Subscapularis and sub-omohyoid plane blocks: an alternative to peripheral nerve blocks for shoulder analgesia

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Editor—The gold standard for shoulder analgesia is the interscalene block (ISB), but it has its own share of disadvantages.1 While some potential side-effects from ISB, such as phrenic nerve block, recurrent laryngeal nerve involvement and Horner’s syndrome, may lead to patient discomfort,2 others, such as neurological injury, intrathecal spread and systemic toxicity of local anaesthetic, can have serious consequences.3 Although studies of ISB have shown a reduction in the incidence in hemidiaphragmatic paralysis with low-volume ISB, the risk of phrenic paralysis is not completely eliminated.4,5

The majority of the shoulder is thought to be supplied by the axillary nerve and the suprascapular nerves, with minor contributions from subscapular and lateral pectoral nerves.6 The regional anaesthesia alternative techniques to the ISB include suprascapular or combined suprascapular and axillary nerve blocks. Although these blocks offer some analgesic benefits by themselves, the quality of analgesia has been shown to be inferior to the ISB.7 This difference in analgesic quality is likely to be attributable to the sparing of some of the shoulder innervation, and targeting all of the shoulder innervation may mitigate this problem. It is well known from anatomical studies that the innervation to the shoulder joint usually travels through various intermuscular planes before reaching the shoulder, and these intermuscular planes are easily identified by musculoskeletal ultrasonography.8 The suprascapular nerve leaves the superior trunk close to the supraclavicular fossa and travels in the posterior triangle of the neck parallel to the inferior belly of the omohyoid muscle to enter the suprascapular notch.9 The axillary nerve leaves the posterior cord in the infraclavicular fossa and bifurcates into anterior and posterior branches while traversing the subscapularis muscle before winding around the humerus to enter the quadrangular space.6 The subscapular nerves arising from the posterior cord are also present on the ventral surface of the subscapularis muscle.6 We describe below the selective targeting of shoulder innervation using intermuscular plane injections, which may be particularly useful in patients at high risk for respiratory morbidity from ISB.

It is our practice to perform the subscapularis plane injection (with or without pectoral nerve block (PECS-1) block) before the sub-omohyoid block. The patient is placed in a semirecumbent/supine position, with the arm adducted and externally rotated. The probe positions for both the sub-omohyoid and the subscapularis plane blocks are shown in Fig. 1A. A linear high-frequency (6–13 MHz) ultrasound probe is placed in the coronal plane over the shoulder where the lesser and greater trochanters of the humerus are identified. The probe positions for both the sub-omohyoid block and the subscapularis plane block are shown in Fig. 1A. A linear high-frequency (6–13 MHz) ultrasound probe is placed in the coronal plane over the shoulder where the lesser and greater trochanters of the humerus are identified. The subscapularis muscle attaches to the lesser trochanter of the humerus (Fig. 1B). The axillary nerve is seen entering the quadrangular space (Fig. 1B). The subclavian artery (SCA) is also seen in the image.
addition to this, PECS-1 block (depositing local anaesthetic between pectoralis major and minor) can be combined to block the lateral pectoral nerve in the same probe position if the acromioclavicular joint is being operated upon concomitantly. For the sub-omohyoid block, the same linear high-frequency (6–13 MHz) ultrasound probe is placed over the supraclavicular fossa to identify the subclavian artery, brachial plexus and the inferior belly of the omohyoid muscle (Fig. 1C). Using an in-plane lateral-to-medial needle approach, ~5 ml of the local anaesthetic solution (ropivacaine 0.5%) is deposited above the clavicle, under the inferior belly of omohyoid, to cover the suprascapular nerve (Fig. 1C). This fascial plane between the inferior belly of omohyoid and the strap muscles of the neck is closely related to the suprascapular nerve along its course until the suprascapular notch.

Viewing of easily identifiable structures, such as the bony landmarks and muscle layers around the shoulder joint, should make this technique feasible even by novices compared with peripheral nerve blocks. We have been using this technique for analgesia in patients with respiratory disease undergoing shoulder surgery along with ultrasound assessment of diaphragmatic function at our institute after preliminary anatomical studies of injectate spread in fresh cadavers were promising. Additionally, as these intermuscular planes can be appreciated arthroscopically, the performance of this technique may even be feasible by the surgeons using conventional or liposomal formulations of local anaesthetics.10

Combined subscapularis plane and sub-omohyoid injections may serve as an alternative to peripheral nerve blocks for shoulder analgesia, with minimal impact on phrenic nerve function. Further well-designed randomized studies are required to evaluate this method in comparison to other analgesic modalities.

Declaration of interest
None declared.

References
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Evaluation of artery and vein differentiation methods using ultrasound imaging among medical students

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