Injection Techniques
The KNEE

Anthony Luke
MD, MPH, CAQ (Sport Med)
UCSF PC Sports Medicine Conference
December 1, 2007

Outline
• Preparation
• Landmarks
• Common Injections

Case 1
LOOK 5'2'', 190 lbs
• Large effusion
FEEL
• Tender over patella and medial > lateral joint line
MOVE
• ROM Left 10° to 105°; Right 0° to 140°
SPECIAL TESTS
• McMurray positive, pain with hyperflexion, Ligament stress tests negative

Who? 52 year old female, event manager, used to do karate
What? L Knee Acute pain, locking and swelling
When? Left greater than right knee pain x 7 yrs, after kicked in kneecap during karate; Re-injured 1 week ago
How? Stepped off curb
Where? Pain diffusely especially posterior
What to do?

• 20 gauge needle
• Aspirated 60 cc clear yellow fluid
• Injected 5 cc 2% Xylocaine, 3cc 0.25% bupivacaine, 2cc Aristospan (Triamcinolone)
• Patient pain free after injection
• Told temporary relief only
• Send fluid?
• Refer to Orthopaedics to consider surgery (TKR?)

Preparation

Needles

• 25 gauge – thinner, easier to insert, more resistance
• 22 gauge – My preferred needle
• 20 gauge – less resistance, easier to aspirate fluid

Syringes

• 3 – 10 mL syringe for injection
• 20 – 60 mL syringe for aspiration

Preparation

Solutions to be injected

• If using bottles that will be used more than once, swab top with alcohol
• Withdraw solution in proper order to avoid contamination of larger bottles

“Prep” materials (or prep trays)

• Betadine and gauze
• Alcohol swabs
• Bandaid
• +/- topical anesthetic (i.e. ethyl chloride spray)

Steroid Agents

Rifat SF, Modler JL, Postgraduate Medicine, 2001

<table>
<thead>
<tr>
<th>Agent</th>
<th>Relative anti-inflammatory potency</th>
<th>Relative mineral/corticoid potency</th>
<th>Solubility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocortisone acetate</td>
<td>1</td>
<td>2-3</td>
<td>High</td>
</tr>
<tr>
<td>Prednisolone lactate</td>
<td>4</td>
<td>1</td>
<td>Medium</td>
</tr>
<tr>
<td>Methylprednisolone acetate</td>
<td>5</td>
<td>0</td>
<td>Medium</td>
</tr>
<tr>
<td>Triamcinolone acetate/hexacetate</td>
<td>5</td>
<td>0</td>
<td>Medium</td>
</tr>
<tr>
<td>Betamethasone sodium phosphate and acetate</td>
<td>20-30</td>
<td>0</td>
<td>Low</td>
</tr>
<tr>
<td>Dexamethasone acetate/sodium phosphate</td>
<td>20-30</td>
<td>0</td>
<td>Low</td>
</tr>
</tbody>
</table>

Knee Injections

My preferred solutions:

• 8 mL 1% lidocaine with 2 mL 40 mg/mL methylprednisolone
  (or 5 mL 1% lidocaine + 3 mL bupicaine + 2 mL steroid)

HA injections

• 3-4 mL 1% lidocaine to localize joint
• Switch syringe to HA injection

Know your anatomy

“Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the “Are you totally lost?” ICON.”
Knee Injections

Landmarks

• Superolateral approach preferred (93% accuracy vs. 71-75% bent-knee)

Knee Injections

• Superlateral quadrant of of the patella (or supermedial)
• Aim toward center of the patella
• Use thumb to stabilize patella and identify lateral (or medial) edge of patella

Post injection

• Check pre and post injection pain levels with provocative tests and palpation (injection can be diagnostic)
• Lidocaine effect should be immediate and the steroid effect will occur in 6 - 24 hours
• Continue other treatments (i.e. stretching, NSAIDS, footwear, +/- nightsplint, etc.)

Post Injection

How long do you rest post-injection?

• Decrease physical activity for 5-10 days after injection

Case 2

LOOK 5’4”, 180 lbs
• Mildly R antalgic gait, mild R effusion
FEEL
• Tender over M&L patella, Tender M&L joint line tenderness, R > L knee
MOVE
• ROM Right 0° to 115°; Left 0° to 130°
SPECIAL TESTS
• McMurray mildly positive, Ligament tests negative

Who? 66 year old female, works part time
What? Chronic knee pain
When? Two years, already seen by Ortho
How? Pain with walking (5 blocks max), prolonged sitting, getting on and off bus
Where? Right > Left diffuse pain
PMH – HTN, hypothyroid, depression
What to do?

Inject? If so, what?
- Viscosupplementation
- Bent knee approach preferred over lateral approach (on right side)
- 4 cc 1% lidocaine, 2 cc Synvisc
- Expectations: Pain should decrease, but not zero; may do previous level of activities
- Patient having Left done now
- Would agree to repeat if at least 4 months of pain improvement

Knee Injections

Bent Knee approach
- Patient supine or sitting with the knee at 90 degrees
Landmarks: tibial plateau and patellar tendon
- Insert needle lateral or medial to the patellar tendon 1 cm above the edge of the tibial plateau
- Angle needle at 30 - 45 degrees towards center of knee (notch)
- May need 3” needle (minimum 1 ½”) ***

VIDEOS

- Landmarking
- Superolateral approach
- Superomedial approach

“Obese” Knee Injections

- Bent knee approach if cannot palpate the patella well
- Use 3” spinal needle for injection
- Inject under fluoro or ultrasound guidance if available
- Recommend weight loss
**ITB injection**
- 2-3 mL of local anesthetic
- 1 mL of steroid
- Aim for point of maximal tenderness
- Angle needle along length of ITB
- Bathe ITB, should have minimal resistance
- Risks of infection, fat atrophy, skin discoloration, sinus tract

---

**Tendons**
Which ones NOT to inject?
- Patellar tendon
- Achilles
- Posterior tibialis
- Not absolute

---

**What's the Diagnosis?**

**Bursal Injections**
- Prepatellar bursitis
- Pes Anserine bursitis
- Use large gauge needle if aspirating
  - (>20 gauge → Bigger is Better)
- If traumatic, perform within 72 hours or wait 6-12 weeks
- Use 3 mL local anesthetic and 1 mL steroid in separate syringes
- Aspirate first, leave needle, switch syringe to inject

---

Thank You!