When Is a Single-injection Nerve Block Not Really a Single Injection?

To the Editor—I read, with interest, the case report describing a brachial plexopathy after an ultrasound-guided interscalene block in a patient with multiple sclerosis and the accompanying editorial and would like to make an observation not mentioned in either.

Interscalene blocks have been performed using either mechanical paresthesia or electrical nerve stimulation, for decades, with success rates reported to be 94–99%. In both of these techniques, the entire dose of local anesthetic is injected upon eliciting the initial desired response. These true single-injection techniques occur at the first nerve root, and likely the most superficial one, encountered. Perlas et al. used real-time ultrasound to quantify the sensitivity of both paresthesia and motor nerve stimulation techniques. A 22-gauge insulated needle was in the axilla of 103 patients, and after visualizing direct needle–nerve contact, the patients were asked whether they felt any paresthesia. The nerve stimulator was then turned on, and a motor response was sought at 0.5 mA or less. The authors concluded that there are a significant number of false-negative responses (direct needle–nerve contact not resulting in paresthesia or motor response) with these traditional methods of localization. This study showed that direct ultrasound visualization does not prevent intimate needle–nerve contact. Although Koff et al. note that their needle “was not seen to penetrate the epineurium by [their] ultrasound image” after the first injection at C5, one must wonder how that initial volume of injection altered the ability to discern the needle–nerve relation of the three subsequent injections/maneuvres used to complete the block.

One of the many questions that needs to be addressed, as we continue to promote the benefits of ultrasound for peripheral nerve blocks, is whether there are any advantages to repositioning a needle multiple times to be able to visualize local anesthetic spread around each of the nerve roots, because our historic success rates imply that this occurs adequately, with the initial injection. That is, does this practice of diving for individual and deeper nerve roots actually increase the risk to patients? The enemy of very good may prove to be better.

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References

(Accepted for publication June 3, 2008)
Can Ultrasound Impact the Risk–Benefit Ratio for Nerve Blocks?

To the Editor—Dr. Hebl’s editorial¹ is thought provoking. The real potential of ultrasound lies in the opportunity to approach nerve blocks in entirely new ways. Regional anesthesia for hand surgery provides an example. Many anesthesiologists consider it axiomatic that one should avoid performing nerve blocks close to the tourniquet. This is partially defensive because “when the site of the block is close to the tourniquet, electromyographic and conduction nerve studies cannot allow more use of suprascapular blocks, either single shot or continuous.” Ultrasound should permit the near total abandonment of the axillary block with the 3-in-1 block in children. Anesth Analg 1989; 69:705–13


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References


Ultrasound allows the abandonment of some, but not all, traditional practices associated with nerve blocks. Many ultrasonographers no longer aspire before injection, because ultrasound is a far more sensitive detector of intravascular injection than any aspiration test. The same cannot be said for potential intrafascicular injection. As Dr. Hebl notes, the precise position of the tip and the nerve is not always apparent until one has injected 2–3 ml of local anesthetic. In the unlikely situation where one has actually placed the needle tip into a nerve fascicle, the damage may already be done before anything shows up on ultrasound. Therefore, ultrasound may not obviate the need for injection pressure monitoring during nerve blocks. Injection pressure can be monitored with an inexpensive proprietary device (Bsmart, Concert Medical, Norwell, MA) or by assessing the compression of an air bubble above the local anesthetic in the syringe.¹⁰

Only when we thoroughly rethink our approach to surgical nerve blocks will ultrasound fulfill its potential for improved safety.

Accepted for publication June 3, 2008.