2015 Annual Brown Orthopedics Symposium
Current Topics in Active Adult Hip and Knee
Orthopedics for the Primary Care Provider

Imaging Studies of the Hip and Knee and Their Interpretation

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Discussios

• Consultant
  • Wright Medical Group, N.V.
  • McKesson Health Solutions

Overview

• Understand the different modalities available for imaging the hip and knee
• Be familiar with common hip and knee imaging findings
Radiographs
- Mineralization
- Morphology and Alignment
- Fractures
- Lesions
- Joint Space
- Soft tissues

Morphology: Goldilocks Principle
Predisposition to OA

- Undercoverage
  - Dysplasia
- Normal
- FAI
- Overcoverage

Influencing factors
- Activity level
- Type of activity

Measurements
- CE angle (Lateral/anterior)
- Alpha angle
- Acetabular index (AI)
- Extrusion index
- Acetabular angle of Sharpe
- Tonnis angle
Radiographic findings


Lateral CE angle:
NL>25 degrees

Tomiis angle:
NL<10 degrees

Hip Dysplasia:
Lateral upsloping

False profile:
Hip dysplasia

Quantitative Analysis of Cam-type FAI

- 39 symptomatic patients
- $\alpha$ angle $\geq 74 \pm 5.4^\circ$
- Range: 55-95
- 35 controls
- $\alpha$ angle $\leq 42 \pm 2.2^\circ$
- Range: 33-48

FAI- Focal bump

3D CT: FAI
FAI- Acetabular retroversion

CT

- Mineralization
- Morphology
- Fractures
- Lesions
- Joint Space
- Soft tissues

33 yo male avid runner
Lesion characterization: Parosteal osteosarcoma
Lesion characterization:
Fibrous dysplasia

Lesion characterization

Lesion characterization:
HADD
Ultrasound
- Great for localized or targeted evaluation.
- Quadriceps or patellar tendon
- Equivalent to MR for tendinous evaluation
- Evaluating of cyst vs. solid mass.
- Dynamic evaluation
  - snapping tendon

Quadriceps tear

Dynamic US
MR

- Imaging modality of choice
  - Occult fractures
  - Soft tissues injuries
  - Marrow abnormalities and disease processes
  - Evaluation of arthropathy

- MR Arthrography
  - Improved evaluation of labral injuries
  - Osteochondral injuries, loose bodies
  - Ligamentum teres sprains

MR Technique

- Global Screening (FOV=body width;5/2-2.5)
  - Coronal T1 and T2 FS/STIR
  - Axial T1 and T2 FS
- Dedicated (FOV=22 cm;4/1)
  - Axial oblique PD FS (hip of interest)
  - Dedicated Axial T1 and T2 FS
- MRA (FOV=18 cm;3-4/0.5)
  - 3 plane T1 FS sequences
  - Coronal T2 no FS

Pre MRA fluoro spot
MRI Test of choice for occult/stress fracture

- Fatigue (True Stress)
- Abnl stress/NL bone
- Insufficiency
  - Abnl bone/ NL stress

Patterns of Stress!

Occult injury
Marrow lesion: Osteoblastic Metastasis
Risk of pathologic fracture

MR soft tissue abnormality

Labral Injury: MR Overall Performance

- Labral Injury (MRAr)
  - Sens >90% Spec >80%

- Chondral Injury (MRAr)
  - Sens 41-79%
  - Spec 77-100%
  - Delamination (FAI) as low as 22%

- Surgical outcome
  - Czerny II/III-No difference
Mild hip dysplasia: 
?Significance

Very significant

FAI—Cam-type
Anterior Labral Base Tear

Complex labral tear

Knee Meniscal injury: How well do we do?
Meniscal tear examples

Ligamentous injury: How well do we do?

Athletic pubalgia
- Osteitis pubis
  - Alteration in biomechanics leading to inflammatory response
- Isolated adductor compartment injury
- Rectus abdominis tendon injury
  - +/- adductor tendon injury
  - Surgical repair with modified Bassini technique
- Includes multiple etiologies all resulting in groin pain elicited by athletic activity
College hockey player

Acute Grade III MCL injury

1 month later
Soft tissue mass:
Intramuscular myxoma

Osteoarthropathy
CR vs MR

Osteoarthropathy
CR vs MR
Osteoarthopathy

MR Neurography

- 54 y/o woman persistent LEFT medial thigh pain and weakness

Axial T1
Clinical FU

- Fascial Band ID’d intra-op at proximal edge of adductor brevis with audible snap upon release.
- Post-op: improved pain and strength with ability to negotiate stairs for first time in over a year.
Summary

- Understand the role of all imaging modalities for work-up of knee and hip issues.
- Understand the appearance of common diseases effecting the hip.
- Understand how MR performs in evaluating soft tissue injury and disease patterns.

Questions?

Thank you

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