Corticosteroid Injection in Athletes

L. Tyler Wadsworth, MD
Advanced Orthopedics and Sports Medicine, LLC
Adjunct Associate Professor, Saint Louis University School of Medicine
Medical Director, Athletic Training Education Program, Saint Louis University
Team Physician, Saint Louis University, Webster University, University City HS
Overview

- Indications
- Anti-Inflammatory & Anesthetic Agents
- Techniques
Indications

• Aspiration
  – Diagnostic Synovial Fluid Analysis
    • Inflammatory arthropathy
    • Trauma
  – Septic Arthritis/ Bursitis - Remove infectious organisms and destructive lysosomal enzymes
  – Pain relief
Synovial Fluid Analysis

- Appearance
- Leukocyte Count
- Crystal Analysis
  - Monosodium urate, calcium pyrophosphate, calcium hydroxyapatite
- Gram's Stain & Culture
- Protein, Glucose, other laboratory data generally less productive
Indications

• Injection
  – Diagnostic
    • Neer impingement
    • AC joint
    • Myofacial trigger points
    • Spine
    • Others
Indications

- **Therapeutic**
  - Control inflammation
  - Control swelling which may threaten neurovascular structures (CTS, Baker's Cyst)
  - Reduce pain (Gout, bursitis, OA)
  - Provide anesthesia for manipulation to treat contractures
Risks

- Collagen atrophy/tendon or capsular rupture
- Infection (0.005%)
- Post-injection flare
  - 1-2%
  - Periarticular injection?
- Steroid arthropathy?
- Skin & soft tissue atrophy
  - Especially fluorinated steroids
- Systemic absorption
  - Watch diabetics for ~ 2-3 wk
  - Facial flushing
- Fat Necrosis
- Collateral damage
  - Nerves, vascular bundles, etc.
Relative Contraindications

- Periarticular Infection
- Bacteremia/ Sepsis
- Intra-articular Fracture
- Clotting Disorder - Including anticoagulation
- Total Joint Arthroplasty
# Corticosteroid Agents

<table>
<thead>
<tr>
<th>Corticosteroid</th>
<th>Strength (mg/ml)</th>
<th>Relative Potency (Vs. HC)</th>
<th>Onset</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocortisone acetate (Hydrocortone)</td>
<td>50</td>
<td>1</td>
<td>Slow</td>
<td>Long</td>
</tr>
<tr>
<td>Triamconolone hexacetonide (Aristospan)</td>
<td>20</td>
<td>5</td>
<td>Slow</td>
<td>Long</td>
</tr>
<tr>
<td>Dexamethasone sodium phosphate (Decadron)</td>
<td>4</td>
<td>25</td>
<td>Rapid</td>
<td>Short</td>
</tr>
<tr>
<td>Dexamethasone acetate (Decadron-LA)</td>
<td>8</td>
<td>25</td>
<td>Rapid</td>
<td>Long</td>
</tr>
<tr>
<td>Methylprednisolone acetate (Depo-Medrol)</td>
<td>20,40,80</td>
<td>5</td>
<td>Rapid</td>
<td>Interm</td>
</tr>
<tr>
<td>Betamethasone acetate and Betamethasone sodium phosphate (Celestone Soluspan)</td>
<td>6</td>
<td>25</td>
<td>Rapid</td>
<td>Long</td>
</tr>
</tbody>
</table>
Context

• Importance of rest?
• Treat underlying cause
• Thou shalt not live by corticosteroid injection alone, but by every muscle that proceedeth along the kinetic chain
How Good Are We?

- **Landmark-Based**
  - Knee accuracy varies between entry sites 71% (anterolateral), 75% (anteromedial), and 93% (lateral midpatellar) (Jackson, et al, JBJS 2002, 240 knees)
  - Shoulder, elbow, wrist, MCP joints, knee and ankle were 82, 100, 97, 97, 100 and 77% (Porat, et al, AJR, 2008, 96 patients)
How Good Are We?

- **Landmark-Based**
  - **Subacromial bursa**
    - 70% regardless of approach (Kang, et al, JBJS, 2008, 60 shoulders, 4 techniques, x-ray)
      - "Clinical improvement did not correlate with accuracy; however, accuracy did reliably produce a positive impingement test."
    - 70% bursa, 20% into deltoid, no difference in pain relief between groups (Yamakado, Arthroscopy, 2002, 53 patients, x-ray)
  - 76% posterior approach, 69% anterior approach (Henkus, et al, Arthroscopy 2006, 33 patients, MRI)
    - Missed injections into cuff, these were more painful
Subacromial Space

- Moderate conflicting support in literature for corticosteroid injection
  - Several meta-analyses: CS similar or perhaps better than NSAID, superior to placebo, anesthetic control
  - Alvarez CM, AJSM 2005, 58 subjects, RCT, no difference between LA + CS and LA alone
Subacromial Space

• Cochrane (2003)
  – “Little overall evidence to guide treatment.”
  – “Subacromial corticosteroid injection for rotator cuff disease and intra-articular injection for adhesive capsulitis may be beneficial although their effect may be small and not well-maintained.”
Subacromial Space

- Useful in impingement, tendinopathy of cuff, not useful for instabilities
Acromioclavicular Joint

- Some use for Grade II - III sprains
- Not in wide use
- Can provide relief of AC arthrosis
Myofascial Trigger Points

• 25-27 gauge 1½-inch needle
• 1-5 cc of anesthetic with or without corticosteroid
• Couple with appropriate rehab, other therapies
Lateral Humeral Epicondyle

• “Pepperling” (Altay et al, CORR 2002, 120 elbows, RCT)

• No difference between CS, “pepperling” with lidocaine
DeQuervain's Tenosynovitis

- Racquet sports
- Good support in literature
Carpal Tunnel

- 25-gauge 1 to 1½-inch needle
- 0.5-1 cc steroid and 0.5-1 cc anesthetic
Lumbar Epidural

- Can be useful for radicular pain associated with lumbar HNP
- Evidence is better for selective transforaminal than caudal ESI
- Questionable effectiveness for LBP
Knee Joint

  - More effective than placebo for pain reduction.
  - Pain reduction from 2-3 weeks.
  - Lack of evidence for effect on pain and function 4-24 weeks.
  - When compared to HA products, no statistically significant differences detected from 1-4 weeks post injection.
  - Short-term benefit of intraarticular corticosteroids for knee OA is well established. Long-term benefits have not been established.
Knee Joint

- **Patellofemoral pain**
  - Occasional
  - Does not substitute for rehab
  - Treat entire kinetic chain
ITB Syndrome

• Can help pain
• Inadequately studied
• Emphasize hip abductor strengthening, ITB stretching, orthoses
Ankle Anterior Synovium

- Anterior impingement
- Prolonged pain post sprain, tenderness in anterolateral ankle joint, usually mild swelling
- Pain with eversion/dorsiflexion
Tarsal Tunnel

- Less evidence than CTS
- Most improve without injection
- Evidence mixed but some support
Plantar Fascia

- Well-documented risk for rupture
- Many cases improve after rupture, up to 20% may worsen
- Kiter, et al, J Am Pod Assoc, 2006, RCT, no difference in peppering vs CS
Morton's Neuroma

- Little support in literature
- Fair anecdotal response
- Chemical neurolysis can benefit
Summary

• Injections can provide relief of some conditions, although data is mixed
• Generally safe
• Should not be done in isolation
Thank You!

L. Tyler Wadsworth, MD
Advanced Orthopedics and Sports Medicine, LLC
Adjunct Associate Professor, Saint Louis University School of Medicine
Medical Director, Athletic Training Education Program, Saint Louis University
Team Physician, Saint Louis University, Webster University, University City HS