Managing OA of the Knee and Hip: From Injections to Joint Replacement. An evidence based talk

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Disclosures

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Outline

• OA:
  – Types
  – Causes
• Pathophysiology
• Diagnosis
• Treatment (KNEE and then HIP)
  – Non-operative measures
  – Operative measures
Osteoarthritis (OA)

• Osteoarthritis is a non-inflammatory, degenerative condition of joints characterized by degeneration of articular cartilage and formation of new bone osteophytes
  – Common in weight-bearing joints such as hip and knee, but can affect any joint
OA Risk Factors

- Hereditary
- Female gender
- Aging
- Obesity (knee)
- Abnormal mechanical loading
  - meniscectomy, instability
- Inherited type II collagen defects
- Joint injury
  - Trauma
  - Infection:
    - Crystalline arthropathy
    - Multiple hemarthroses (hemophilia)
Classification of OA

- Primary
- Secondary
Primary OA

• More common than secondary OA
• Cause – Unknown
  – Genetic—multifactorial
  – Congenital (alignment issues)
• Common in elderly where there is no previous pathology.
• Its mainly due to wear and tear changes occurring in old ages mainly in weight bearing joints
Secondary OA

- Due to a predisposing cause such as:
- Trauma
- Iatrogenic (previous meniscectomy)
- Infection
- Inflammatory arthritis (RA)
- Crystalline arthropathy
- Congenital hip dysplasia (CDH)
- Deformity
- Obesity
- Other disease: hemophilia, hyperthyroidism, etc.
Pathophysiology

- Cartilage erosion often central/weight bearing areas.
- Fibrillation leads to softening, splitting and fragmentation of the cartilage in both weight bearing & non-weight bearing areas.
- Collagen fibers split with disorganization of the proteoglycan/H2O/collagen relationship, which causes further softening and flaking.
- These flakes of cartilage may break off and impact the joint surfaces causing locking and inflammation.
Pathophysiology

• Interleukin-1 (IL-1) is a potent pro-inflammatory cytokine that, in vitro, is capable of inducing chondrocytes and synovial cells to synthesize Matrix Metallo Proteinases (MMPs).
• These MMPs are the primary enzymes responsible for the degradation of articular cartilage.
• IL-1 suppresses the synthesis of type II collagen and proteoglycans, and inhibits the transforming growth factor-β stimulated chondrocyte proliferation.
Diagnosis

• So Easy even an orthopod can do it!
  – History
  – Physical Exam
  – Imaging
  – Sorry folks... no labs!
History

• Pain
• Stiffness (often first thing patients notice)
• Deformity (knee)
• Instability (knee)
• Muscle weakness or atrophy
• Joint enlargement
• Crepitus
• Effusion (knee)
Pearls of OA Wisdom

• Knee OA hurts in the knee
  – Beware the radiating knee pain
• Hip OA hurts in the groin, thigh, and knee!
  – Patients often DO NOT KNOW WHERE THE HIP IS!
  – PCP’s may know but not ask?
Pearls (Back Pain)

Back of “hip” Or Buttocks
Pearls (Trochanteric Bursitis)
Pearls (True Hip Pain)

• Don’t think “groin pull” Think hip OA!
• Knee pain... Always consider hip as source!
Physical Exam

• Hip:
  – Antalgic gait (limp)
  – Loss of motion
  – Pain with motion (internal rotation!)

• Knee
  – Antalgic gait
  – Loss of motion
  – Contractures
  – Pain with motion
  – Varus/valgus deformity
  – Joint effusion
  – Enlargement (osteophytes)
  – Crepitus/Patellar grind
  – Popliteal (Baker’s) Cyst
  – Pain with hip motion
Imaging

- Radiographs
- MRI
Pearls of Wisdom

Do This...

Not This...!
Radiographs (WEIGHT BEARING!)

- Subchondral cysts
- Osteophytes
- Subchondral Sclerosis
- Joint Space Narrowing
Pearls of Wisdom

Do This...

Not This...

- Osteosclerosis
- Joint space narrowing
- Osteophytes
Evidence-Based Treatment

- Treatment
  - Non-operative
    - Non-Pharmacologic
    - Pharmacologic
    - Procedures/Injections
  - Operative
    - Arthroscopy
    - Osteotomy
    - Arthroplasty
The basis of the evidence

TREATMENT OF OSTEOARTHRITIS OF THE KNEE

EVIDENCE-BASED GUIDELINE
2ND EDITION

Adopted by the American Academy of Orthopaedic Surgeons
Board of Directors
May 18, 2013
Knee Treatment

Treatment

Non-operative
- Non-Pharmacologic
- Pharmacologic
  - Procedures/Injections

Operative
- Arthroscopy
- Osteotomy
- Arthroplasty
Knee: Non-pharmacologic treatment

- Self management (exercise, PT, neuromuscular education)
- Rest/activity modification
- Assistive device (cane, walker)
- Weight loss
- Acupuncture
- TENS
- Manipulation (massage, chiropractic, myofascial release)
- Unloader bracing
- Shoe wedges (orthotics)
- Glucosamine/Chondroitin
- Psychosocial support
Knee: Non-operative: Non-Pharmacologic

• **Recommended:**
  – Low Impact Exercise (AAOS strong evidence)
  – Weight loss (moderate evidence)

• **Cannot recommend:**
  – Glucosamine and Chondroitin (strong evidence)
  – Acupuncture (strong evidence)
  – Shoe wedges (moderate evidence)
  – TENS (strong evidence)

• **Inconclusive:**
  – Physical (manual therapy)
  – Unloader bracing
Other Non-Pharmacologic treatments

• Not Covered by AAOS guidelines (common sense?):
  – Rest (activity modification)
  – Assistive device (cane, walker)
  – Psychosocial support
Knee Treatment

Non-operative

- Non-Pharmacologic
- Pharmacologic

Operative

- Procedures/Injections
- Arthroscopy
- Osteotomy
- Arthroplasty
Knee: Non-operative Pharmacologic

- NSAIDs (oral or topical)
- Acetaminophen
- Tramadol
- Opioids
- Pain patches
- CBD creams
Knee: Non-operative: Pharmacologic

• Recommend:
  – NSAIDS
    • Oral or topical (strong evidence)
    • (Tramadol?)

• Inconclusive
  – (acetaminophen?)
  – pain patches
  – (opioids!)
How about Cannabidiol (CBD)?
Non-operative: Procedural

- Corticosteroid injections
- Hyaluronic acid injections
- Needle Lavage
- Prolotherapy
- PRP
- Stem cells
Non-operative: Procedural

- **Inconclusive:**
  - Corticosteroids
  - PRP, growth factors

- **Cannot Recommend:**
  - Hyaluronic acid (strong evidence)
  - Joint lavage (prolotherapy?) (moderate evidence)
Stem Cells?

• Tremendous interest
  – Patients
  – Practitioners
  – Media

• Tremendous Cost
  – Patients

• Tremendous Profits
  – Practitioners

• Tremendously POOR evidence
Knee Treatment

- Treatment
  - Non-operative
    - Non-Pharmacologic
    - Pharmacologic
    - Procedures/Injections
  - Operative
    - Arthroscopy
    - Osteotomy
    - Arthroplasty
Operative Treatment Knee

- Cannot Recommend
  - Arthroscopy (strong evidence)
  - Interpositional arthroplasty (consensus)
Operative Treatment

• **Consider:**
  – Proximal tibial osteotomy (Limited evidence)
    • Appropriate for the very young
    • Milder OA
  – Very painful
  – Limited expectations
Operative Treatment of knee OA

- Total knee arthroplasty
- Unicompartmental knee arthroplasty
Operative Treatment: Total Knee Replacement

• “Total Knee Arthroplasty”
• Has been around since 1960’s
• One of the most successful operations in all of medicine
• Knee “resurfacing” is more appropriate term
• The damaged cartilage surface is removed and resurfaced with metal caps with a plastic spacer in between
"See? The idiots put my danged knee replacement in backward!"
The Procedure
The Procedure

• Step 1: Remove damaged cartilage from the femur
The Procedure

- Step 2: Remove damaged cartilage from the Tibia
The Procedure

- Step 3: Remove Damaged cartilage from the Patella (knee cap)
The Procedure

• Step 4: Cap the Femur
The Procedure

• Step 5: Cap the Tibia
The Procedure

- Step 6: Cap the Patella
The Procedure

• Now you are done
Total Knee Replacement

Before

After
How Long do they Last?

• Howell SM et al. Implant Survival and Function Ten Years After Kinematically Aligned Total Knee Arthroplasty. J Arthroplasty. 2018
  – 98% survivorship at 10 years

  – 90.6% of knees doing well at 15 years.

  – 92.4 % of knees doing well at 19 years
Osteoporosis and TKA


- 100 consecutive total knees in osteoprotic patients (mean age 77)

- Summary: outcomes rivaled that of comparable series of non-osteoporotic patients
Osteoporosis and TKA


  – 22 TKA/osteoporosis patients compared to controls
  – Measured BMD by DEXA at baseline, 6 months and 12 months after knee replacement.
  – Preserved or improved periprosthetic bone quality compared to controls
Teriparatide: Miracle Drug?

Operative Treatment:
Partial Knee Replacement
Partial Knee Replacement
Medial or Lateral Partial:
Partial Knee Replacement
Knee Cap (Patellofemoral)
Partial Knee Replacement

• Advantages:
  – Less invasive surgery
    • Easier, faster recovery
  – Preserves your native bone and ligaments
    • May feel more like your native knee

• Disadvantages
  – May have residual pain in other compartments
  – May develop pain later in other compartments
Partial or total solution?

- **A “partial” knee is not a “partial” solution!**
    - 93% of knees doing well at 15 years and 90% doing well at 20 years

- **Foran JR, Sheth NM, Della Valle, CJ.** Long Term Patellofemoral Progression. **Textbook Chapter 21 Partial Knee Arthroplasty**: Techniques for Optimal Outcomes,). 2012.
Treatment Hip OA

MANAGEMENT OF OSTEOARTHRITIS OF THE HIP
EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE

Adopted by the American Academy of Orthopaedic Surgeons
Board of Directors
3.13.17

Endorsed by:

POSNA
American Physical Therapy Association
ACR
PANORAMA
Orthopedics & Spine Center
Evidence-Based Treatment

- Treatment
  - Non-operative
    - Non-Pharmacologic
    - Pharmacologic
    - Procedures/Injections
  - Operative
    - Arthroscopy
    - Osteotomy
    - Arthroplasty
Hip: Non-operative:

- **Recommended:**
  - Weight loss (AAOS moderate evidence)
  - Non-narcotic management (strong)
  - Physical Therapy (Strong)
    - For mild/moderate OA
  - Glucosamine (moderate)
    - Only analyzed 1 of 85 studies!
  - Intraarticular cortisone (strong)

- **Not Recommended**
  - Hylaruonic acid injections (strong)
Total Hip Replacement

• Developed in 1960’s
• Also one of the most successful operations in all of medicine
• Advances in implant materials and surgical techniques have led to longevity of hip replacements
Many Ways to Skin a Cat

• Anterior
• Anterolateral
• Direct Lateral
• Posterolateral
• Posterior

• Many approaches
• All have pros/cons
• All have been around for a long time
• No clear advantage in the literature
I can't say I'm entirely pleased with my hip replacement.
Total hip replacement: before and after
Total Hip Replacement

Before

After
How long Will it Last?

Hips

  - 81.5% doing well at 25 years!

    - modern cementless hip design
    - 82.5% doing well at 23 years.

  *(Neither of these long term studies utilize modern materials)*

  - 94% survivorship at 16 years!
Osteoporosis and THA


• 35,870 patients with hip osteoarthritis and osteoporosis
• 3162 and 1667 respectively treated with bisphosphonates and other non-bisphosphonates AOM respectively
• **Outcome:** risk of needing THA same in all patients.
A Role for AOM’s?


- Prospective study
- Cementless THA. 10 patients received denosumab versus control
- Findings: up to 7.3% increase in periprosthetic BMD in treatment group
Summary

• OA: progressive degenerative condition
  – Large genetic component
  – Complex pathophysiology
  – Non-operative treatments: perhaps not evidence based
  – Increasing role for metabolic treatments

• Pearls:
  – Weight-bearing radiographs BEFORE MRI!
  – Hip pain: groin, thigh, knee
  – Avoid opioids for chronic treatment
  – Long term survivorship for modern TKA and THA
Thanks!