Femoral Acetabular Impingement

10/22/2016
Disclosures

• No Disclosures to report
Questions

• Does FAI lead to early development of osteoarthritis?
• Is surgical correction an effective treatment for FAI?
• Who is an appropriate candidate for surgery?
“FAI is a pathologic condition resulting from abnormal acetabular and femoral head morphology that has been implicated as a precursor to secondary osteoarthritis.” Ganz 2003
Morphology

NORMAL

PINCER

CAM
Causes of Cam and Pincer

- Pediatric disorders
  - Slipped Capital Femoral Epiphysis (SCFE)
  - Leg Calve Perthes Disease (LCPD)
  - Developmental Dysplasia of the Hip (DDH)
- Trauma
  - Proximal femur fractures
- Genetics/Family history: DDH, Coxa Magna
- Idiopathic, atraumatic
Patterns of Injury

• Pincer deformity
  – Damage to labrum
  – Compressed against neck
  – Repeated trauma, labral chondral separation
  – Labral Ossification
Patterns of Injury

• Cam deformity
  – Bump, decreased offset
  – Shear stress, rotation
  – Sliding mechanism
  – Delamination of cartilage
Patterns of Injury

• Pincer Lesions
  – Labral injury
  – Repeated trauma
  – Separation/tearing
  – Bone growth
  – Labral calcification
  – Peripheral cartilage loss

• Cam Lesions
  – Incongruuity
  – Shear stress
  – Labrum protected
  – Delamination of cartilage

Bony abnormalities are the structural problem, however, symptoms appear to be related to labral tearing or cartilage delamination.
FAI → OA

- Predictable patterns of injury
  - Direct observation of open hip surgery
  - Different lesions lead to different types of wear

- Retrospective reviews
  - Young pts with THA
  - Earlier onset of symptoms
Predisposed to OA?

• Cam lesions correlated with increased development of **radiographic** OA compared with controls
  – The larger the cam lesion the more likely to have osteoarthritis
  – Increased alpha angle
  – Pincer lesions
Biomarkers of OA

• 6 known markers associated with OA progression
• Cartilage Oligomeric Protein (COMP)
  – Increased levels of COMP in male athletes with FAI\textsuperscript{Bedi et al}
  – Two recent studies showing no correlation
• CRP increased in patients with symptomatic FAI compared with controls\textsuperscript{Bedi et al}
Osteoarthritis

- Cam / Pincer Lesion
  - Delamination of Cartilage
  - End stage Osteoarthritis
  - THA

Screening xray for Cam or Pincer Lesions?
Asymptomatic Pts

- Radiographic review
  - 2114 pts
  - 37% had Cam lesions
  - 63% had Pincer lesions
- Questioned the correlation between lesions and development of OA
- Does the presence of a Cam or Pincer lesion eventually lead to osteoarthritis?
Cartilotype

- Not all cartilage is the same
- Certain patients have cartilage that is more susceptible to damage from shear stresses
Cartilotype

- Some people have a Cam or Pincer and never develop OA despite shear stresses on the articular cartilage
Morphology is important, but kinematics, biologic makeup of a patients cartilage, and the biologic response to injury are equally as important
Does surgery alter NH

• What is the natural history?
  – Not all patients progress to symptomatic stages of impingement despite bone changes present
  – Diagnosis is often made late

• Who is an appropriate candidate for surgery
  – Can we identify who is likely to progress
  – Goal of preserving the hip
  – Is surgery more effective than non-surgical management
Nonsurgical Management

• Hong Kong JOS 2011: 37 pts with mild FAI treated non-surgically
  – 2 yr f/u
  – 89% of pts had significant improvements in Hip scores
  – 11% went to surgery
  – “Mild” FAI may respond well to non-surgical management
Open Surgical Dislocation

• Popularized by Ganz
  – Hip anterior
  – Protect circumflex vessels

• Early studies
  – 60-70% of pts had good to excellent outcomes
  – Increased OA correlated with worse outcomes
  – Improved outcomes with osteoplasty plus labral repair vs labral debridement
    • Preservation of labrum
Complications

• Osteonecrosis
  – Rare
  – Salvage with THA

• Trochanteric bursitis/pain
  – 45-75%
  – Described as mild
  – No decrease in function

• Heterotopic Ossification: 8-10%

• Large studies, complication rate of 5%
Arthroscopic Approach

• Hip arthroscopy
  – Used for infection and removal of loose bodies
  – Treatment for FAI since approx. 2000
• Many short term f/u studies available
  – Systemic review of 12 studies
  – 75% of pts had good-excellent results
  – Conversion to THA varied from 0% to 10%
• Technically difficult, steep learning curve
Arthroscopic Approach

• Confirmed importance of labral repair
• Need to address the bony anatomy
  – Removal of bony impingement strongly correlated with greater long-term success and fewer early failures
Complications

• Generally low
  – Cartilage injury from instruments: 10%
  – Heterotopic ossification: 2%
  – Adhesions: Rare
  – Osteonecrosis: Very Rare

• Traction induced nerve injury
  – Reported, no known rate
Open vs Arthroscopic

• 2011 Systemic review: 26 articles
  – 1409 pts, three different surgical techniques
    • Open vs Arthroscopic vs Combined
• Each study demonstrated improvements in Harris Hip scores
  – Scope: 26
  – Open: 20
  – Combined: 12
• Complication Rates: 2%, 9%, and 16%
• Higher rate of return to professional sports with arthroscopic approach
• Possible Bias: Open & Combined approaches used for most severe cases?
Surgical Candidate

• Clinically symptomatic hip pain
• Confirmatory imaging
  – Xray
  – MR arthrogram
• Confirmatory injection?
• Failure of conservative treatment options
• Minimal/Mild osteoarthritis
• Non-smoker, Non-obese
Imaging of Hip

- Dunn view (lateral)
- Degree of OA present
  - Joint space, Osteophytes
- Quantify the Cam deformity
  - Alpha angle
  - >60 degrees
Imaging of the hip

• Degree of retroversion
  – Crossover sign
  – Retroversion index
  – Prominent ischial spine
MRI

- Arthrogram most effective
- Eval degree of OA
Confirmatory Injection

• Can be helpful
• Inflammatory response
  – Increased CRP
• Safe
  – Low side effect profile
• Older pts
• Presence of OA
  – “Buying time”
Degree of OA
Surgical Candidate

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Conclusion

• Syndrome of FAI
• Correlation of OA
• Surgery can be effective
  – Arthroscopic vs Open
• Ideally surgery prior to development of OA
• Future directions
  – Identify biomarkers/genetics that accurately predict those patients with Cam/Pincer lesions that will progress to symptomatic FAI and eventually OA
Questions?

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