Knee and Shoulder Injection Workshop

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Outline

- Common sites of injection
- Indications and contraindications
- Considerations
- Consent
- Positioning
- Documentation
- Preparation/Sterile Technique
The Most Common Injection Sites

- Knee Joint
- Subarcromial Bursa
- Glenohumeral Joint
- AC joint
- Greater Trochanteric Bursa (Hip)
- Lateral Epicondyle (elbow)

Diagnostic Indications

- Evaluate fluid for:
  - Infection
  - Inflammatory arthropathies
  - Trauma
  - Immediate pain relief often indicates inflammatory condition.
Therapeutic Indications

Relief of pain/inflammation from:

- Arthritis
- Tendonopathies
- Bursitis
- Trauma
- Gout
- Rheumatoid Arthritis

Relative Contraindications

- Anticoagulated patient
- Injection within the last 3 months
- Minimal or no relief with 2 prior injections
- Diabetes
- Immunocompromised patient
- Inaccessible joints
- Unstable joints
Absolute Contraindications

- Local cellulitis (overlying)
- Septicemia/Bacteremia
- Allergy or Hx of anaphylaxis to injection medications
- Prosthetic joint (unless you put it in)
- Acute or Subacute fracture
- Patella and Achilles tendonopathy

Medications - Theories

- Steroids
  - Suppress Inflammation in acute phase
  - Stop inflammatory damage-repair-damage cycle (chronic)
- Anesthetic
  - Direct analgesia
  - Diagnostic of intra-articular etiology
  - Dilution (greater effect on larger area)
  - Distension (of the joint)
- Hyaluronic acid
  - Lubrication
  - Distension
Steroids

- Methylprednisolone * (greatest potency)
  - Depo-medrone (40mg/ml)

- Triamcinolone
  - Adcortyl (10mg/ml)
  - Kenalog (40mg/ml)

- Hydrocortisone
  - hydrocortistab (25mg/ml)

Steroids

- Betamethasone (Celestone Soluspan)
  - Long acting
  - 6-12mg for large joint (knee, shoulder)
  - 1.5-6mg for small/intermediate joints
Anesthetics

- Lidocaine 1% (Xylocaine) w/o epinephrine
  - Intra-articular injection and local when aspirating
  - Fast onset
  - Diagnostic

Anesthetic

- Bupivicaine (0.25%) (Marcaine)
  - Possible cause of chondrocyte death (reported with continuous infusion in mice)
  - Frequently used
Complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>Estimated prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postinjection flare</td>
<td>2–10%</td>
</tr>
<tr>
<td>Needle Fracture</td>
<td>&lt;0.001%</td>
</tr>
<tr>
<td>Tendon rupture</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Facial flushing</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Skin atrophy, depigmentation</td>
<td>&lt;1–4%</td>
</tr>
<tr>
<td><strong>Iatrogenic infectious arthritis</strong></td>
<td><strong>&lt;0.001 to 0.072%</strong></td>
</tr>
<tr>
<td>Transient paresis of injected extremity</td>
<td>Rare</td>
</tr>
<tr>
<td>Hypersensitivity reaction</td>
<td>Rare</td>
</tr>
</tbody>
</table>

**Steroid Arthropathy**

- A well known complication of local injections
- Largely a myth
- Cases reporting osteonecrosis were associated with high dose PO steroids and/or high dose and high frequency injection (1 per month for 6 – 12 months)
- Evidence supports injections every 3-4 mos for up to 2 years as safe.
Adverse Reactions

- Loss of glucose control in DM (short term)
- Increased appetite
- Insomnia
- Irritability

Considerations

- Evaluate the patient
- Patient education
- Consent
- Patient positioning
- Sterile preparation and technique
- Documentation
Examine the Patient

- Avoid the common reaction to give anyone with joint pain an injection
- Obtain a good history
- Examine the other joints
- Obtain x-rays
- MRI only if appropriate

Patient Education

- Inform patient:
  - Medications in the syringe (allergies?)
  - Expected results (including what it won't do)
  - Approximate time for results
  - Next step if injection is ineffective
Consent

- Verbal or Written
- Physician dependent or facility dependent

Positioning

- Knee
  - Seated (Lateral portal)
  - Supine (superolateral approach)

- Shoulders
  - Seated (watch for vasovagal)
  - Ethyl chloride (cold spray)
  - Distraction/pain reliever
  - Will drip onto clothes
Sterile Technique

1. Expose site
2. Use alcohol, betadine or chlorhexidine prep
3. Use aseptic technique
4. Consider use of sterile gloves
5. Sterile drapes/towels are optional

Following the Injection

- Band-Aid
- Pressure dressing on bleeders
- Rest and Ice for 24 hours
  - Anesthetic wears off, pain often returns
- Warn about potential steroid flare
Documentation - Exam

- In H&P, note all exam findings to support the decision to aspirate or inject
- Site (joint and what side)
  - Specify GH vs subacromial, etc.
- Medications and Doses used
- Expiration dates and lot numbers
  - Recently problematic

Document - Fluid

- Amount of fluid aspirated
- Color, clarity and viscosity of fluid
- Purulent?
- Blood? (trauma)
- Lipid? (trauma/occult fx)
What to Order When Sending Fluid

Labs:
- Cell Counts
- Cultures (Aerobic & Anaerobic)
- Gram stain
- Crystal Analysis
- Fungal
- Lyme

Dosing Recommendations by Location

Knee
- Intra-articular (1 cc steroid: 4-6 cc anesthetic)

Shoulder
- SA (1 cc steroid: 3-6 cc anesthetic)
- AC (1 cc steroid: 1 cc anesthetic)
- GH (1 cc steroid: 3-6 cc anesthetic)
What You Will Need

- Alcohol wipes/Betadine/Chloroprep
- Gloves (sterile/nonsterile)
- 20 – 25 gauge 1.0 – 1.5 inch needle*
- 1 mL to 10 mL syringe**
- Local anesthetic
- Corticosteroid preparation
- Ethyl Chloride (optional)
- Adhesive bandage dressing

*18 gauge for aspiration, can numb tract
**Multiple 60cc syringes may be required if aspirating
Injections

Knee
- Intra-articular

Shoulder
- GH
- Subacromial
- AC joint

Knee Injection Sites

- Superolateral Patella
- Lateral portal
- Medial portal

http://www.knee-explained.com/knee.jpg
Knee Bursa

- Superolateral approach most reliable
- 93% accuracy vs. 71-75% with bent knee anteromedial/antrolateral approach
- Lowest risk of tendinous or ligamentous injury

The Knee

http://www.knee-image/knee-pain-flatb.jpg
Superolateral Approach

- Patient Supine with knee extended
- Palpate bony landmarks
  - Patella
  - Lateral Femur

Palpate lateral border of patella and Lateral femur at the PF joint

Draw the patella laterally with your contralateral hand and palpate the soft spot

Soft spot = Ideal injection site
The Injection

- Reassure patient
- Relaxed quads = more space at PF joint
- Needle Trajectory
  - 15-20 degrees posterior

Needle Trajectory

http://sitemaker.umich.edu/fm_gmeig/Residency/Musculoskeletal/knee_injectionimages/index.html
Anterior Approach (medial or lateral)

- Not as accurate as superolateral approach
- Greater risk of fat pad injection (source of pain)
- Can be easier in the obese knee, or if patient can’t tolerate laying down.
- Patient sitting with knee bent to 90 degrees

Anterior Approach (bent knee)

Injections in primary care
Anterior Approach

Palpate landmarks
- Inferior pole of patella
- Patella tendon
- Tibial Plateau

Injection

- May inject medial or lateral to patella tendon
- Half the distance from plateau to inferior pole of patella
- Trajectory toward intercondylar notch
- Must aspirate to assure not in vessel
- If you feel resistance to injection, pull back gently to avoid injection into ligament

http://injectioncourses.blogspot.com/
Lateral Portal

[Image: http://www.rheumatologynetwork.com/sites/default/files/rm/1871521.png]

Medial Portal

[Image: http://injectcourse.blogspot.com/]

Illustration © Robert Margolies, CMI 2011

http://www.rheumatologynetwork.com/sites/default/files/rm/1871521.png

http://injectcourse.blogspot.com/
Shoulder (GH joint)

- Posterior approach
- Position patient sitting with arm at side
- Palpate bony landmarks
  - Clavicle
  - Coracoid
  - Posterolateral acromion
    - Approx 1-2cm inferior
    - Approx 1cm medial
    - Find soft spot
    - Using contralateral hand with finger on coracoid
    - Trajectory is toward the coracoid with slight caudad tilt
    - If resistance is felt, slight adjustment in needle is necessary

Shoulder (SA Bursa)

- Posterior
  - Repeat same steps as GH injection
  - Trajectory is 10-30 degrees cephalad

- Lateral
  - Trajectory is approximately 5-10 degrees caudad
Landmarks

http://injectioncourses.blogspot.com/
Shoulder

- Needle placement accuracy (Kang, 2008)
  - 60 shoulders with impingement
  - 70% subacromial accuracy rate
  - No differences among injection approaches
  - Clinical improvement did not correlate with accuracy

Postinjection Flare

- Occurs and resolves within 48 hrs
- Occurs in about 10% of people
- Flares occur more frequently in soft tissue injections (Roberts, 2005)
Questions?

Thank you

Resources

- http://injectioncourses.blogspot.com/
- http://www.rheumatologynetwork.com/sites/default/files/m/1873633.png
- http://sitemaker.umich.edu/fm_gmeig_musculoskeletal_joint-inject-aspir/knee_injectionimages

(need website)