Ultrasound Guided Foot and Ankle Injections

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Disclosure
No relevant financial relationships exist

Pre-Procedural Considerations
- Pre-procedural planning
- Choose equipment
- Plot approach (MRI correlation)
- Time allotment
- Contraindications
- Set up (needle selection and ergonomics)

Transducer Selection
- 5-12 MHz linear probe
  - Good for most MSK
- 7-15 MHz “hockey stick” probe
  - Small footprint
  - Easy gel standoff
- 4-9 MHz curved array probe
  - Deeper structures
  - Wider field of view

Sterile Procedure
- Betadine?
- Tegaderm?
- Sterile probe cover
- Sterile field

Sterile Procedure
- Full sterile field – safest
- Allows more flexibility
- Probe and needle adjustments
Sterile Technique

- Sterile Procedure
  - Betadine
  - Faster
  - Image similar to gel
  - Less room for error adjustment
  - Not completely sterile
  - May damage probe

Tegaderm

Injection Technique

- Appropriate anesthesia (skin, subQ, superficial structures)
  - Plot approach with smaller gauge needle
- Find needle
  - Use tissue harmonics if necessary
- Advance to target
  - Follow needle tip
- Do not move needle and probe at the same time
- Small movements, anchor probe
- Aspirate / inject

Technique

<table>
<thead>
<tr>
<th>In-Plane</th>
<th>Out of Plane</th>
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<tbody>
<tr>
<td>Preferred approach to visualize needle shaft and tip</td>
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<tr>
<td>Needle is parallel or co-linear to the probe and perpendicular to the sound beam</td>
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<tr>
<td>Needle perpendicular to the probe</td>
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<td>Sound beam reflects a cross-section of the needle shaft which appears as a dot</td>
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<tr>
<td>“Step down technique” often required</td>
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In-Plane Approach
In-Plane Approach

Needle In-Plane Advancing to Target

Out of Plane Approach

Out of Plane Approach
• Needle Tip/Shaft perpendicular to probe face
• Needle appears in cross section within joint space / recess
• Medication fills joint space / recess

Out of Plane Step-Down Technique - for Deeper Structures

Target Recesses
Anterior Tibio-talar joint
**Ergonomics**
- Seated vs. standing
- Monitor positioning
- Patient positioning
- Minimize patient anxiety
- Foot pedal/Probe Controls
- Needle driving (2D vs 3D)

**Miscellaneous Concepts**
- Target Recesses
- Heel-toe
- Wag tail / Toggle
- Needle movement
  - Tissue harmonics
- Power Doppler / color flow
- B-Steer
- Virtual convex
- Gel standoff
- Hydrosissection

**Gel Standoff**
- Allows for change in needle approach
- Obtain better visibility with needle parallel to probe

**Gel Standoff with Foot**

**Ankle Injection**
- Patient supine
- Knee flexed to allow foot flat on bed
- Linear array probe
- Find tibiotalar joint and anterior recess in long view
- 22 or 25 guage needle
- In-plane approach from the lateral side or out-of-plane approach.
- Anterior in-plane approach is difficult
- (Beam Steer and Gel Stand-off)
- Avoid artery
- 20-40 mg of Kenalog
Ankle Injection

Subtalar Injection
- Localize joint
- Posterior lateral
  - In-plane
- Lateral approach
  - Out-of-plane
- Medial approach
  - Proximity to nerve
- 25 gauge needle
- 20mg kenalog

Lateral Subtalar Approach

Posterior Tibialis Tendon Sheath Injection
- Lateral Decubitus
- Ankle Facing up
- Trans to Tendon
- Needle in plane
- 25G Needle
- 20mg Kenalog

Peroneal Tendon/Sheath Injection
- Similar to set up for PT
- Lateral Ankle Exposed
- Injecting Posterior to Anterior

Tibial Nerve Injection/Tarsal Tunnel
**Tarsal Tunnel Ganglion Cyst**

**Tarsal-Tarsal/TMT Midfoot Injection**
- Transverse to Joint
- Out of Plane Approach
- Avoid Dorsalis Pedis Artery

**Hallux Rigidus**

**1st MTP Joint Aspiration and Injection**
- Out-of-Plane needle Approach
- Probe Longitudinal to Joint and Tendon
- Use M/D Cursor Assist
- 25 guage needle to Inject
- 18 guage to aspirate
- Consider lavage for dry tap

**1st MTP Joint Injection**

**Morton’s Neuroma Injection**
- In-plane Dorsal Approach
- Alternative - Out of Plane Webspace approach
Plantar Fasciitis

- Multiple approaches
  - Superficial Long or Trans
  - Deep Long or Trans

- Little evidence for CSI after 6 weeks
- Needle Fasciotomy and PRP incompletely studied

Superficial Plantar Fascia Injection

Deep Plantar Fascia Injection

Plantar Fascia Needle Tenotomy

Platelet Rich Plasma Injections

Achilles Tendon PRP
Procedure: Joint Aspiration / Injection Procedure
Indication: Symptomatic relief, glenohumeral osteoarthritis.
Informed Consent: Prior to starting the procedure, the patient’s identity was verified, pertinent available records were reviewed, the nature of the procedure was explained along with risks, benefits and alternatives. Consent was signed. The appropriate sites of the procedure were confirmed directly with the patient, verified, and marked. A pre-procedure pause was performed for final verification of all the above.
Location: Right shoulder.
Preparation and Technique: Skin prep ChoraPrep, sterile preparation of site (in usual fashion). Local anesthesia with lidocaine (1 ml, 1% strength, without epinephrine). An initial pre-injection ultrasound evaluation was performed to survey the relevant anatomy. Approach: lateral, posterior, under continuous ultrasound guidance using a 4S curved array probe at a frequency of 5 mHz, in plane approach, per the protocol originally published by Zwar, et. al, in the American Journal of Roentgenology, July 2004 Vol. 183.). Sterile needle used (size #22 gauge, length 2.5 inch).
Joint injected with Kenalog 40mg 4ml 1% Lidocaine without epinephrine. Procedure tolerated well. No Complications.
Patient Instructions: Ice shoulder tonight, gradually resume use as pain permits.

Billing - CHANGES 1/1/15
• Standard Joint, Bursa, Tendon Injections do not accompany CPT 76942 US Guidance for Needle Placement when billing Medicare as of January 2015
• Ganglion or Nerve procedure injection codes may still require documented indication
• Requires description of procedure
• Requires permanently stored image of target localization and needle
• May be used in combo with Diagnostic Codes if justified and appropriately documented

References

Thank You