

## Case Report

### Ultrasound-guided suprascapular nerve block for shoulder reduction and adhesive capsulitis in the ED ☆☆☆

#### Abstract

The suprascapular nerve (SSN) emerges from the upper trunk of the brachial plexus (C5-C6) and provides the majority of the sensory innervation to the glenohumeral and acromioclavicular joints. In addition, it provides motor innervation to the supraspinatus and infraspinatus muscles [1]. Blockade of the SSN was first described in 1941 by Wertheim and Rovenstine [2] and, since then, has been used extensively by anesthesiologists for a variety of conditions including adhesive capsulitis and postoperative pain control for shoulder arthroscopy [3]. Recently, Harmon and Hearty [4] described an ultrasound-guided technique that could be easily learned and implemented by emergency physicians. Herein, we describe the successful SSN blockade with ultrasound guidance for treatment of emergency department (ED) patients with anterior shoulder dislocation and adhesive capsulitis.

With the patient on a cardiopulmonary monitor and in the seated position, the ultrasound machine is placed anterior to the patient allowing an unobstructed view of the ultrasound screen by the operator posterior to the patient (Fig. 1). A linear transducer (L38x 10-5-MHz, broadband linear array; SonoSite M-Turbo, Inc, Bothell, WA) is placed just cephalad and parallel scapular spine. The operator should identify the scapular spine as a hyperechoic linear structure that, unlike the pleura, does not move with normal respiration. Moving the probe laterally and cephalad, the SSN is identified as a 2- to 3-mm hyperechoic structure 3 to 4 cm deep to the skin beneath the transverse scapular ligament in the scapular notch (Fig. 2).

The skin should be sterilized with antiseptic solution and a sterile adhesive dressing applied to the probe surface. A 30- to 50-mm short bevel needle is then advanced in-plane with ultrasound guidance in a medial to lateral approach toward the scapular notch. When the needle tip is adjacent to the

nerve and underneath the transverse suprascapular ligament, 10 mL of local anesthetic is injection in 3- to 5-mL increments with intermittent aspiration. A successful injection is confirmed by cephalad displacement of the transverse scapular ligament (Fig. 3).

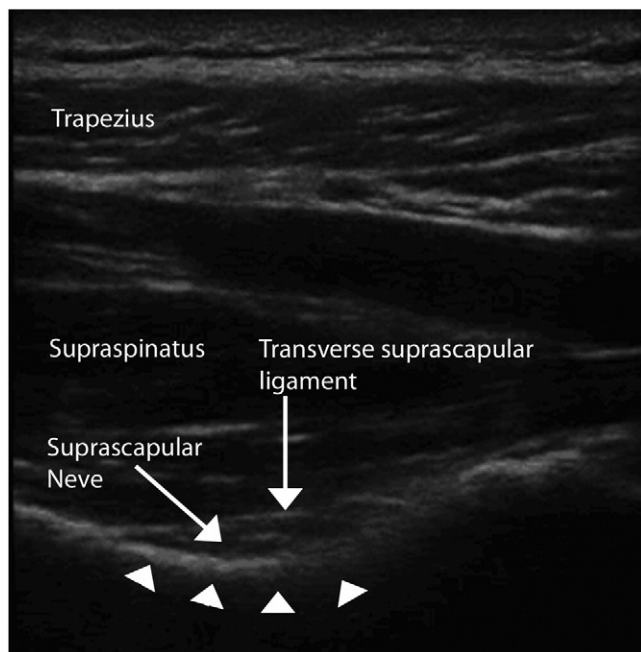
A 63-year-old woman presented to the ED with severe left shoulder pain. The patient denied recent shoulder trauma or any symptoms of localized infection. The patient reported worsening pain and loss of function for 2 weeks despite optimal oral analgesics and anti-inflammatory medication. On examination, the shoulder was diffusely tender to palpation, with severe pain with any movement beyond 5° to 10° from the neutral position. No signs of



**Fig. 1** The patient should be seated with the ultrasound machine in placed anterior to the patient allowing an unobstructed view of the ultrasound screen by the operator standing posterior to the patient.

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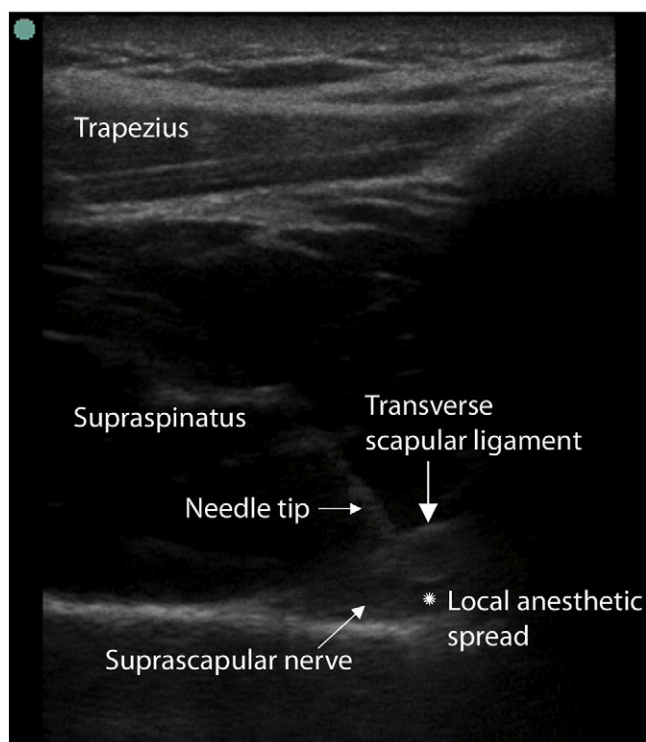
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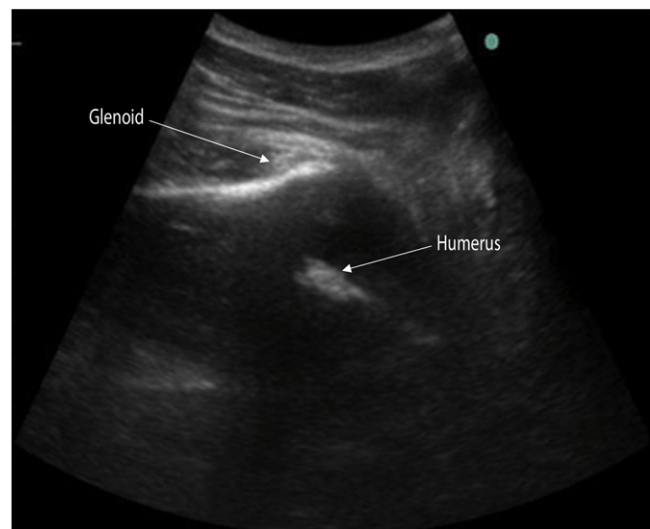
**Fig. 2** Transverse sonogram of the scapular notch (arrowheads), the transverse suprascapular ligament, and the SSN.

intra-articular or local skin infection were present. Plain radiography of the shoulder indicated no bony abnormalities, effusion, or dislocation.

A diagnosis of adhesive capsulitis or “frozen shoulder” was made. After written consent was obtained, the authors



**Fig. 3** Transverse sonogram of the scapular notch and SSN during local anesthetic injection.



**Fig. 4** Transverse posterior sonogram of the glenohumeral joint showing anterior dislocation.

performed an ultrasound-guided SSN block with 0.5% bupivacaine. Fifteen minutes after injection, the patient reported near complete pain relief and was able to fully range her shoulder without discomfort. The pain relief and functional improvement persisted at telephone follow-up at both 10 days and 14 weeks postinjection.

A 19-year-old man presented to the ED in severe discomfort secondary to an obvious left anterior shoulder dislocation. The patient had been previously seen in the ED with a similar episode and was reduced under procedural sedation. Plain radiographs and bedside ultrasound confirmed an anterior glenohumeral dislocation without associated fracture (Fig. 4). After written consent was obtained, block of the SSN under ultrasound guidance was performed with 10 mL of 0.5% bupivacaine. Fifteen minutes postinjection, his shoulder was then reduced using scapular manipulation and traction-countertraction. The patient reported no pain during reduction. Plain radiographs confirmed an adequate reduction.

Ultrasound-guided regional anesthesia is a relatively new concept in emergency medicine. Use of SSN block for painful shoulder complaints such as adhesive capsulitis and anterior dislocation demonstrates the increasing sophistication in ED pain management made possible by ultrasound guidance. Previous studies have examined the efficacy of blind intra-articular injections and ultrasound-guided interscalene and supraclavicular brachial plexus blocks for shoulder reductions and analgesia [5-7]. Each of these techniques has distinct advantages and disadvantages and merits a position in the emergency physician's therapeutic armamentarium. Unlike brachial plexus blocks, ultrasound-guided SSN blocks provide both analgesia and muscle paralysis to the shoulder without a complete motor block of the upper extremity. Intra-articular shoulder injection can provide excellent analgesia but does not directly produce

muscle relaxation, potentially limiting its efficacy in dislocations associated with significant muscular spasm (muscular patients and/or subacute dislocations).

We report the first ED cases of ultrasound-guided SSN nerve block for anterior shoulder reduction and for the treatment of adhesive capsulitis. Further prospective trials are needed to investigate the utility of ultrasound-guided SSN block for both ED shoulder reduction in comparison with other techniques (procedural sedation, ultrasound-guided brachial plexus blockade, intra-articular glenohumeral injection, etc) and ED treatment of adhesive capsulitis to better delineate patients who are best suited for this localized procedure.

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