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Regional Anesthesia: A Silver Bullet, Red Herring, or Neither?

Eric Sun, MD/PhD^{1,2}, Stavros G. Memtsoudis, MD/PhD/MBA³, Edward R. Mariano, MD/MAS^{1,4}

¹Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University School of Medicine, Stanford, CA 94305

²Department of Health Research and Policy, Stanford University School of Medicine, Stanford, CA 94305

³Department of Anesthesiology, Hospital for Special Surgery, Weill Medical College of Cornell University, New York, New York 10021

⁴Anesthesiology and Perioperative Care Service, Veterans Affairs Palo Alto Health Care System, Palo Alto, California 94304

Today, clinicians in the perioperative realm are faced with increasing pressure from payers and policymakers to improve longer-term postoperative outcomes such as resource utilization (i.e., reduced readmission rates) and persistent opioid use after surgery. Many anesthesiologists believe that nerve blockade can play an important role in achieving these aims. This belief is fairly intuitive; a large body of literature has established that regional anesthesia is associated with increased mobility and decreased risk for many short-term complications.¹ Moreover, the evidence strongly suggests that regional anesthesia is associated with improved pain control, which provides a basis for the assumption that it could reduce the risk of persistent postoperative opioid use. However, although widespread, is this belief actually true? In this issue of *Anesthesiology*, Hamilton and colleagues² address this issue by comparing longer-term outcomes (i.e., readmission rates and costs within 7 days of surgery as a primary outcome and within 30 days as a secondary outcome) among ambulatory shoulder surgery patients who received peripheral nerve blockade to those who did not. Overall, these researchers found that nerve blockade was not associated with any difference in a composite outcome measure, although it was associated with a small increase in costs (which may largely reflect the costs of the block itself), and—in a secondary analysis—a modestly reduced readmission rate.

The study has many strengths, such as the large size (59,644 patients from 118 hospitals), and careful statistical approach that adjusted for many possible confounders. As with any observational study, there is the concern of selection and indication bias as patients who received blocks and the anesthesiologists who performed them may be different from those

Corresponding Author: Eric Sun, MD/PhD, Department of Anesthesiology, Perioperative and Pain Medicine, H3580, Stanford University Medical Center, Stanford, CA 94305, (p) (650) 723-5728; (f) 650-725-8544, esun1@stanford.edu.

Conflicts of Interest: Dr. Sun reports consulting fees from Egalet, Inc, and the Mission Lisa Foundation that are unrelated to this work. Dr. Memtsoudis reports consulting fees from Teikoku and Sandoz. He is a medical advisory board member for HATH and has a pending patent application for a multi-catheter infusion system. He is the owner of SGM Consulting, LLC. None of these relationships are related to this work.

who did not. Irrespectively, it is worth noting that patients who received a block had generally similar characteristics compared to those who did not, although important patient and practitioner-related covariates may not have been available.

While this study was limited to ambulatory shoulder surgery, other studies have found no association between nerve blockade and longer-term outcomes in a variety of settings.^{3–5} Thus, we are left with a dilemma: while clinical intuition and a fairly robust literature suggest that nerve blockade is associated with improvements in short-term outcomes, ultimately, the findings of this study—in line with others—suggest that the current state of nerve blockade has little impact on longer-term outcomes. This dilemma raises two important questions. First, given the lack of evidence that it impacts longer-term outcomes, should nerve blockade be abandoned in routine practice? Our opinion is that it should not: Anesthesiologists should still advance the science and clinical practice of regional anesthesia based on the well demonstrated short-term benefits of nerve blocks, while realizing that the literature to date is at best equivocal in suggesting a longer-term benefit.

The second question is why is there a discrepancy between studies examining short-term outcomes, which have generally found better outcomes with nerve blockade, and studies that have examined longer-term outcomes, which generally have not? An easy answer is that this simply reflects the reality of the situation, but there are several other possibilities with important implications for research and clinical practice. The first possibility concerns variations in clinical practice. In this study, single-injection and continuous catheter approaches were grouped together as nerve blockade. Moreover, neither this study nor any other studies to date have considered factors such as dosing and length of infusion (in the case of continuous catheters). Intuitively, it may very well be the case that, for nerve blockade techniques to demonstrate longer-term benefits, the block must last for a longer time (i.e., continuous infusion for several days). However, as demonstrated by this study and others,⁶ continuous catheters represent a small fraction of the nerve blocks that are placed in clinical practice. A second factor is the possibility of effect dilution. Half of the patients in the study by Hamilton and colleagues received a block.² If we assume that the block would only be beneficial in a minority of these patients (i.e., those with severe comorbidities), the benefits of the block for this subpopulation would be “diluted” or “averaged out” by the majority of patients for whom the block had little benefit. A final factor is the simple fact that long-term outcomes, particularly opioid use, represent the sum of a patient’s long-term interactions with the healthcare system (i.e., the patient’s surgeon and primary care physician). In this context, it may make sense that a nerve block, as one of many other perioperative interventions, would, at least by itself, have limited effect on longer-term outcomes.

In light of these factors, perhaps one key takeaway from this study is that anesthesiologists should focus on the use of continuous nerve catheters and/or other modalities that extend analgesia to match the trajectory of pain resolution. Moreover, this study suggests that further research should focus on identifying who is likely to benefit from a block, and that in clinical practice, anesthesiologists should expend efforts on making sure that blocks are offered—and made available—to the right patients (i.e., those who will benefit most). Finally, since long-term outcomes are determined in large part by the patient’s longer-term

interaction with the healthcare system, anesthesiologists—as part of our desire to be wholistic perioperative physicians—may need to consider how we can impact these interactions (i.e., through healthcare system changes) in order to improve these outcomes.

Ultimately, given its benefits in the short-term, nerve blockade should continue to be an important part of anesthesiology practice and considered as a first-line approach for many patients. However, at least for now, anesthesiologists should recognize that the evidence for longer-term benefit is mixed at best. Going forward, research and clinical practice should be aimed at identifying and addressing factors that may limit the ability of nerve blockade to improve long-term outcomes.

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