

# Random Clinical Decisions

## Identifying Variation in Perioperative Care

THE phrase “cleared for surgery” is one that nearly every anesthesiologist has seen documented in the medical record of a patient presenting for surgery. Unfortunately, being “cleared for surgery” means very little to the scrutinizing anesthesiologist. More fundamentally, it is unclear why certain patients are referred to be “cleared” in the first place. In this issue of *ANESTHESIOLOGY*, Wijesundera *et al.* explore the practice of preoperative medical consultation and shed light on this intriguing part of the perioperative process.<sup>1</sup>

Using administrative data from 79 hospitals and more than 200,000 patients undergoing elective surgery in Ontario, Canada, over 5 yr, they observed that more than one-third of patients were referred for preoperative medical consultation. This preoperative medical consultation visit was distinct from routine primary care and presumably hoped to achieve the theoretical goals of preoperative optimization: reducing day of surgery delays or cancellations, day of surgery urgent testing, and ensuring that medical management of chronic comorbid diseases was consistent with contemporary guidelines and perioperative needs. However, the authors observed a striking range of consultation rates across hospitals, from 10 to 897 consultations per 1,000 patients. Of greater interest, although patients undergoing consultation were older and sicker, patient or procedural factors only explained 5.9% of the observed variation in consultation rates across hospitals. Essentially, the consultation process is driven by hospital practice patterns, provider prefer-



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ences, and other unmeasured factors rather than patient risk and procedural complexity.

Quantifying the extent of adjusted variation is the first step in a journey of quality improvement.<sup>2</sup> At its most extreme, unexplained variation is attributable to either the absence of evidence-based guidelines to establish standards of care or the absence of evidence-based care despite accepted standards of care. In reality, a blend between the two extremes is usually the cause of variation in care. Nearly every clinical specialty has described significant variation in care, from percutaneous coronary intervention in acute myocardial infarction<sup>3</sup> to radioactive iodine for thyroid cancer.<sup>4</sup> As a result, what is striking about the data presented by Wijesundera *et al.* is not the presence of variation, but the fact that it has taken so long for a robust analysis of multicenter data to be reported.

Although the field of anesthesiology has been hailed as a patient safety leader for its reduction of catastrophic intraoperative mishaps,<sup>5</sup> our specialty must now expand its quality-improvement efforts beyond rare events. A beginning point is to assess the extent of variation in fundamental processes of care controlled by the anesthesiologist, such as anesthesia technique, use of peripheral nerve blockade, invasive monitoring, blood pressure management strategies, and intraoperative medications. Although sporadic data evaluating the variation in use of general anesthesia for ophthalmic,<sup>6</sup> orthopedic,<sup>7,8</sup> and obstetric<sup>9,10</sup> procedures have been published, our field

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lacks a systematic approach to variation assessment. Assessing variation in practice, and eventually, variation in outcomes, is an essential component to professionalism, a key element which differentiates medicine from a technical career.

There are several root causes for the paucity of systematic, multicenter anesthesiology variation studies. First, most studies evaluating surgical and medical variation are based on administrative data collected as a routine part of the healthcare services reimbursement process. The availability of national, detailed procedural information *via* procedure and diagnoses codes allows insightful exploratory analyses of variation in care for surgical procedures<sup>11</sup> and medical interventions.<sup>4</sup> Unfortunately, these nationally available administrative datasets lack detailed information regarding fundamental anesthesia choices. For example, the commonly used Medicare Provider Analysis and Review data file offered by the Center for Medicare and Medicaid Services does not allow derivation of anesthesia technique, use of concurrent regional or neuraxial blocks, or use of invasive monitoring. Anesthesiology investigators must perform advanced record linking to professional fee claims or state-specific data collection registries to access rudimentary anesthesia technique data. Second, there is a shortage of rigorous, randomized controlled trials establishing strict standards of care in anesthesiology. Practice guidelines in our field are often based on small single-center trials, retrospective analyses, case series, or expert opinions. The challenges of patient blinding, ethical randomization, and operating room efficiency make large scale randomized controlled trials the exception, rather than the rule. As a result, choices such as depth-of-consciousness monitoring<sup>12</sup> or use of epidurals<sup>13</sup> lack consensus benchmarks that allow variation assessment and reduction. Finally, although firmly rooted in science, the field of anesthesiology has had a bias toward the art of medicine. There is a strong individualism component to the practice of anesthesia, with providers spending long and lonely hours behind the surgical drape. Unlike surgeons and medical specialists who constantly direct a team of operating room and floor personnel, anesthesiologists are often a one-person team. This leads to clinical creativity and diversity, with a resulting abundance of epidural anesthesia “cocktails” and airway management techniques. Because the anesthesiologist is at the point of care making and executing second-to-second decisions, there is limited institutional oversight or checks and balances of anesthesiologist decisions. All in all, what our field lacks in randomized controlled trials, we make up in “random clinical decisions.” Even during a single operation, the hemodynamic and pain management techniques may completely change as a result of provider handover.

However, the days of unmeasured variation and oversight may be numbered. As new research suggests that anesthetic interventions may have an impact on long-term outcomes such as surgical site infection, venous thromboembolism, cancer recurrence, and cognitive dysfunction, the need to exercise insightful introspection into our practices is increasing.<sup>14</sup> In addition, as rising costs and an aging population strain the healthcare resources of all nations, institutional

scrutiny of the anesthesiologist’s operating room decisions is increasing.

We can either wait for payers and governments to define appropriate *versus* inappropriate variation, or anesthesiologists can take a leadership role and perform the research necessary to establish clinically meaningful process-of-care measures. Wijeyesundera *et al.* have begun that journey for the preoperative medical consultation decision. The variation they have unearthed needs to be confirmed using clinically rich international datasets capable of delineating the root causes underlying the observed variation. Next, objective research including a comprehensive set of risk-adjustment and outcome measures including clinical results, financial costs, process efficiency, patient satisfaction, and provider satisfaction must identify which patients benefit from preoperative medical consultation. These data would serve to identify truly unnecessary consultations and variation, a necessary step in improving value. This process of identifying variation, understanding variation, establishing optimal care, and measuring adherence to optimal care must be performed for each anesthesiology intervention. Only then can we continue to hail ourselves as patient safety leaders of the future, not just the past and present.

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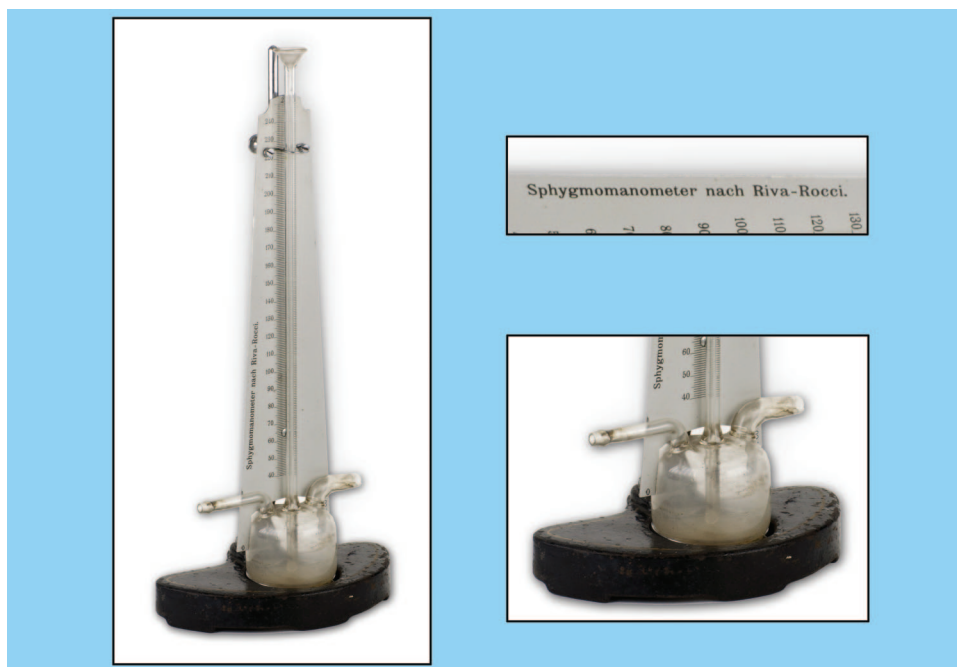
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## ANESTHESIOLOGY REFLECTIONS

### Cushing, Riva-Rocci and Intraoperative Blood Pressure



In January of 1893, Harvard medical student Harvey Cushing witnessed the anesthetic demise of a patient he was etherizing. Cushing considered abandoning medicine but eventually resolved to improve patient monitoring. After years of Halsted surgical residency at Johns Hopkins, Cushing would tour surgical amphitheatres, clinics, and laboratories throughout Europe. In Italy on May 5, 1901, he sketched the mercury sphygmomanometer that Scipione Riva-Rocci was using to measure blood pressure in his Pavian clinics. On returning to Baltimore 4 months later, Cushing introduced blood pressure measurement of anesthetized patients to Johns Hopkins Hospital. Unlike the “home made” originals that Cushing had seen in Pavia, Italy, the Wood Library-Museum’s Riva-Rocci sphygmomanometer (*left*) was manufactured in Germany. The reservoir (*lower right*) of this example is displayed here without rubber tubing, cuff, or mercury. (Copyright © the American Society of Anesthesiologists, Inc. This image also appears in the *Anesthesiology Reflections* online collection available at [www.anesthesiology.org](http://www.anesthesiology.org).)

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