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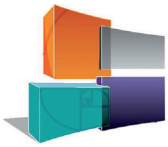

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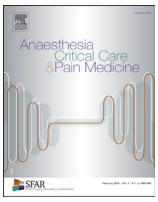

Letter to the Editor

Sensory selective peripheral nerve block for wide-awake surgery

In hand and wrist surgery, wide-awake surgery is favoured for simultaneous evaluation of active joint movement and surgical correction. Local anaesthesia is most frequently performed yet a blind technique with compromised reliability, potential systemic toxicity, and limited application. Ultrasound-guided sensory selective peripheral nerve block (SSPNB) can provide safe and reproducible wide-awake anaesthesia to more invasive or extensive surgeries. In this case, a patient who had underwent the Sauve-Kapandji procedure and developed post-operative clicking was examined. Under the ultrasound-guided SSPNB, a revision was successfully completed with his active motion assessed intraoperatively.

This report was approved by the Institutional Review Board of the hospital. A 57-year-old male patient (171 cm; 55 kg), who had been a bus driver for years suffered from chronic wrist pain. He was diagnosed with right distal radioulnar joint arthritis and ulnar impaction syndrome. After unsuccessful medical treatment, Sauve-Kapanji operation was performed under the infraclavicular brachial plexus block (BPB). The procedure was completed in the usual manner including incision between the extensor carpi ulnaris (ECU) and the extensor digiti minimi, osteotomy of the ulnar neck, and anchoring of the pronator teres to the ulnar stump. The post-operative X-ray was impeccable, however he complained of clicking in his right wrist particularly during supination and pronation and it was deteriorated to the extent he ditched a spoon in his meal. Corrective surgery of proximal ulnar stump stabilisation and screw removal was performed under infraclavicular BPB only to result in persisted snapping and request another correction. The surgeon consulted us regarding an anaesthesia modality to preserve the supination during the surgery.

Ultrasound-guided SSPNB was planned. The peripheral nerves were explored using ultrasound with a 5–12 MHz linear probe. We used ultrasound guided in-plane technique to inject approximately 3 mL of 0.375% ropivacaine into each peripheral nerve with a 25-gauge, 45-mm needle (Fig. 1). First, cutaneous sensory nerves of the medial forearm were individually examined and blocked; the medial antebrachial cutaneous nerve, the posterior antebrachial cutaneous nerve, and the sensory branches of the ulnar nerve and the median nerve. The medial antebrachial cutaneous nerve was visualized lateral to the basilic vein in the cubital fossa. The posterior antebrachial cutaneous nerve was identified to arise approximately 5 cm above the lateral epicondyle of the humerus from the radial nerve and blocked distal to the bifurcation not to compromise the radial nerve. The ulnar nerve and the median nerve were individually scanned and blocked in the mid-level of the forearm before their divergence to the palmar and the proper palmar branch to provide analgesia for potential pain from muscles, fascia, and skins during operation.

Additionally, the posterior interosseous nerve (PIN) and the anterior interosseous nerve (AIN) were independently blocked to maintain analgesia of the interosseous membrane. The deep branch of the radial nerve stimulates the supinator muscle and pierces through the muscle to become the PIN, which descends to the deep muscle layer of the forearm bearing motor fibres to the extensor pollicis longus and brevis and the adductor pollicis longus. Then the sensory fibres of the PIN are projected to the ligaments and the radioulnar joint, the interosseous membrane of the forearm, and the periosteum of the radius [1,2]. In order to maintain intact supination and provide adequate surgical anaesthesia, the deep branch of the radial nerve to the supinator muscle was subject to salvage while the PIN to blockade. Therefore, the sensory blockade of the PIN was performed about the proximal third of the forearm where the nerve piercing through the supinator muscle coursed sufficiently through the deep muscle layer such as extensor pollicis longus and brevis and abductor pollicis longus. The AIN arises from the median nerve inferior to the cubital fossa dorsomedially and terminates to the pronator quadratus and the distal radioulnar joint [2,3]. Since the pronator quadratus is less dominant muscle in pronation, weighted value was given to provide sufficient analgesia to the interosseous membrane [3]. Tracing the median nerve, the AIN was identified and blocked at the distal third level of the forearm bypassing the branch to the pronator teres from the median nerve.

After 20 minutes upon the completion of the block, cold and pain sensation were evaluated using ice and pinprick respectively to confirm the acceptability of the surgical anaesthesia and the patient was asked to flip his palm facing up and down to ensure his full range of motion was practiced and the problematic clicking was represented. The surgical procedure initiated with a 7 cm longitudinal skin incision along the dorsoulnar aspect of the patient's right wrist and additional longitudinal incision along the radiopalmar aspect. Dissecting the forearm tissues to expose the periosteum, a hole was drilled through the palmar cortex of the ulnar stump through which the harvested ECU tendon was passed. The proximal ulnar stump stabilisation was adjusted monitoring the patient's active supination-pronation and the ECU tendon was tightly sutured to the palmaris longus tendon after confirming no further clicking presented (Video 1). Neither rescue block nor additional local infiltration was required throughout the surgery. At 1 year post-initial visit, he reported no discomfort in supination and pronation.

Our case indicated anatomical correction and passive movement of the wrist joint under conventional anaesthesia may not be sufficient to guarantee stability and comfort of active joint motion of the patient. With the recent advance in ultrasound to differentiate each nerve branch of interest, wide-awake surgery assessing the active joint motion, having commonly practiced with local infiltration, can be complemented under sensory-selective peripheral nerve block. Nakanishi et al. introduced the ultrasound

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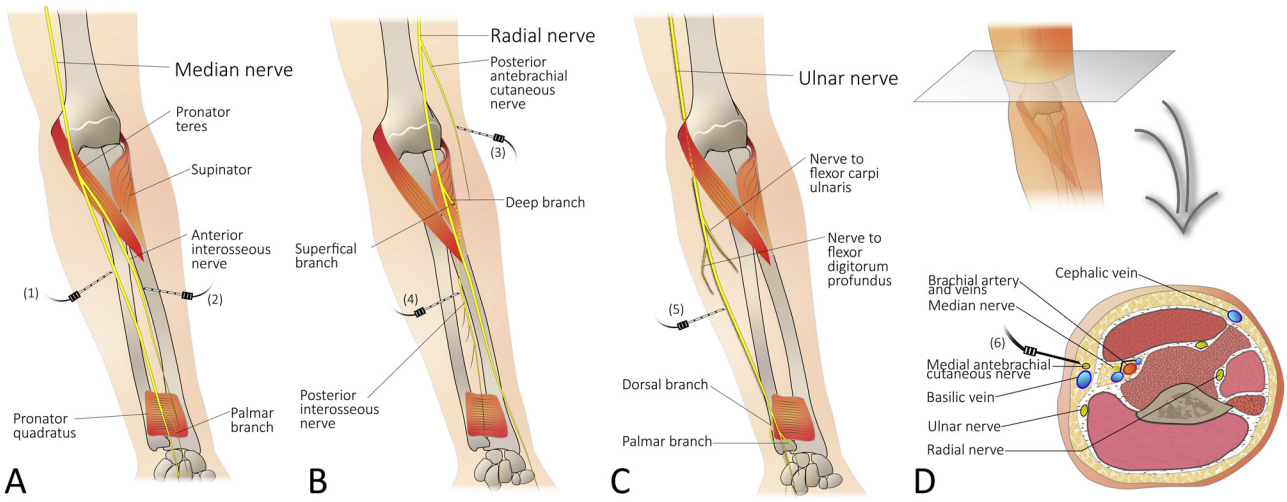

Fig. 1. Description of our ultrasound guided SSPNB. A. Along the median nerve, (1) the sensory branch to the forearm was targeted before its division to the palmar branch and (2) the AIN after its division to the pronator teres. B. Tracing the radial nerve, (3) the posterior antebrachial cutaneous nerve was aimed away from the radial nerve and (4) the PIN away from the branches to the supinator. C. The sensory branch of the ulnar nerve was blocked (5) after its divergence to the forearm muscles. D. The medial antebrachial cutaneous nerve was also blocked (6) lying lateral to the basilic vein.

guided selective sensory nerve block for the forearm tendon reconstruction [4]. Also, Matsuda et al. applied it to the vascular access surgery in the forearm to selectively block the musculocutaneous nerve and the medial antebrachial cutaneous nerve [5]. Our study supported the adequacy of the ultrasound guided selective sensory nerve block by exercising it to more invasive surgery involving osteotomy with larger surgical field proximal to the wrist joint. Further clinical studies are warranted to provide useful groundwork for the use of the ultrasound guided selective sensory nerve block.

Disclosure of interest

The authors declare that they have no competing interest.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at https://doi.org/10.1016/j.accpm.2018.12.002.

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