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Original Contribution

Ultrasound-guided Suprascapular Nerve Block Technique

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Background: In this article, we describe a case report of using real-time, high-resolution ultrasound guidance to facilitate blockade of the suprascapular nerve. We describe a case report and technique for using a portable ultrasound scanner (38 mm broadband (13-6 MHz) linear array transducer (SonoSite Micromaxx SonoSite, Inc. 21919 30th Drive SE Bothwell W. A..)) to guide suprascapular nerve block.

Methods: A 44-year old male patient presented with severe, painful osteoarthritis with adhesive capsulitis of his right shoulder. The ultrasound transducer in a transverse orientation was placed over the scapular spine. Moving the transducer cephalad the suprascapular fossa was identified. While imaging the supraspinatus muscle and the bony fossa underneath, the ultrasound transducer was moved laterally (maintaining a transverse transducer orientation) to locate the suprascapular notch. The suprascapular nerve was seen as a round hyperechoic structure at 4 cm depth beneath the transverse scapular ligament in the scapular notch. The nerve had an approximate diameter of 200 mm. Real-time imaging was used to direct injection in the scapular notch. Ultrasound scanning confirmed local anesthetic spread.

Results: The patient's pain intensity decreased. Shoulder movement and function improved. These improvements were maintained at 12 weeks.

Conclusion: Ultrasound guidance does not expose patients and personnel to radiation. It is also less expensive than other imaging modalities. This technique has applications in both acute and chronic pain management.

Key words: Technique, visualization, real-time, Ultrasound,nerve, analgesia.

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A case report using real-time, high-resolution ultrasound guidance to facilitate the local anesthetic block of the suprascapular nerve is presented.

Case report

A 44-year-old right-handed male patient (height 176 cm, weight 85 Kg) presented with severe, painful osteoarthritis with adhesive capsulitis of his right shoulder. His pain was aggravated by movement and made sleep particularly difficult. Shoulder movement was limited in all planes. Despite physical therapy and oral analgesics, his pain averaged 6–7 out of 10 (numerical rating scale). Orthopedic surgery proposed delaying shoulder replacement with the use of pain management techniques.

Subsequently, the patient consented for an ultrasound-guided right-sided suprascapular nerve block.

The patient was placed in a sitting position with the right hand resting on the contra lateral shoulder. The operator was positioned behind the patient with the ultrasound machine on the right side in front of the patient. This allowed an uninterrupted field of view of the ultrasound screen. The skin was cleaned with chlorhexidine solution. The ultrasound transducer [HFL 13-6 MHz, 38 mm broadband linear array (SonoSite Micromaxx, Inc, Bothell, WA)] was inserted into a sterile sheath (CIVCO Medical Instruments, Kalona, IA, USA) containing ultrasound gel. A thin layer of sterile gel was placed between the draped ultrasound transducer and the skin.

An initial scan was performed in the sagital orientation at the superior medial border of the scapula to identify the pleura (4 cm depth). Scanning proceeded laterally with this transducer orientation. Where the scapula moved beyond the lung field was noted. The ultrasound transducer was now placed parallel to the scapular spine (Fig. 1) such that the scapular spine was visualized. By moving the transducer cephalad the suprascapular fossa was identified. While imaging the supraspinatus muscle and the bony fossa underneath, the ultrasound transducer was slowly moved laterally (maintaining a transverse transducer orientation) to locate the suprascapular notch (Fig. 2). The suprascapular nerve was seen as a round hyperechoic structure at 4 cm depth beneath the transverse scapular ligament in the scapular notch. The nerve had an approximate diameter of 200 mm. Lung tissue in this scanning field was not seen. A 21-gauge, 50-mm b-bevel needle (Stimuplex; B. Braun, Bethlehem, PA) was inserted along the longitudinal axis of the ultrasound beam. This needle was chosen due to its good ultrasound visibility. The needle was visualized in its full course (Fig. 3). The endpoint for injection was an ultrasound image demonstrating the needle tip in proximity to the suprascapular nerve in the suprascapular notch. Electrical stimulation was not used to identify the nerve. Levobupivacaine 0.5% (4 mLs) and triamcinalone (80 mgs) mixture was injected. The injection and spread of local anesthetic was visualized. The patient's pain intensity decreased to a 2 out of 10 (numerical rating scale). Shoulder movement and function improved. Sleep improved. These improvements were maintained at 12 weeks.

Discussion

In this article, we describe a case report of using real-time, high-resolution ultrasound guidance to facilitate blockade of the suprascapular nerve.

Beneficial blockade of the suprascapular nerve is practiced in acute (1) and chronic pain management (2).

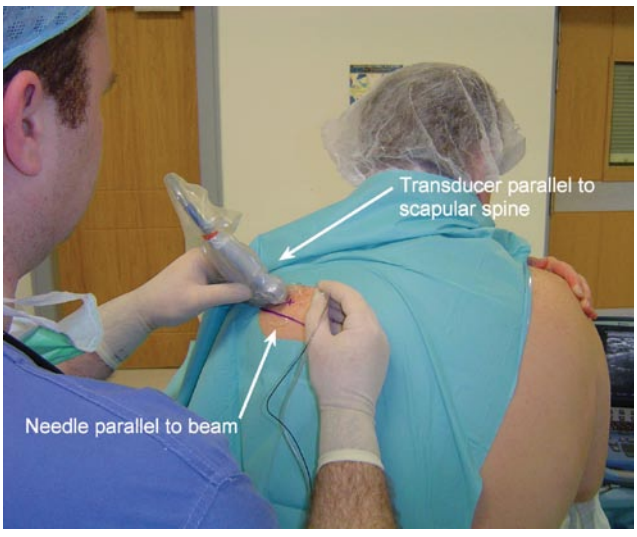

Fig 1. *Ultrasound transducer and needle orientation for the ultrasound guided suprascapular block.*

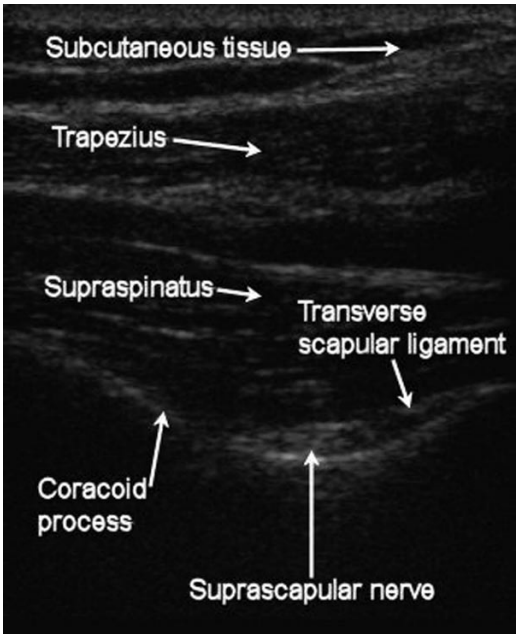

Fig 2. *Transverse view of suprascapular fossa and scapular notch with a SonoSite ultrasound system and a 6-13 MHz linear transducer.*

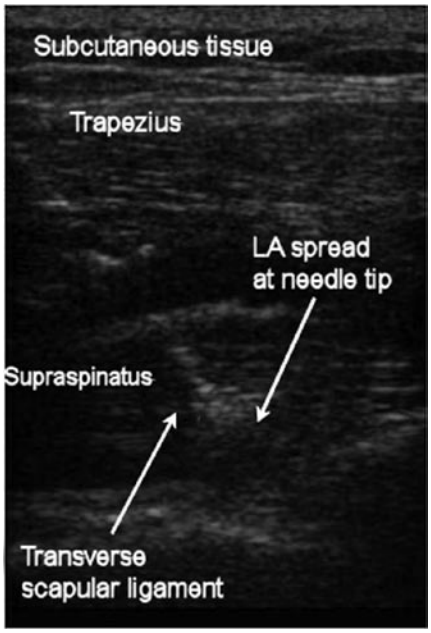

Fig 3. *Real-time imaging of needle insertion for the ultrasound guided suprascapular block. Local anaesthetic and steroid is injected deep to the scapular ligament.*

Karatas and Meray (3) have reported that nerve blocks close to the nerve with electromyography (EMG) guidance is more effective than blind injection in the suprascapular fossa. Thus, techniques that target the nerve more selectively are potentially advantageous. Ultrasound is an imaging modality where peripheral nerves and their relations can be identified and used to target injections and observe local anesthetic spread (4,5). In this case report, we describe for the first time, visualization of the suprascapular nerve with ultrasound and real-time guidance of the injection.

Fluoroscopy, fluoroscopy and nerve stimulation (6) plus CT guidance (7) have been described for suprascapular nerve blocks. Unlike fluoroscopy and CT, ultrasound does not expose patients and personnel to radiation. Ultrasound is also less expensive and more readily available than CT and fluoroscopy (8).

Potential complications of suprascapular nerve block may be avoided through the use of ultrasound guidance. Pneumothorax has been reported following suprascapular block (9). Pneumothorax of all causes is a significant cause of litigation in chronic pain practice, accounting for 4% of all claims (10) . The incidence of pneumothorax associated with suprascapular block is reported as <1% (9). It is postulated that avoiding entering the suprascapular notch in the vertical plane will decrease this risk (11). This is possible using the technique described in this case report.

The pleura lies anterior to the scapula. Using a sagital transducer orientation, the pleura can be identified deep to the superior border of the scapula at its medial aspect. Maintaining the transducer orientation the superior border of the scapula can be traced laterally to the scapular notch. In our patient the hand of the side to be blocked rested on the contra lateral shoulder. This has the effect of pulling the scapula outside the lung field. At the level of the suprascapular notch, pleura was not identified anterior and superior to the scapula.

The authors do not routinely, as in this case, use nerve stimulation in association with ultrasound for peripheral nerve blockade. This is based on the lack of specificity of nerve stimulation (12). For the suprascapular block, we found that a high-resolution ultrasound system is required to visualize the suprascapular notch and nerve. The ideal ultrasound transducer should have high resolution capabilities between 10 and 15 MHz.

In our experience, a transverse plane of imaging is optimum for the ultrasound guided suprascapular block. The needle is advanced parallel to the ultrasound beam. Although the needle may be brought into the ultrasound beam on a short axis view, a 21-gauge needle on short axis view appears as a small dot that can be easily overlooked. In addition, when the needle is imaged on short axis view, the operator may be visualizing a cross-section of the needle shaft, rather than its tip. When the needle is advanced in the longitudinal plane of the ultrasound beam, the operator can see the entire needle and make adjustments as needed.

Conclusion

A case report and technique for using a portable ultrasound machine and a linear array transducer to guide suprascapular nerve block.

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