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Sports Medicine Update for the Primary Care Physician

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Sports Medicine Update for the Primary Care Physician

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Disclosures

- No financial disclosures
AKA “What the bleep do they do over there in team 4?”
Agenda

• OA vs Degenerative meniscal tear
• Review of OA diagnosis
• Degenerative Meniscal tears
• Management of degenerative meniscal tears and OA
• Rotator Cuff Pathology
Is it possible to have degenerative meniscal tears without osteoarthritis?

Osteoarthritis
- Degeneration of joint cartilage and the underlying bone

Degenerative Meniscal Tear
- Degeneration/tearing of meniscal tissue with no acute injury
Osteoarthritis of the Knee - Why should we care as Family docs?

- Nearly 1 in 2 people may develop symptomatic knee OA by age 85 years.
- Nearly 2 in 3 of obese people will have symptomatic knee OA.
  - In PA, 30-35% of population is obese as reported in 2014.
- By 2030, 67 million Americans (18+) will be diagnosed with “arthritis.”
- Most common cause of disability.
Osteoarthritis of the Knee - Why should we care as Family docs?

- The total costs attributable to arthritis and other rheumatic conditions (AORC) in the United States in 2003 was approximately $128 billion. This equaled 1.2% of the 2003 U.S. gross domestic product.
- $80.8 billion were direct costs (i.e., medical expenditures).
- $47.0 billion were indirect costs (i.e., lost earnings).
Diagnosis of OA

• From clinical history and Physical alone:
  • Sensitivity of 95%, Specificity of 69%
• The present of knee pain + 3 of the following six clinical characteristics
  • Greater than 50 years of age
  • Morning stiffness for less than 30 min
  • Crepitus on active motion of the knee
  • Bony tenderness
  • Bony enlargement
  • No palpable warmth
Diagnosis of OA

- Radiographic evidence of osteophytes increases specificity to 86%

- Ordering X-rays when patient has non-acute knee pain:
  - ALWAYS get standing/weight bearing films
  - 4 views - bilateral AP, bilateral 45 degree flexion (PA), lateral, and sunrise views
  - Radiographic changes in OA are insensitive, particularly with early disease, and correlate poorly with symptoms. When present, however, the specificity of the radiographic changes of OA often renders further diagnostic imaging unnecessary
Diagnosis of OA on X-ray

- Joint space narrowing
- Subchondral sclerosis
- Osteophyte formation
- Subchondral cysts
Diagnosis of OA - Physical Exam

• Medial or lateral joint line tenderness most sensitive/specific test for OA
• Check for intra-articular effusion
• Check for loss of range of motion
  • Normal is 0-135 degrees flexion
Degenerative meniscal tears
The Meniscus

- C-shaped fibrocartilaginous structures with bony attachments at anterior/posterior aspects of the tibial plateau
- Superior meniscal surface is concave -> improving contact with the curvilinear-shaped femoral condyle
- Inferior surface is flat -> improving contact with the flattened tibial plateau
- Outer 1/3 - red zone, has good blood flow and ability to heal
- Inner 2/3 - white zone, limited to no blood supply, limited to no ability to heal
Degenerative Meniscal Tears

- Degenerative tears
  - Occur in pts > 40
  - minimal or no healing capacity - most in white zone
  - horizontal cleavage tears, flap tears, and complex tears are most common
Case 1

- 52 year old female with right medial knee pain x 2 months
- No acute injury
- No history of knee pain
- Pain with stairs
- Mostly sedentary
Physical Exam

• Vitals - Height: 5’3”, Weight 220 lbs, BMI: 39

• MSK exam: Right knee with joint line tenderness medial side, trace effusion. Range of motion 0-130 degrees, equal to unaffected side, ligament testing normal. No warmth, no erythema. Pain with McMurray’s and Thessaly dance test.
Imaging

- X-ray
Further imaging?

- To MRI or not to MRI....
- Will it change management?
A CONTROLLED TRIAL OF ARTHROSCOPIC MENISCOSCOPY FOR DEGENERATIVE TEARS IN THE KNEE

J. BRUCE MORELEY, M.D., KIMBERLY O’MALLEY, PH.D., NANCY J. PE
BRADY, ARTHUR BRODY, PH.D., DAVID H. KUKKENDALL, PH.D., JONI
CAROL M. ASHTON, M.D., M.P.H., AND NELDA P. I

ABSTRACT

Background Many patients report symptomatic relief after undergoing arthroscopy of the knee for osteoarthritis, but it is unclear how the procedure achieves this result. We conducted a randomized, placebo-controlled trial to evaluate the efficacy of arthroscopy for osteoarthritis of the knee.

Methods A total of 180 patients with osteoarthritis of the knee were randomly assigned to receive arthroscopic débridement, arthroscopic lavage, or placebo surgery. Patients in the placebo group received skin incisions and underwent a simulated débridement without insertion of the arthroscope. Patients and assessors of outcome were blinded to the treatment group assignment. Outcomes were assessed at multiple points over a 24-month period with the use of five self-reported scores — three on scales for pain and two on scales for function — and one subjective test of walking and stair climbing. A total of 165 patients completed the trial.

Results At no point did either of the intervention groups report less pain or better function than the placebo group. For example, mean (±SD) scores on the Knee-Specific Pain Scale (range, 0 to 100, with higher scores indicating more severe pain) were similar in the placebo, lavage, and débridement groups: 48.9±21.9, 54.8±19.8, and 51.7±22.4, respectively, at one year (P=0.14 for the comparison between placebo and lavage; P=0.51 for the comparison between placebo and débridement) and 51.6±23.7, 53.7±23.7, and 51.4±23.2, respectively, at two years (P=0.64 and P=0.96, respectively). Furthermore, the 95 percent confidence intervals for the differences between the placebo group and the intervention groups exclude any clinically meaningful difference.

Conclusions In this controlled trial involving patients with osteoarthritis of the knee, the outcomes after arthroscopic lavage or arthroscopic débridement were no better than those after a placebo procedure.
Arthroscopic Partial Meniscectomy vs Sham Surgery for a Degenerative Meniscal Tear - NEJM Dec 2013

- 146 patients ages 35-65 with knee pain, no osteoarthritis and degenerative meniscal tears on both MRI and as diagnosed on arthroscopy
- Randomly assigned to surgery arm or sham surgery arm, both done at time of arthroscopy
- Outcomes measured using Lysholm and Western Ontario Meniscal Evaluation tool scores at 12 months after surgery
- Outcomes after partial meniscectomy no better than sham surgery
Arthroscopic Partial Menisectomy vs Sham Surgery for a Degenerative Meniscal Tear - NEJM Dec 2013

- Arthroscopic partial menisectomy is the most common orthopedic procedure performed in the USA
- Most meniscal tears are degenerative tears
- In the past 15 years # of arthroscopic procedures for osteoarthritis has decreased dramatically, however # partial meniscectomies has increased by 50%
  - Annual medical cost is $4 Billion
Indications for MRI

- Acute injury causing instability or mechanical dysfunction
- Concern for fracture not seen on X-ray, stress fractures
- Mechanical symptoms in chronic pain, such as locking, catching
Degenerative Meniscal Tear

- Treatment is similar to OA.

"Take one of these whenever you get the cap off."
Conservative Management of Degenerative meniscal tears

• Always start with conservative
  • Activity modification
  • Weight loss - Every pound lost is 4-6 lbs off the knee!
  • Exercise/PT
  • Supplements
    • Glucosamine
  • Topical treatments
  • Acetaminophen
  • NSAIDs
  • Bracing
Injections

- Corticosteroids
- Viscosupplements
- PRP
- Stem cells
Don’t be this guy. You can do injections!

“I specialize in referrals to specialists!”
Corticosteroid injections

- Mixture of anesthetic and steroid
  - Both medicines known to be toxic to articular cartilage cells
  - Delivers anti-inflammation directly to joint
- Limit to every 3-4 months
- Risks - Bleeding and infection

- Cochrane review in 2015 showed clinically important benefits remain unclear at 1 and 6 weeks, and show no effect remaining at 6 months

Viscosupplement Injections

- Only FDA approved for the knee
- Several brands available - i.e. Synvisc, orthovisc, euflexxa, and others
- No head to head trials, and evidence is mixed about benefits
- *My opinion - worth a try if alternative is a knee replacement!
## Viscosupplement Product Comparison

<table>
<thead>
<tr>
<th>Product</th>
<th>Hylan G-F 20 (Synvisc&lt;sup&gt;®&lt;/sup&gt;)</th>
<th>Sodium Hyaluronate (Hyalgan&lt;sup&gt;®&lt;/sup&gt;)</th>
<th>Sodium Hyaluronate (Supartz&lt;sup&gt;®&lt;/sup&gt;)</th>
<th>High-molecular-weight Hyaluronan (Orthovisc&lt;sup&gt;®&lt;/sup&gt;)</th>
<th>1% Sodium hyaluronate (Euflexxa™)</th>
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<tbody>
<tr>
<td>Dose per injection</td>
<td>16 mg</td>
<td>20 mg</td>
<td>25 mg</td>
<td>30 mg</td>
<td>20 mg</td>
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<tr>
<td>Number of injections per treatment course</td>
<td>3</td>
<td>3-5</td>
<td>5</td>
<td>3 or 4</td>
<td>3</td>
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<tr>
<td>Duration of pain relief</td>
<td>6 months</td>
<td>3 injections 60 days</td>
<td>6 months</td>
<td>22 weeks</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Molecular weight&lt;sup&gt;®&lt;/sup&gt; (×10&lt;sup&gt;6&lt;/sup&gt; d)</td>
<td>6</td>
<td>0.5-0.7</td>
<td>0.62-1.2</td>
<td>1.0-2.9</td>
<td>2.4-3.6</td>
</tr>
</tbody>
</table>

*Molecular weight of human HA is ~6 million daltons.*

Intra-articular Autologous Conditioned Plasma Injections Provide Safe and Efficacious Treatment for Knee Osteoarthritis

An FDA-Sanctioned, Randomized, Double-blind, Placebo-controlled Clinical Trial

Patrick A. Smith,*† MD

Investigation performed at the Columbia Orthopaedic Group, Columbia, Missouri, USA

Background: Platelet-rich plasma (PRP) injections have become an intriguing treatment option for osteoarthritis (OA), particularly OA of the knee. Despite the plethora of PRP-related citations, there is a paucity of high-level evidence that is comparable, cohort specific, dose controlled, injection protocol controlled, and double-blinded.

Purpose: To determine the safety and efficacy of leukocyte-poor PRP autologous conditioned plasma (ACP) for knee OA treatment through a feasibility trial regulated by the US Food and Drug Administration (FDA).

Study Design: Randomized controlled trial; Level of evidence, 1.

Methods: In accordance with FDA protocol, patient selection was based on strict inclusion/exclusion criteria; 114 patients were screened, and 30 were ultimately included in the study. These patients were randomized to receive either ACP (n = 15) or saline placebo (n = 15) for a series of 3 weekly injections. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores served as the primary efficacy outcome measure. Patients were followed for 1 year.

Results: No adverse events were reported for ACP administration. Furthermore, the results demonstrated no statistically significant difference in baseline WOMAC scores between the 2 groups. However, in the ACP group, WOMAC scores at 1 week were significantly decreased compared with baseline scores, and the scores for this group remained significantly lower throughout the study duration. At the study conclusion (12 months), subjects in the ACP group had improved their overall WOMAC scores by 78% from their baseline score, compared with 7% for the placebo group.

Conclusion: ACP is safe and provides quantifiable benefits for pain relief and functional improvement with regard to knee OA. No adverse events were reported for ACP administration. After 1 year, WOMAC scores for the ACP subjects had improved by 78% from their baseline score, whereas scores for the placebo control group had improved by only 7%. Other joints affected with OA may also benefit from this treatment.

Keywords: FDA; autologous conditioned plasma; leukocyte-poor platelet-rich plasma; placebo; saline control; WOMAC; osteoarthritis; level 1
Stem Cell Injections

- Not covered by insurance
- Some low level evidence showing pain relief
- Usually done in a series of 2 injections months apart
Rotator Cuff Pathology
Muscles of the Rotator Cuff

- Subscapularis
- Supraspinatus
- Infraspinatus

Front View
- Teres minor

Back View
- ©MMG 2008
History and Physical

- History
  - Mechanism is key

- PE
  - Confirm history, but...
  - “lack of clarity with regard to whether common OSTs used in clinical examination are useful in differentially diagnosing pathologies of the shoulder”
    - Physical examination tests of the shoulder: a systematic review with meta-analysis of individual tests BJSM, 2008.
    - Neers Sensi. 79 Spec. 53, Hawkins: Sens. 79, Spec. 59
    - Similar when repeated in 2012
Case #1

• 45 y/o male, loves Crossfit, but felt sharp pain when catching his bag as it fell from the overhead bin

• PE: Limited active ROM, full passive ROM, pain near greater tuberosity, weakness with empty can

• Always ask, “Would you consider surgery?”

• X-ray - should probably be done
Plan

- MRI
  - Confirms suspected tear
  - No other significant pathology

- Partial vs. Complete
  - Partial = trial of PT, maybe injection, NSAIDs
    - Refer for cont pain and loss of function
  - Complete = Surgery

FINISHED A CROSSFIT WORKOUT
DIDN'T DIE
memegenerator.net
Case #2

- 65 y/o female
  - Visit for increased pain over past few months. No specific trauma of recent. Few falls - one she remembers years ago that caused pain for months. Decreased Sleep. Difficulty with ADLs.

- PE: Full active and passive ROM. Weakness on supra testing (4/5)

- PMH: DM - controlled, HL, CAD
Treatment Plan

- Imaging?
  - X-ray - probably a good idea
  - MRI - not initially
  - U/S

- PT, PT, PT

- Injections
  - Limited to cortisone

- Surgery
  - MRI needed
  - Isolated chronic w/ no atrophy = RTC repair
  - Massive cuff tears - multiple involved, DJD = reverse shoulder
Imaging?

- Age-related prevalence of rotator cuff tears in asymptomatic shoulders
  - JSES - 1999
  - 411 volunteers - 23% had asymptomatic tears
    - 50-59 y/o - 13%
    - 60-69 y/o - 20%
    - 70-79 y/o - 31%
    - >80 y/o - 51%
  - Unknown why asymptomatic become symptomatic
Effectiveness of physical therapy in treating atraumatic full-thickness rotator cuff tears: a multicenter prospective cohort study


*Journal of Shoulder and Elbow Surgery* 2013, 22 (10): 1371-9

75% had successful outcome with non operative treatment
With degenerative rotator cuff tears, surgical repair did not improve functional outcome more than conservative treatment at one year. However, disability and pain were better in the surgical group.
Maybe I didn’t want to know...

- MRI with no acute trauma

- Report shows complete tear
  - Retraction?
  - Atrophy?
Cost Savings?

Reducing Unnecessary Shoulder MRI Examinations Within a Capitated Health Care System: A Potential Role for Shoulder Ultrasound.

Show full citation

45% of studies were ordered inappropriately
85% could have been defined by U/S and radiographs
Clinical Pearls for the Rotator Cuff

- Initial imaging for acute traumatic tears
- Chronic tears deserve trial of conservative management
- Cuff tears are more common as we age
- U/S is an equivalent if not better modality for tears