Evaluation of the Painful Total Hip Arthroplasty

R. Michael Meneghini, MD
Associate Professor of Orthopaedic Surgery
Indiana University School of Medicine
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Total Hip Arthroplasty

Lancet 2007 “The Operation of the century: Total Hip Replacement”

- Very reliable in reducing / eliminating pain
- Rarely are patients not satisfied
Pain following THA

• Frustrating for the patient and doctor.
• Long list of possible causes
• Approach systematically
• Do not revise without knowing etiology
# Painful THR: Differential Diagnosis

**Intrinsic Etiology:**
- Loosening
- Infection
- Instability
- Impingement
- Particulate Synovitis
- Poly Wear
- Metal Hypersensitivity
- Modulus mismatch

**Extrinsic (local):**
- Bursitis
- Tendonitis
- Heterotopic Ossification
- Abductor Avulsion
- Stress Fracture
Painful THR: Differential Diagnosis

Extrinsic: Remote
- Spinal Pathology
- Nerve Palsy / Neuropathy
- Nerve Entrapment

Vascular Disease
- Claudication
- Osteitis Pubis / pubic symphysitis
- Hernia
- Intra-abdominal pathology
- Tumor
History

• Indications – “Why did you have your hip replaced”
• “What was done prior to surgery”
• “Who did your surgery”
  – Surgical Approach
• Wound Drainage
• Antibiotics
• Recent Infections
• Past Medical History:
  – Medications
  – Chronic disease (Diabetes, RA)
History

• When Did you begin having Symptoms?
  
  – Early postoperative
    • Acute infection
    • Heterotopic bone
    • Early instability
    • Initial misdiagnosis
History

• When Did you begin having Symptoms?
  – Late
    • Component loosening
    • Late or chronic infection
    • Bursitis/tendinitis
    • Stress fracture
    • Particulate synovitis
History

- **Location**
  - Groin
    - Acetabular loosening
    - Iliopsoas
  - Buttock
    - Sacroiliitis or referred LBP
  - Thigh
    - Femoral loosening
    - Modulus mismatch
  - Knee
    - Femoral loosening
  - Lateral thigh
    - Tendinitis or bursitis
History

• Character
  – Activity related?
  – “Start-up”
  – During “at risk” positions
  – Rest?
  – Night?
  – Snapping?
  – Same as prior to THA?
Painful THR - Examination

- Gait
- Spine
- Hip
- Neurologic
- Vascular
- Abdomen / groin

Avoid Preconceived Diagnosis
Physical Examination

- Gait
  - Trendelenberg sign = weakness
  - Antalgia = pain

- Strength
  - Abductors
  - Hip Flexors
  - Knee Extension
Physical Examination

- Hip
  - Palpation
    - Bursitis
    - Sacroiliitis
    - Specific muscle groups
    - Fascial defects

- Stinchfield test
  - Intraarticular pathology

- Pain with ROM
  - Any motion...?infection, synovitis
  - Extremes...?loosening

- Snapping, crepitation
Physical Examination

- **Spine**
  - Root tension signs
  - Complete neurologic exam
    - Foot Drop
    - Pain with hyperextension

- **Vascular**

- **Abdomen/groin**
  - Hernia
  - Aneurysm
  - Visceral etiology
Painful THR: Radiographs

- Component Position Change
- Cement Fracture
- Prosthesis Fracture
- Progressive Radiolucencies
- Polyethylene Wear
- Periosteal Lamination
- Endosteal Scalloping
- Localized Osteolysis
Serial radiographs are the most effective method of detecting component loosening.

Attempt to obtain preoperative and initial postoperative radiographs.
Painful THR: Radiographs

Significance ??
Painful THR: Radiographs

2 mos.

12 yrs.
Cementless Acetabular Loosening

• Radiographic Loosening Criteria
  – Radiolucent lines >1mm that initially appeared after two years
  – Progression of radiolucent lines after two years
  – Radiolucent lines in all three zones
  – Radiolucent lines 2 mm or wider in any zone
  – Migration

94% Sensitivity, 100% Specificity

Cemented Stem Loosening

- Definite Loosening
  - Subsidence
  - Fracture of Stem
  - Cement Mantle Fracture
  - Continuous RLL cement/stem

Harris WH, McGann WA. JBJS 1986;68A:1064-1066
Uncemented Stem Loosening

• Uncemented Stems
  – Complete RLL over the *coated* part of stem
  – Subsidence
  – Position change
  – Abnormal bone remodeling
Osteolysis

- Most osteolysis in absence of loosening is asymptomatic
- Stress fracture of Greater Trochanter or Acetabulum
Painful Total Hip Replacement

- Particulate debris
  - Particulate debris synovitis:
    - Joint, psoas sheath
  - Lysis related stress fractures
    - acetabulum
    - greater trochanter
    - lesser trochanter
- Metal Hypersensitivity
  - MoM Bearing / Trunionosis
Painful Total Hip Replacement

• Psoas Impingement
  – Acetabular component with anterior or inferior acetabular component prominence
  – usually cup is under anteverted and lateralized
  – Component may appear oversize relative to native acetabulum
Painful Total Hip Replacement

- Psoas Impingement
Laboratory Tests

- History and Physical should provide a differential diagnosis
- Avoid Ordering Unnecessary tests
Painful THR - Infection

- Always suspect infection
- Must always be excluded
  - Delayed wound healing /drainage
  - UTI, URI, etc.
  - Superficial or deep infection immediately post-op
  - Healed or draining sinuses
  - High risk patients
Laboratory Tests: ESR/CRP

- Excellent screening tool
- High sensitivity
  - Rarely normal in the face of infection
    » Schinsky, Della Valle et. Al, JBJS 2008
      • 235 consecutive revision THA’s
      • No infections found in pts with nl ESR/CRP
    » Spanghel et. Al, JBJS 1999
      • 202 consecutive revision THA’s
      • No infections found in pts with nl ESR/CRP
- Obtain prior to every revision TJA!
Laboratory Tests: Aspiration

- Consider if ESR/CRP elevated and history is suspicious
- Problem with high rate of false positives
- Must be off of abx for at least 2 weeks prior to aspiration
• When used ALONE optimal cut-off 4,200
• Better used in COMBINATION with ESR/CRP
  – ESR/CRP both ↑ optimal cut-off 3,000
  – ESR or CRP ↑ optimal cut-off 9,000
Painful Total Hip Replacement

- Now what???
  - Solidly fixed implants on radiographs
  - Pain
  - Infection excluded
Painful Total Hip Replacement

- Bone Scan - Tc-MDP
  - Sensitive
  - Not specific – false positives
  - Stress Fracture, Sacroiliitis, loosening etc.
Painful Total Hip Replacement

Well Fixed

Aseptic Loosening
Differential Marcaine Injection

• Extrinsic vs. intrinsic pain

• Valuable if pain relief obtained
  • Location
  • Quantification

• Absence of pain relief does not rule out loosening
Painful Total Hip Replacement

• End of Stem Pain
  – Activity Related
  – Generally within first 12 months
  – Large stem sizes
  – ? stiffness mismatch
  – Typically uncemented stems

• Modulus of Elasticity Mismatch
  – 297 patients
  – trend toward thigh pain with larger implant sizes
  – Usually diminishes
  – Vresilovic, 1992
Metal Hypersensitivity THA

- Red Flags:
  - New onset pain or weakness
  - Late dislocations

- "At Risk" Implants
  - MOM total Hips
  - Modular Necks
  - Large Diameter Heads
  - **Can be ANY size metal head**
  - "I can’t find anything wrong"
Metal Hypersensitivity Workup

- Serum Metal Ions
  - Cobalt / Chromium
  - May be equally elevated in MoM bearings
  - Trunionosis Cobalt preferentially elevated

- Metal Artifact Reduction “MARS” MRI

- Decision to Revise Multi-Factorial
Conclusions

- Invoke a Systematic Approach
  - Thorough History and Physical
  - Radiographic Evaluation
  - Laboratory and other studies

- Keep Differential in Mind

- Establish Etiology

- Do not be afraid to:
  - Say No to Surgery and Observe
  - Seek a colleagues 2nd Opinion

- Develop a clear surgical plan targeting etiology
Thank You