Ultrasound of Common Hip Pathology

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Outline:
• Hip joint
• Bursae
• Tendon abnormalities
• Snapping hip syndrome

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

Hip Effusion:
• Separation of anterior and posterior layers
• Capsule distention at femoral neck > 7 mm or difference of 1 mm from opposite side
• Extension & abduction improves visualization
• Do not internally rotate hip: capsule thickens

Radiology 1999; 210:499
Scand J Rheumatology 1989; 18:113
Acta Radiologica 1997; 38:867
**Hip Joint: septic effusion**

*Long Axis*

**Pitfall: capsule thickening**

- Internal rotation of hip:
  - Anterior hip capsule
  - Thicker, convex anterior

**Hip Effusion: misconception**

- It is **incorrect** to assume that joint fluid may not be seen anterior due to gravity
- Native hip: joint fluid distributes around femoral neck
- In no cases was fluid only seen posterior
- Exception: after hip surgery

Moss et al. Radiology 1998; 208:43

**Hip Effusion:**

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

* AJR 1998; 206:731

**Pigmented Villonodular Synovitis**

**Juvenile Idiopathic Arthritis**
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

Total Hip Arthroplasty:

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

Femoral Head

Labral Tear

Femoral Neck

Sagittal-oblique

Hip Arthroplasty:

- Ultrasound cannot differentiate small effusion from post-op change
- Suspect infection:
  - Pseudocapsule > 3.2 mm: suspect infection
  - Extra-articular fluid collection
  - Not visualized with arthrography if non-communication

Head

Neck

Weybright PN et al. AJR 2003; 181:215
AJR 1994; 163:381

Hip Arthroplasty: infection

Superior

Inferior

Sagittal

Teaching Point:
Always screen soft tissues about an arthroplasty prior to fluoroscopic joint aspiration
Metal-on-Metal Arthroplasty: pseudotumor

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Trochanteric Pain Syndrome:
- Most commonly caused by gluteus minimus and medius tendon abnormalities<br>
- Trochanteric bursitis: uncommon
  - 20% of symptomatic patients<br>
  - Not actually inflamed<br>
  - Not associated with pain

References:
1. Eur Rad 2007; 11:1772
2. Long SS et al. AJR 2013; 201:1083
3. Clin Rheumatol 2008; 17:17</ref>

Greater Trochanter

Greater Trochanter

Yellow arrow = gluteus medius
White arrow = gluteus minimus

Axial MRI

Anterior

Posterior
Greater Trochanter

AF: anterior facet
LF: lateral facet
PF: posterior facet

Gluteus Minimus and Medius: Long Axis

Trochanteric Bursitis

Transverse
Coronal

Iliopsoas Bursa:
- Hip joint communication in 10%
  - Increased with hip joint pathology
- May extend cephalad into abdomen
- May be mistaken for abscess:
  - Look for hip joint communication

Radiology 1995; 197:853

Iliopsoas Bursal Fluid

Axial
T1w post-gadolinium
Ischial or ischiogluteal Bursa
- Uncommon
- “Weaver’s Bottom”
- Between ischial tuberosity and gluteus maximus

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Acute Muscle and Tendon Injury
- Direct impact: contusion, muscle belly
- Indirect (strain):
  - Musculotendinous junction
    - Especially muscles than span 2 joints
    - Hamstrings, gastrocnemius
  - Osseous avulsion

Tendon Injury
- Tendinosis
- Hypoechoic, increased thickness
- Progression to partial and full-thickness tendon tear
  - Hypoechoic or anechoic tendon defect
  - Retraction: full-thickness tear

Tendinosis: Gluteus Minimus

Tendinosis: Gluteus Medius
Tear: Gluteus Medius

Calcific Tendinosis: Gluteus Medius

Calcific Tendinosis: rectus femoris

Semimembranosus: tendinosis

Conjoint Tendon: tendinosis

Semimembranosus Tear

>2 mm cortical irregularity depth (x-ray) = 90% positive predictive value for gluteus tendon tear

Steinert et al. Radiology 2010; 257:754
**Sports Hernia?:**

- A non-anatomic, non-diagnostic term attributed to many cause of groin pain
  - Tears or attenuation of inguinal structures
  - Bulge posterior wall of inguinal canal
  - Obturator nerve entrapment
- Common aponeurosis abnormality:
  - Rectus abdominis and adductors tendons
- Associated: pubic symphysis instability, FAI

Omar IM et al. Radiographics 2008; 28:1415
Garvey JFW et al. Hernia 2010; 14:17
Hopkins JN et al. JBJS Reviews 2017; 5:1

**Outline:**

- Hip joint
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Snapping Hip Syndrome

- Painful snap with hip motion
- Intraarticular
- Extraarticular:
  - Medial: iliopsoas tendon
  - Lateral: iliotibial tract or gluteus maximus

Snapping Hip Syndrome: iliopsoas

- Image long axis to inguinal ligament superior to femoral head
- Extension of flexed abducted and externally rotated hip
- Abrupt movement of iliopsoas as iliacus muscle interposed between tendon and bone moves

Deslandes et al. AJR 2008; 190:576

Snapping Hip Syndrome: iliotibial tract

- Transverse over greater trochanter
- Hip external rotation / flexion
- Abrupt motion of iliotibial tract over greater trochanter

Snapping Hip: lateral

- Transverse over greater trochanter
- Hip external rotation / flexion
- Abrupt motion of iliotibial tract or gluteus maximus over greater trochanter
Take-home points: hip

- Joint effusion: anterior recess
  - Pitfalls: large patients, post-arthroplasty
- Bursae and gluteal tendons:
  - Use facets of greater trochanter for orientation
- Sports hernia:
  - Common aponeurosis
- Snapping hip:
  - Dynamic evaluation

Syllabus on line and other educational material:
www.jacobsonmskus.com

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