

Ultrasound-guided Popliteal Intraneural Approach: Comment

To the Editor:

With great interest we have read the article by Cappelleri *et al.*¹ describing a study in which they performed intentional intraneural injection and completed clinical and neurophysiologic examinations at 5 weeks and 6 months. The intraneural injection reduced the dose of local anesthetics and provided a faster onset and greater success rate of local anesthesia; however, persistent electrophysiologic changes suggested possible axonal damage that might never recover. There are a few points we would like to present.

First, the authors stressed that one purpose of their method was to decrease the risk of systemic local anesthetic toxicity. Actually, the incidence of systemic toxicity after ultrasound-guided regional block itself is rare.

Second, their method apparently did cause nerve damage, possibly by high local anesthetic concentration or volume deposited around the nerve fascicles. Local anesthetics must penetrate several tissue barriers, with perineurium causing the largest drop in concentration.² We regard perineurium as a protective mechanism of the nerve. Direct intraneural injection greatly increases the concentration of the drug acting on the nerve, which may cause nerve injury. Pressure caused by intraneural injection may also be deleterious. An animal study focusing on median and lingual nerves used a small volume (5 ml) and controlled injection pressure (less than 103.4 kPa; 15 psi).³ In the median nerve, where there is a larger share of nonneural tissue with numerous and smaller fascicles, the injection caused distension to the outer epineurium and displacement of the fascicles but did not damage them. In the lingual nerve, injection caused distension to the outer epineurium and displacement of the fascicles. The sciatic nerve may be a low compliant tissue. Injections in low compliant fascicles may lead to their disruption and neurologic injury. Although the researchers used a manometer to achieve an injection pressure less than 15 psi (15 psi = 775 mmHg), it is still too high for the vulnerable fascicular interconnections and may cause microvascular ischemia.⁴

Intraneural injection takes effect quickly in a few minutes, as Cappelleri *et al.*⁵ had previously shown. Even so, considering the cost of persistent electrophysiologic changes, this is definitely not worth it. To these points,

we agree with Vlassakov *et al.*⁶ that intraneural injections should be avoided and not encouraged as a safer alternative. Electrophysiologic assessment before surgery is not a routine procedure for regional anesthesia patients. Intraneural injection may aggravate some subclinical nerve injuries, causing long-term clinical neurologic symptoms.

To conclude, remember that the purpose of nerve block is to facilitate surgery. If faster onset and greater success rate comes at the cost of nerve injury, we need to reevaluate. There are other and safer ways to achieve better anesthesia. Safety is always the starting principle.

Competing Interests

The authors declare no competing interests.

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