Do Anesthetic Choices Signal Quality?

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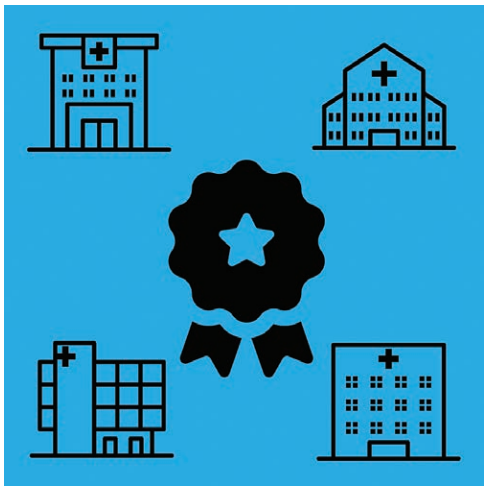
HOW does one identify high-quality anesthetic care? Although the specialty of anesthesiology has succeeded in improving the safety and quality of care over time, with a 97% reduction in anesthesia-related deaths between 1948 and 2005, from 3.3 per 100,000 population to 1.1 per million,[1,2] our ability to identify high-quality anesthesia care at the level of the individual provider or practice remains sharply limited. For example, hospitals that equate high-quality anesthesia with having high operating room efficiency may implement process measures such as the percentage of on-time first case starts to evaluate individual anesthesiologist performance, but these measures rarely have an impact on surgical outcomes.[3,4] In this issue of Anesthesiology, McIsaac *et al.*[5] present new data with potential implications for how anesthesia quality is understood and measured by exploring patient outcomes across hospitals with distinct signatures of practice based on their utilization of neuraxial *versus* general anesthesia.



"…measuring anesthesia care at the institutional level might offer insights as to other unmeasured aspects of an institution's quality and performance."

McIsaac *et al.*[5] studied a large population-based cohort of Canadian older adults receiving care for hip fracture, a condition that occurs more than 1.6 million times each year worldwide and is associated with high morbidity and mortality. Over a period of 14 years, among the more than 100,000 patients who underwent hip fracture repair, McIsaac *et al.*[5] found that 53% received neuraxial anesthesia alone, with the vast majority of these cases receiving spinal anesthesia. The remainder received general endotracheal anesthesia, which was typically administered without a concurrent neuraxial technique. In adjusted models, McIsaac *et al.*[5] observed no difference in survival when considering the anesthesia type administered to each patient. However, the authors observed a strong association between the fraction of cases at each hospital that received neuraxial anesthesia in the year before surgery and 30-day mortality, even after controlling for the specific type of anesthesia each patient received. The association of hospital neuraxial anesthesia use with survival was most pronounced at hospitals in the lowest quintile of neuraxial use, where patients had a 12% greater relative risk of dying within 30 days of surgery compared to patients in the second lowest quintile of neuraxial use prevalence. In contrast, there was only an additional 1% relative increase in survival among patients grouped across the other four quintiles of neuraxial anesthesia prevalence.

What might explain this discrepancy? That is, why would a hospital's anesthesia practice patterns in the previous year be associated with an individual patient having improved survival after hip fracture surgery? One possibility is that the "signature" of anesthesia practice at a given hospital may serve as a marker for other patient, provider, or institutional factors that affect survival above and beyond the specific type of anesthetic a patient receives. While the data of McIsaac *et al.*[5] do not show patterns of utilization of neuraxial anesthesia to be correlated with other measurable differences in the quality of care, such patterns may point to underlying differences in skill among the surgeons or anesthesiologists practicing at hospitals with higher *versus* lower rates of neuraxial use. Alternately, factors not related to practitioner skill, such as the engagement and experience of other operating room staff, may affect both the likelihood that a given patient receives neuraxial anesthesia while also potentially affecting the quality and outcomes of care more generally.

Image: J. P. Rathmell.

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Accepted for publication November 10, 2017. From the Department of Anesthesia and Perioperative Care, the Philip R. Lee Institute for Health Policy Studies, and the San Francisco Center for Healthcare Value, University of California, San Francisco, California (C.L.C.); and the Department of Anesthesiology and Critical Care and the Department of Internal Medicine, Division of Geriatric Medicine, Perelman School of Medicine, the Leonard Davis Institute for Health Economics, and the Center for Perioperative Outcomes Research and Transformation, University of Pennsylvania, Philadelphia, Pennsylvania (M.D.N.).

 Anesthesiology 2018; 128:429-30

<zdoi;10.1097/ALN.0000000000002074>

In the management literature, the value of meaningful but indirect markers of quality has long been recognized, particularly in contexts where quality may be difficult to observe directly. One oft-cited example comes from the seminal 1980s rock band Van Halen.[6] As recounted by the band's lead singer, David Lee Roth, the technical setup for Van Halen's live shows involved extensive work by local arena staff that was required to ensure not only the quality of the performance but also the safety of the performers. To check on the arena teams' attention to detail, the band's management buried deep in the contract rider, amid a list of requests for food to be made available backstage, a request for a bowl of M&Ms from which all the brown ones had been removed. When the band arrived backstage at a new arena, seeing a bowl of M&Ms backstage without any brown candies in it signaled immediately to the band that they could trust the work of the local staff. In contrast, Roth notes, if they saw even one brown M&M backstage, "we'd line-check the entire production. Guaranteed you're going to arrive at a technical error."

Just as adherence to the brown M&M clause in Van Halen's performance contracts provided tangible reassurance of the underlying quality of the production set up, measuring anesthesia care at the institutional level might offer insights as to other unmeasured aspects of an institution's quality and performance. Avedis Donabedian, a key figure in the quest to improve quality measurement in healthcare, noted in 1988 that "some elements in the quality of care are easy to define and measure, but there are also profundities that still elude us. We must not allow anyone to belittle or ignore them; they are the secret and glory of our art."[7] The study of McIsaac *et al.*[5] raises the question of whether patterns of anesthesia choice for hip fracture—like the story of Van Halen's brown M&M test—might provide hints about those otherwise elusive "profundities" of care that distinguish individual hospitals in terms of quality and outcomes. Examples include process differences between hospitals such as better preoperative risk stratification, more effective postoperative prophylaxis of preventable complications, and the presence of subtle differences in an institution's culture of care. This study also underscores the need for high-quality randomized-trial level evidence—ideally obtained through study designs that properly account for potential hospital quality differences across sites—before adopting quality measures that assess the utilization of one or another type of anesthesia at the level of the individual patient.

The results of McIsaac *et al.*[5] have important limitations to consider. Due to the retrospective observational nature of their analysis, the authors could not account for all confounders, including differences in hip fracture severity or the severity of other comorbid diseases. In addition, differences in the patient's level of frailty and overall functional status may have influenced the choice of one anesthetic approach over another. Nonetheless, the analysis controls for a wide array of potential patient and facility-level confounders, making differences in patient disease severity less likely to be the sole explanation for their findings.

Further work will be needed, potentially using qualitative as well as quantitative methods, to understand what underlies the outcome differences the authors observed across the hospitals in their sample. Moreover, although conducted within the context of hip fracture care, this study begs the question of whether similar patterns might be observed for other procedures. Prior comparative effectiveness research in anesthesiology has explored differences in outcomes attributable to the use of neuraxial *versus* general anesthesia for a range of procedures including elective lower extremity arthroplasty and abdominal surgery.[8] Exploring whether those hospitals that more frequently employ neuraxial techniques for these conditions achieve better outcomes—even after accounting for any direct effect of the anesthetic approach—has the potential to yield broader insights into other unmeasured aspects of care that might influence variations in outcomes across hospitals. Pursuing such questions may represent a key step toward more fully comprehending the important elements that comprise high-quality anesthesia practice and better articulating those elusive "profundities" that underpin good care.

Competing Interests

The authors are not supported by, nor maintain any financial interest in, any commercial activity that may be associated with the topic of this article.

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