INSTRUCTIONS FOR LETTERS TO THE EDITOR

Editorial comment in the form of a Letter to the Editor is invited. The length of a letter should not exceed 800 words, with a maximum of 10 references and no more than 2 figures or tables; and no subdivision for an abstract, methods, or results. Letters should have no more than 4 authors. Financial associations or other possible conflicts of interest should be disclosed.

Letters should be submitted via our online submission system, available at the Manuscript Central website: http://mc.manuscriptcentral.com/jrheum For additional information, contact the Managing Editor, The Journal of Rheumatology, E-mail: jrheum@jrheum.com

Techniques for "Blind" Glucocorticosteroid Injections into Glenohumeral Joints

To the Editor:

Corticosteroid injections into glenohumeral joints have long been a valuable adjunct therapy in managing selected patients with localized persistent pain usually accompanied by decreased range of motion (ROM). Such local injections are performed by rheumatologists[1], orthopedic surgeons[2], and other physicians[3]. The accuracy of intraarticular injections into shoulder[1-3] or other[1,4] joints has been emphasized for achieving optimal patient comfort and therapeutic benefit[1-7].

In a recent article in *The Journal*[6], a study reporting a low 42% accuracy of glenohumeral injections confirmed by radiographic contrast dye[8] was cited. That cadaveric study[6] evaluated positional and bony landmark techniques to improve subacromial and glenohumeral injection accuracy and to limit dye dispersal, without radiologic or fluoroscopic imaging assistance, i.e., using "blind" clinical techniques. Another recent cadaveric study[7] indicated greater ($p = 0.04$) accuracy of an anterior [16 of 20 (80%)] than posterior [10 of 20 (50%)] shoulder approach. In that study[7], accuracy was determined fluoroscopically, after injecting contrast dye. A recent letter[9] described conflicting reports of anterior glenohumeral injection accuracy given at the 2006 Annual Meeting of the New England Shoulder and Elbow Society (Jay Peak, VT, USA; January 28-29, 2006), from low (Dr. Patel) to excellent results (Dr. K. Shea).

Considering current concerns and controversy about "blind" shoulder injection techniques, selected aspects of our procedures are summarized (Table 1) that reflect over 100 person-years' experience[1,5]. The estimated therapeutic injection success rates are based upon patients' reported post-injection decrease in symptoms, improved shoulder ROM measurements, and followup evaluations. However, anatomical accuracy of injection placement was not confirmed using contrast radiography[6,7,9]. Such imaging procedures were not considered necessary in achieving our desired satisfactory clinical results. Reliable performance of this common steroid injection is expected in clinical practice, provided that sufficient instruction in anatomical landmarks and procedural experience have been acquired[1,5,6]. When injecting via the anterior approach, our needle entry site is immediately lateral to the deeply palpated anterolateral edge of the coracoid process[2,7] (Table 1), not at 1 cm lateral to the coracoid, as described[3]. The site is on a palpable "groove" between the coracoid process and the humeral head. It is also important to gently penetrate the soft tissues with a thin 1.5-in needle, avoiding bony contact or increased resistance, until the hub of the needle presses against the skin and a sensation of "popping" through the anterior capsule is noted[2,7] (Table 1). Such technique achieves sufficient depth of injection in almost all adult patients.

Debate on adverse consequences of inaccurate glenohumeral steroid injections may be mitigated by the very nature of the instilled steroid agents. Inaccurate instillation of steroids into paraarticular nontendinous soft tissues may not be harmful, and may still confer benefit to the patient[2,9]. Instillation may not need to be entirely and accurately placed within the shoulder joint cavity to achieve clinical benefits. In the future, however, hyaluronan products likely will be injected into shoulder joints for osteoarthritis-related persistent pain and loss of motion[10,11]. Such injections will likely require refined techniques with strict criteria for accuracy of needle placement and instillations[9]. Paraarticular infiltration with hyaluronan may cause discomfort and "after-pain" or possibly an "inflammatory (pain)" reaction[9,12] that is less likely to confer benefit. Ultrasound, radiographic, or fluoroscopic guidance may deserve consideration with hyaluronan shoulder injections, but did not appear needed in a large-scale controlled study[10,11].

The recent *Journal* article[6] further signals that accuracy of shoulder joint injections should be a key consideration for clinicians and investigators alike. Anatomical and positional factors should be optimized to achieve accuracy of glenohumeral injections and maximal patient comfort, with either anterior or posterior approaches[1-8] (Table 1). Additional objective data are needed in order to achieve clinical accuracy and efficacy of steroid therapy[1-8] and expected future hyaluronan[9-11] shoulder injections. Our comments do not address issues of clinical indications, cost-effectiveness, or side effects of shoulder joint injection therapy, which also require further investigation.

ALFONSE T. MASI, MD, DrPh, University of Illinois College of Medicine at Peoria; RICHARD P. DRIESSNACK, MD, Orthopedic Institute of Illinois; MUHAMMAD B. YUNUS, MD, University of Illinois College of Medicine at Peoria, Peoria, Illinois; DAVID H. NEUSTADT, MD, University of Louisville School of Medicine, Louisville, Kentucky, USA. Address reprint requests to Dr. A. Masi, One Illini Dr., Peoria, IL 61656, USA. E-mail: amasi@uic.edu

REFERENCES

1. Steinbrocker O, Neustadt DH. Aspiration and injection therapy in arthritis and musculoskeletal disorders: a handbook on technique and management. Hagerstown, MD: Harper & Row; 1972.
2. Sethi PM, Kingston S, El Attrache N. Accuracy of anterior intra-articular injection of the glenohumeral joint. Arthroscopy 2005;21:77-80
3. Tallia AF, Cardone DA. Diagnostic and therapeutic injection of the shoulder region. Am Fam Phys 2003;67:1271-8.
4. Jones A, Regan M, Ledingham J, Patrick M, Manhire A, Doherty M. Importance of placement of intra-articular steroid injection. BMJ 1993;307:1329-30.
5. Masi AT, Driessnack RP, Yunus MB. Accuracy of intra-articular injection of the glenohumeral joint: a cadaveric study [letter]. Orthopedics 2006;29:480.
6. Hanchard N, Shanahan D, Howe T, Thompson J, Goodchild L. Accuracy and dispersal of subacromial and glenohumeral injections in cadavers. J Rheumatol 2006;33:1143-6.
7. Sethi PM, El Attrache N. Accuracy of intra-articular injection of the glenohumeral joint: a cadaveric study. Orthopedics 2006;29:149-52.
8. Eustace JA, Brophy DP, Gibney RP, Bresnihan B, Fitzgerald O. Comparison of the accuracy of steroid placement with clinical outcome in patients with shoulder symptoms. Ann Rheum Dis 1997;56:59-63.

Table 1. Summary of corticosteroid injection techniques into glenohumeral joints.

Aspects of Injection Techniques	RPD (Orthopedist)	ATM (Rheumatologist)	DHN (Rheumatologist)	MBY (Rheumatologist)
Approaches to injection	Posterior	Anterior	Anterior or posterior	Anterior
Allay patient tension and anxiety	Important	Most important	Very important	Most important
Positioning to "open" joint space	Sitting, affected limb hanging relaxed	Semi-inclined, arms relaxed in the lap	For posterior: adduct hand to opposite shoulder	Semi-inclined, arms relaxed at the sides
Bony landmarks for injection[1,7]	As described	As described, important to palpate for "groove"	Humeral head and coracoid process	As described
Local skin anesthesia (wheal)	No, not needed	1% lidocaine, 31 gauge, ½" needle	Yes, 1% lidocaine 25-26 gauge, 5/8" or 7/8" needle	1 or 2% lidocaine, 27 gauge, 1 ½" needle
Intra-articular needle size	22-gauge, 3 ½"	27-gauge, 1 ½" (caution, not to angulate or bend)	22 or 20 gauge, 1½-2" needle	23-gauge, 1 ½"
Anesthetic in guiding syringe	As needed, infrequently	Routinely, then changed to "mix" syringe, to inject	No, injected through cutaneous wheal	Use about ½ cc, before injection of the mix
Necessity of a "second" pass	Minimal adjustments	Less than ¼ of times	Rarely need to change angle	About 15%
Anesthetic mix in the injection	4 ml of 0.25% Marcaine in mix	5 ml of 1% Xylocaine mixed with the steroid	Rarely, as a "therapeutic test", if a patient has great pain	0.5 ml of 2% Xylocaine mixed with the steroid
Depo-Medrol® equivalents	40-80 mg equivalent	30-40 mg equivalent	40 mg (1ml) to 80 mg (2 ml)	30-40 mg equivalent
Degree of injection discomfort	Minimal	Typically minimal (patients often so remark)	Caution as to rare post-injection reaction	About 10% indicate moderate discomfort
Pain decreased after injection	Rapid, within minutes	Usually within minutes	Frequently prompt relief	Usually in 5-10 min.
Increase in measurable ROM	Documented in follow ups	Uniformly documented	Increase of ROM is variable, follow ROM active exercise	Almost always
Recorded injection complications	None	None documented	Caution about rare "after pain"	None
Associated subacromial injections	Rarely	Most often indicated	Adjacent injections when indicated	Required in majority
Estimated "success" of injection	Essentially 100%	Essentially 100%	75-80% good response	Estimated at 95%

9. Sethi PM [letter]. Orthopedics 2006;29:480.
10. Altman RD, Moskowitz R, Jacobs S, Daley M, Udell J, Levin R. A double-blind, randomized trial of intra-articular injection of sodium hyaluronate (Hyalgan®) for the treatment of chronic shoulder pain [abstract]. Arthritis Rheum 2005;52 Suppl:S461.
11. Blaine TA, Skyhar MJ, Collins PC, et al. Double-blind randomized trial of IA sodium hyaluronate (Hyalgan) for chronic shoulder pain. American Academy of Orthopaedic Surgeons 73rd Annual Meeting. March 24, 2006, Chicago, IL. Paper 426.
12. Vitanzo PC, Sennett BJ. Hyaluronans: is clinical effectiveness dependent on molecular weight? Am J Orthop 2006;35:421-28.

Mr. Hanchard replies

To the Editor:

The letter from Masi, *et al* provides interesting insights on developments and practice in this area. Their summary of their "100 person-years' experience" is thought-provoking. However, more information on their methods, presumably retrospective, of data collection and analysis is required to assess the validity of their findings. The reported absence of adverse events ("reported injection complications") and their informally-estimated blind injection "success" rates should therefore be viewed with caution. With regard to these high "success" rates, 3 aspects are of particular note. First, the doses of steroid injected varied from 30 to 80 mg Depo-Medrol® equivalent. (It is unclear whether steroid concurrently targeted at the subacromial bursa was additional to this.) At the higher dosages in particular, the possibility of systemic steroid effects means that interpretation of injection "success" as an indicator of injection accuracy is tenuous. Second, disagreement among the authors as to the incidence of concurrent subacromial bursitis (the perceived need for concurrent bursal injection varied from "rarely" to "required in majority") typifies the diagnostic difficulties that confound evaluations of injection efficacy. Third, since glenohumeral "capsulitis" tends to recover spontaneously, attribution of improvement to any uncontrolled intervention is particularly insecure. As Masi, *et al* imply, further research in this area is required. Like Dr. Sethi, in response[1] to a recent letter by Masi, *et al*[2], I look forward to the "additional objective scientific data [obtained] with appropriate methodology"[1] that will enable progress in this area.

NIGEL C.A. HANCHARD, MSc, James Cook University Hospital, Teesside Centre for Rehabilitation Sciences, Marton Road, Middlesbrough, TS4 3BW, United Kingdom.
E-mail: n.hanchard@tees.ac.uk

REFERENCES

1. Sethi PM [letter]. Orthopedics 2006;29:480.
2. Masi AT, Driessnack RP, Yunus MB. Accuracy of intra-articular injection of the glenohumeral joint: a cadaveric study [letter]. Orthopedics 2006;29:480.