Henkus H-E, Cobben LPJ, Coerkamp Eg et al. The Accuracy of Subacromial Injections: A Prospective Randomized Magnetic Resonance Imaging Study. Arthroscopy 2006;22:277-82.

Design: Randomized clinical trial

Population/sample size/setting:

- 33 patients (mean age 46, 11 men, 22 women) with subacromial pain treated in university orthopedic department in The Netherlands
- Diagnosed with subacromial impingement if they had nontraumatic shoulder pain localized to deltoid region with inability to lie on affected side; all had full passive range of motion and positive Neer or Hawkins sign
- Excluded if they had signs of glenohumeral instability or impaired movement on exam, arthritis of glenohumeral or acromioclavicular joint on radiographs, calcific tendinitis, history of trauma, biceps tendinitis, rotator cuff rupture, or cervical radiculopathy

Main outcome measures:

- All received injection of bupivacaine and methylprednisolone with gadolinium in subacromial bursa
- Randomized to receive injection with anteromedial approach (n=16) or posteromedial (n=17)
- Subacromial bursa identified when sudden decrease of resistance was felt; degree of confidence that injection site was in the bursa was recorded as "hit, miss, or doubtful" depending on resistance felt to injection
- MRI arthrogram done immediately after injection
- Degree of confidence was high for both approaches (82% for posteromedial, 94% for anteromedial)
- MRI showed that there were only 9/33 true hits of the bursa alone (4/17 posteromedial, 5/16 anteromedial); 13/33 hit both bursa and rotator cuff, 3/33 hit rotator cuff alone, and 8/33 hit other structures (A-C joint, glenohumeral joint, deltoid & subcutaneous tissue)
- When only the bursa was infiltrated, there was significant pain relief on VAS and significant improvement of Simple Shoulder Test (SST), with no change in Constant Score (CS)
- When both bursa and cuff were infiltrated, there was a significant increase in VAS pain, but no change in SST or CS
- When only the cuff was infiltrated, there was no significant change in VAS, SST, or CS
- When other structures were infiltrated, there was significant deterioration in CS but no change in SST or VAS

Authors' conclusions:

- The accuracy of subacromial bursa injections is limited
- High frequency of infiltrating rotator cuff is worrisome

- Practical use of diagnostic injections is limited; the value of the Neer impingement test for doing subacromial decompression is also probably limited

Comments:

- It appears that the rotator cuff was injected in 16 of the 33 injections, approximately a 50% frequency
- Randomization was to anteromedial versus posteromedial approaches, showing that accuracy was limited in both approaches
    - No imaging guidance was used for any injections; no statement can be made regarding any advantage of imaging guidance over landmark guidance of subacromial injections, either for accuracy or for clinical outcome
- Dogu 2012 also used gadolinium contrast to ascertain placement of the injectate into the subacromial space, and also reported that other shoulder structures (deltoid or rotator cuff) were sometimes hit, but reported that the clinical outcomes were not significantly different between the group with ultrasound-guided and landmark-guided injections; the ultrasound-guided group had a lateral approach and the blinded group had a posterior approach
    - The blinded injections hit the rotator cuff in 4 of 23 (17%) of cases, much less than the 50% rate in this study, where 9 of 17 cases with the posterior approach had some contrast material in the rotator cuff

Assessment: Adequate for evidence that when no imaging guidance is used, there are no differences between anteromedial versus posteromedial approaches to subacromial injection with respect to accuracy or effectiveness, and that the rotator cuff is frequently inadvertently injected in either approach. No evidence regarding any comparisons of landmark and imaging guidance for subacromial injections.

Reference:

Dogu B, Yucel SB et al. Blind or Ultrasound-Guided Corticosteroid Injections and Short-Term Response in Subacromial Impingement Syndrome: A Randomized, Double-Blind, Prospective Study. Am J Phys Med Rehabil 2012;91:658-665.