This letter was sent to the author of the original article referenced above, who declined to respond.—Evan D. Kharasch, M.D., Ph.D., Editor-in-Chief.

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Suture-catheters Compared with Traditional Catheters: Comment

To the Editor:

We read with interest the first human randomized, controlled trial of the "Suture-method *versus* Through-the-needle Catheters for Continuous Popliteal-sciatic Nerve Blocks" by Finneran *et al.*[1] The technique was developed and first demonstrated in cadavers by Rothe *et al.* for popliteal sciatic block in prone position.[2,3] The method relies on the curvature of the needle and enough space available for it to reliably exit and not in close proximity to the surgical field or other vital structures.

Unfortunately, a successful new catheter system needs to have a design that fits all the nerve block locations and all patient sizes, and this one suffers from numerous drawbacks (pertaining to infection risk, challenging nerve locations, *etc.*), which the authors have already pointed out in great detail.[1–3]

However, the ultrasound visualization of a curved needle has not been addressed. The authors mention that curved needles are better visualized than straight needles, which in our opinion is an inaccurate statement. The current ultrasound systems utilized for placement of nerve blocks are able to provide two-dimensional cross-sectional images of the tissues. As a result, so long as the needle is inside this imaging plane, it will be visible.[4] However, various factors such as lateral forces exerted on straight needle tip leading to curvature may lead to an unpredictable needle trajectory which cannot always be assumed to be straight or even in a single two-dimensional plane.[4] The needle might then be viewed in bits such that the tip at the end of the high-contrast shaft may be obscured by shadows or poor reflection back to the probe.

Complex needle segmenting/needle enhancing algorithms are available to visualize straight needles, and more advanced algorithms exist which can enable curved needles visualization with two-dimensional ultrasounds but not available routinely.[5] These algorithms, even if available, often fail if the curvature is excessive.[5,6] Similarly, the echogenic catheter mostly curved may pose similar challenges to visualize and reposition. Rothe *et al.* describe that manipulating the curved needle facilitates the tip to move in an arc somehow facilitating needle visualization, but they provide no evidence of this being true.[3] It's no wonder, then, that Finneran *et al.* struggle to visualize the needle clearly at meager depth of possibly just a few (2 to 4) centimeters as evident in their figure 3.[1]

We commend the authors for successfully demonstrating the utility of a somewhat simpler nerve catheter system; however, this system is far from perfect in design, ergonomics, or ease of placement.

Competing Interests

The authors declare no competing interests.

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Suture-catheters Compared with Traditional Catheters: Reply

In Reply:

We agree with Drs. Wardhan and Nimma that the suture-catheter system is simpler in design than conventional through-the-needle catheters and that no system will be perfect in design, ergonomics, or ease of placement.[1] However, our experience with the catheter insertion system differs from their suggestion that relative to a straight needle, the suture shape is more difficult to visualize. As our study progressed, we were somewhat surprised to discover that the 19-gauge suture needle visualized at least as well, if not better, than a Tuohy needle of the same gauge. Drs. Wardhan and Nimma note that "lateral forces exerted on [a] straight needle tip leading to curvature may lead to an unpredictable needle trajectory which cannot always be assumed to be straight or even in a single two-dimensional plane." We concur and suggest that the suture-shaped needle remains within a two-dimensional plane precisely because of its curvature, which appears to greatly strengthen the needle: It is extraordinarily rigid and resists bending laterally (in a direction other than its curvature).

Furthermore, as our colleagues note, straight needles often bend, resulting in the end being "obscured by shadows or poor reflection back to the probe." We agree, and we found that the suture design did not exhibit this weakness, possibly because the gently curved needle is comparatively parallel to the ultrasound probe when it reaches the target nerve.

Lastly, we respectfully disagree with our colleagues' statement that we "struggle to visualize the needle clearly at meager depth of possibly just a few (2 to 4) centimeters as evident in [our] figure 3." To the contrary, the needle appears clearly for its entire length (within the ultrasound field) in the first two panels of figure 3. Any distortion is an artifact of the static image, which was originally viewed in real-time. This can be best appreciated in the supplemental videos associated with the article, which demonstrate how the suture-catheter can be seen moving through tissue in real time.[2]

We join our colleagues in calling for additional research to provide actionable information for clinicians to optimize benefits—and minimize risks—of perineural catheter delivery systems.

Competing Interests

Ferrosan Medical Devices (Søborg, Denmark) provided an unrestricted research grant and suture-type perineural catheters used in the original study to the University of California. This institution has also received funding and product for other research projects from Myoscience (Fremont, California), Epimed (Farmers Branch, Texas), InfuTronix (Natick, Massachusetts) and SPR Therapeutics (Cleveland, Ohio). In addition to the above, Dr. Ilfeld's institution has received funding for a different research project from Heron Pharmaceuticals (San Diego, California).

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Suture-method *versus* through-the-needle catheters for continuous popliteal-sciatic nerve blocks: A randomized clinical trial. Anesthesiology 2020; 132:854–66

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Multimodal Analgesia for Spine Surgery: Comment

To the Editor:

With great anticipation, we read the study by Maheshwari *et al.*[1] and congratulate the authors for a prominently featured article and infographic on the cover of Anesthesiology. We were interested to see that the results of the study suggest that multimodal analgesia, as administered in this protocol, did not benefit participants' postoperative quality of recovery, opioid consumption, or pain scores after spine surgery. However, with closer scrutiny, we found several elements of the experimental design that were, perhaps, not well-suited to properly explore the study aim and hypothesis in the context of the primary outcome measure. Surprisingly, the authors did not control for intraoperative analgesic strategies such as surgeon-administered epidural analgesia or local anesthetic wound infiltration. Even more concerning, the authors did not control for postoperative multimodal analgesic medications. Postoperative acetaminophen, gabapentin, tramadol, and ketorolac were not limited to the experimental group. In nearly identical numbers, both groups consumed the same postoperative analgesics for the first 48 h after surgery.

The authors found it surprising that the multimodal analgesic regimen proved ineffective in their patients. We politely disagree. Measuring the Quality of Recovery score 3 days after surgery, as well as other postsurgical pain measures, is confounded when both the experimental and control groups received multimodal analgesics during and after surgery. If the goal of the study was to examine the quality of recovery outcome 3 days after a single preoperative dose of acetaminophen and gabapentin with intraoperative ketamine and lidocaine infusions, then both groups should have received identical multimodal-free medication regimens after surgery. If, however, the objective was to examine multimodal *versus* opioid-only strategies, the control group should have been restricted from nonopioid analgesics during the pre-, intra-, and postoperative periods.

We recognize the challenge in designing studies that restrict therapies that are possibly beneficial to patients. However, we believe that the data presented in this study are inadequate to support the authors' conclusion that "this combination of four analgesics was not beneficial for patients having multilevel spine surgery." We agree with the authors that multimodal analgesia should be formally tested in each clinical context but disagree that the data presented here suggest a lack of benefit in spine surgery patients.

Competing Interests

Dr. Johnson has previously received financial support from the American Board of Anesthesiology (Raleigh, North Carolina), Applied Medical Visualizations (Salt Lake City, Utah), IARS – Anesthesia & Analgesia Editorial Board (San Francisco, California), and the American Society of Anesthesiologists (Schaumburg, Illinois); however, none of these funding sources had any direct conflict of interest pertaining to the content of this letter. The other authors declare no competing interests.

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Multimodal Analgesia for Spine Surgery: Reply

In Reply:

Meier *et al.*[1] contend that our trial poorly tested the effect of multimodal analgesia because we did not control intraoperative local anesthetic use or postoperative analgesia. Epidural analgesia is rarely used for spine surgery in our setting. As presented in Table 1, fewer than 1% of our patients had epidural analgesia.[2] Furthermore, local wound infiltration was used only in one quarter of the patients