type
  - Broad irregular femoral neck
  - Possible cortical irregularity at US
- Associated with anterior labrum tear
- Consider dynamic evaluation

Radiology 2005; 236:588
CAM Impingement

Femoroacetabular Impingement

Sagittal-oblique

Hip Arthroplasty:
- Prosthesis identifiable
- May use sonography to guide hip aspiration
- Most useful: non-communicating abscess, bursitis, incision infection
Total Hip Arthroplasty:

- Metal components demonstrate posterior reverberation
- Artifact occurs deep to prosthesis away from fluid collection (unlike MRI, CT)

*AJR 1994; 163:381*

Total Hip Arthroplasty:

- Pseudocapsule distention: > 3.2 mm: suspect infection*
- Extra-articular fluid collection:
  - Suspect infection
  - Not visualized with arthrography if non-communication

Total Hip Arthroplasty: infection

Superior Inferior Sagittal

Native Femur
Pathology:

- Joint abnormalities
- Soft tissue infection
- Muscle and tendon injury
- Snapping hip syndrome
- Peripheral nerve abnormalities
- Masses

Cellulitis

- Early: thickened and hyperechoic subcutaneous fat
- Late: anechoic channels (distended lymphatics)
- May appear similar to simple edema

J Ultrasound Med 2000; 19:743
Cellulitis: chronic

Trochanteric Pain Syndrome:
- Most commonly caused by gluteus minimus and medius tendon abnormalities\(^1\)
- Trochanteric bursitis: rare
  - Not actually inflamed\(^2\)
  - Not associated with pain\(^3\)

\(^1\)Eur Rad 2007; 17:1772.
\(^2\)J Clin Rheumatol 2008; 14:82
\(^3\)Skeletal Radiol 2008; 37:903

Trochanteric Bursal Fluid:
- Bursal fluid not normally seen
- Fluid distention:
  - simple fluid: anechoic
  - complicated fluid: mixed echogenicity
Greater Trochanter

Subgluteus Minimus: SGMiB
Subgluteus Medius: GMeB
Trochanteric: TrB

Pfirrmann et al. Radiology 2001; 221:469