

4. Sites BD, Taenzer AH, Herrick MD, Gilloon C, Antonakakis J, Richins J, Beach ML: Incidence of local anesthetic systemic toxicity and postoperative neurologic symptoms associated with 12,668 ultrasound-guided nerve blocks: An analysis from a prospective clinical registry. *Reg Anesth Pain Med* 2012; 37:478–82

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## Ultrasound-guided Popliteal Intraneural Approach: Comment

To the Editor:

Although the study by Cappelleri *et al.*<sup>1</sup> provides us with insights about the reduction of nerve action potentials in human sciatic nerves that persist to at least 6 months after ultrasound-guided intraneural injections, we are concerned by the ethical implications and interpretation of safety of this study in widespread regional anesthesia practice. An unanticipated finding from a previous study, showing that unintentional intraneural injection in a small subgroup (4 of 48 patients) resulted in a faster block onset, allowed Cappelleri *et al.* to justify providing intentional intraneural injections to subjects receiving sciatic nerve blocks. Unfortunately, the original study was neither powered nor designed to measure long-term consequences on human nerves.<sup>2</sup> Similarly, a 2016 trial of 88 patients from the same author shaped the ethical foundation of this current study. However, the 2016 study lacked a sample size calculation on an important secondary outcome (electrophysiologic impairment) and was not powered to detect differences in neurologic recovery at 5 weeks.<sup>3</sup> Also, only two thirds of those patients completed assessment at 5 weeks.<sup>3</sup> This further weakened the probability of finding a difference in electrophysiologic impairments between the intraneural and extraneural groups. What if there had been significant recovery of amplitude and latency of action potentials in the extraneural group but not the intraneural group by 6 months in the 2016 study? Then, it would be ethically challenging to substantiate the current all-intraneural design. Alarming, during follow-up

at 5 weeks in that 2016 article, “there was a nonsignificant trend toward patients in the intraneural group to present with more postoperative neurologic symptoms (in 5 of 7 patients).”<sup>3</sup>

Furthermore, the authors hypothesized that a decrease in volume of a highly concentrated ropivacaine solution might decrease the incidence of local anesthetic systemic toxicity. However, there is no reported case of local anesthetic systemic toxicity, to date, among patients undergoing hallux valgus surgery with extraneural techniques using higher volumes of local anesthetic. Proposing a controversial technique to minimize an extremely rare complication appears ill-advised.

Using ultrasound to safely prevent intraneural injections and hopefully to avoid fascicular injury is advocated, and frankly, without convincing safety data in animal nerve models or long-term electrophysiologic testing in humans or a clear clinical benefit, other than a 15-min shorter block onset time, we must use common sense when drawing conclusions.

### Competing Interests

The authors declare no competing interests.

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### References

1. Cappelleri G, Ambrosoli AL, Gemma M, Cedrati VLE, Bizzarri F, Danelli GF: Intraneural ultrasound-guided sciatic nerve block: Minimum effective volume and electrophysiologic effects. *ANESTHESIOLOGY* 2018; 129:241–8
2. Choquet O, Noble GB, Abbal B, Morau D, Bringuier S, Capdevila X: Subparaneural *versus* circumferential extraneural injection at the bifurcation level in ultrasound-guided popliteal sciatic nerve blocks: A prospective, randomized, double-blind study. *Reg Anesth Pain Med* 2014; 39:306–11
3. Cappelleri G, Cedrati VL, Fedele LL, Gemma M, Camici L, Loiero M, Gallazzi MB, Cornaggia G: Effects of the intraneural and subparaneural ultrasound-guided popliteal sciatic nerve block: A prospective, randomized, double-blind clinical and electrophysiological comparison. *Reg Anesth Pain Med* 2016; 41:430–7

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