

In-plane interscalene block: A word of caution

Sir,

Ultrasound guided interscalene block is one of the most commonly performed blocks with both in-plane and out-of-plane approaches to the brachial plexus being described. The in-plane technique can be performed from lateral to medial needling or vice versa, with each approach having its own merits. Through this letter, we wish to highlight the potential avoidable, but disastrous complications of in-plane needling technique.

Lateral to medial direction of needling, while performing an in-plane interscalene block results in a slight caudal needle entry when compared with the classical “Winnie” technique and makes traversing through the Middle scalene muscle, a technical necessity.^[1] Hence, the dorsal scapular nerve (DSN) and the long thoracic nerve (LTN) which course through this muscle may be put at an unnecessary risk of unrecognised needle trauma if one fails to identify them on ultrasound scan. The DSN originates from C5 to possibly C6, pierces the middle scalene muscle to traverse anteriorly under the levator scapulae (elevates the scapula) which it innervates and descends to innervate the rhomboids (pulls the scapula medially). Injury to this nerve causes the DSN syndrome, which presents as a dull ache along the medial border of scapula and pain radiating to the arm and forearm. This is accompanied by the atrophy and weakening of the supplied muscles.^[2] The LTN originates from C5, C6 and possibly C7, pierces the middle scalene muscle lying below the DSN, courses away from the brachial plexus behind the axillary vessels to lie on the serratus anterior

muscle which it supplies. The LTN injury thus results in shoulder pain and winging of scapula.^[3] Hanson and Auyong have shown in their prospective study that either of these nerves can be visualized in over 90% cases, this must be done proactively to avoid injury.^[4] Their appearance is predominantly hyperechoic with areas of hypoechoic fascicles within them [Figure 1]. Since no outcome data describing injury to these nerves are available apart from case reports, no technical guidelines are in place to ensure avoidance of this event.^[5] Perhaps following a shallower needle trajectory to avoid entering the bulk of middle scalene muscle, using a peripheral nerve stimulator to identify proximity to these nerves and their proactive identification may constitute a safer methodology.

Similarly, the medial to lateral in-plane needling at interscalene level is fraught with injury to the phrenic nerve as it may lie in the path of the needle trajectory. Phrenic nerve originates from C3 to C5 and lies in close proximity to C5 at the cricoid level before descending medially over the belly of anterior scalene muscle as it courses caudally. Kessler *et al.* have shown in their volunteer study that it is visible as a predominantly hypoechoic structure with hyperechoic border [Figure 2] in over 90% of the cases.^[6] Failure to identify this nerve during this approach risks its injury that may present as delayed persistent respiratory compromise.^[7] Thus, proactive identification of phrenic nerve, use of a nerve stimulator and using a safe trajectory (once phrenic nerve is away from C5) would be the best approach in this case.

Out of plane needling may provide a safer route to the brachial plexus at interscalene area. This typically involves needle insertion and deposition of local anesthetic on either side of the brachial plexus. However, a medial needle insertion may damage phrenic nerve if a proximal higher site of needling is

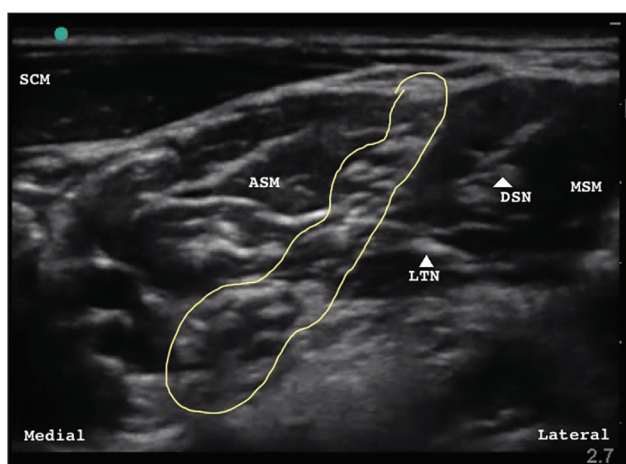


Figure 1: Yellow outline demarcates the brachial plexus at C6. White arrows point towards respective nerves. SCM — Sternocleidomastoid muscle, ASM — Anterior scalene muscle, MSM — Middle scalene muscle, DSN — Dorsal scapular nerve, LTN — Long thoracic nerve

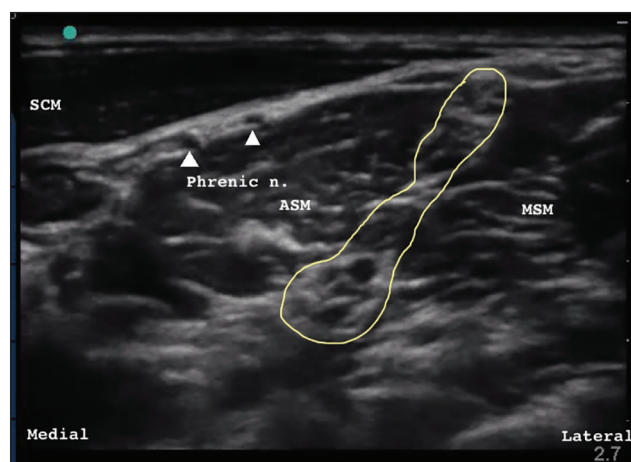


Figure 2: Yellow outline demarcates the brachial plexus at C6. White arrow points towards phrenic nerve. SCM — Sternocleidomastoid muscle, ASM — Anterior scalene muscle, MSM — Middle scalene muscle

selected, when the phrenic nerve emerges from the C5 nerve root on its medial side. Thus avoiding a medial needling altogether or choosing a sufficiently distal point for out of plane needling when phrenic nerve is away from C5 root, is the safest option in our view.

Although we have not encountered such injuries to the brachial plexus in our clinical practice, the possibility still exists. To conclude an effort should be made to visualize these nerve, especially while placing an in-plane interscalene block irrespective of the direction of needling.

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References

1. Mariano ER, Loland VJ, Ilfeld BM. Interscalene perineural catheter placement using an ultrasound-guided posterior approach. *Reg Anesth Pain Med* 2009;34:60-3.
2. Sultan HE, Younis El-Tantawi GA. Role of dorsal scapular nerve entrapment in unilateral interscapular pain. *Arch Phys Med Rehabil* 2013;94:1118-25.
3. Meininger AK, Figuerres BF, Goldberg BA. Scapular winging: An update. *J Am Acad Orthop Surg* 2011;19:453-62.
4. Hanson NA, Auyong DB. Systematic ultrasound identification of the dorsal scapular and long thoracic nerves during interscalene block. *Reg Anesth Pain Med* 2013;38:54-7.
5. Thomas SE, Winchester JB, Hickman G, DeBusk E. A confirmed case of injury to the long thoracic nerve following a posterior approach to an interscalene nerve block. *Reg Anesth Pain Med* 2013;38:370.
6. Kessler J, Schaffhalter-Zoppoth I, Gray AT. An ultrasound study of the phrenic nerve in the posterior cervical triangle: Implications for the interscalene brachial plexus block. *Reg Anesth Pain Med* 2008;33:545-50.
7. Kaufman MR, Elkwood AI, Rose MI, Patel T, Ashinoff R, Fields R, *et al.* Surgical treatment of permanent diaphragm paralysis after interscalene nerve block for shoulder surgery. *Anesthesiology* 2013;119:484-7.

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