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# Easier and Safer Regional Anesthesia and Peripheral Nerve Block under Ultrasound Guidance

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Regional anesthesia for the peripheral nerve or plexus has been widely used in the management of acute or chronic pain. To deliver a smaller volume to the targeted nerve without injury to it or its surrounding structures can be critical in the practice of regional anesthesia [1]. Therefore, the identification of the target nerve is important to provide better efficacy and safety in regional anesthesia. To increase the success rate of target nerve blocks, an electrical nerve stimulation device is popularly used. However, in spite of the use of a nerve stimulator, it is sometimes difficult to identify the exact position of the tip of the needle [2].

Since 1978, ultrasound has been widely used in several kinds of regional anesthetic practices. Recently, the improvements in ultrasound technology allow you to place the tip of the needle near the targeted nerve and monitor the spread of the local anesthetics precisely. In addition, ultrasound guidance enables the physician to replace the needle in the case of mal-distribution of the local anesthetic in real time. Therefore, ultrasound-guided technique has been considered the gold standard for performing regional anesthesia or peripheral nerve blocks [3].

The interscalene brachial plexus (IBP) block is very useful for upper extremity surgery. But IBP at the C6 level often fails to affect the ulnar nerve in up to 50% of blocks [4]. Kim et al. [2] injected 55 ml of local anesthetic via low approach IBP below the C6 level using a nerve stimulator for upper extremity surgery. A low approach IBP provided more caudad spread of local anesthesia in the brachial plexus, resulting in a better efficacy in blocking the ulnar nerve than the conventional IBP approach at the C 6 level (46% vs 81%; $P < 0.0001$).

However, it may be associated with several concerns. The vertebral artery enters deep into the transverse process at the level of C6 or C7. Therefore, a nerve stimulant guided low approach IBP below the C6 level increases the risk of vertebral artery puncture, which may result in catastrophic outcomes. The nerves from C5 and C6 innervate the upper arm or forearm. When muscular twitching in the forearm is observed, it is difficult to identify whether the motor response originates from the C5 or C6 nerve. And thus, it is difficult to identify the exact position of the tip of the needle from the nerve stimulation.

In this issue, Park et al. [5] reported the effect of ultrasound guided low approach IBP for upper limb surgery. They used 40 ml of local anesthetics for IBP, which provided adequate anesthesia without any significant complications in all 20 patients.

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Ultrasound provides direct visualization of the best site for the injection and helps avoid incidental puncture of blood vessels and damage to nerves. In addition, the volume of local anesthetic needed can be reduced by monitoring the spread of local anesthetics. Thus, continuously observing the distribution of local anesthetic and replacing the needle when mal-distribution of the injectate occurs improves the efficacy and safety of regional anesthesia or peripheral nerve block under ultrasound guidance. Substantially, the use of ultrasound can decrease the performance time of regional anesthesia, which may promote the routine use of ultrasound guidance in regional anesthesia. Therefore, it is justified to enable physicians to acquire the knowledge and techniques to use ultrasound guidance in regional anesthesia and in performing peripheral nerve blocks.

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