Perioperative Databases

From Data to Improvement of Outcome

ANESTHESIA and surgery have a prominent role in health care, and during the last decade major innovations in anesthesia, surgical technology, and perioperative care have occurred with documented benefits on early and late postoperative outcomes. However, with a continuous increase in healthcare costs attributable to the growing elderly population with comorbidities and the development of expensive new procedures, there is agreement that outcome data must be available such as those provided by anesthesia and surgical perioperative databases. In this context, major advances in the design of large surgical databases have been documented, especially by well-defined risk scoring to allow comparison between institutions such as those used in the National Surgical Quality Improvement Program.[1] Such databases represent a prerequisite to assess organizational aspects and new treatment principles in relation to outcomes and health economics.[2] Another advantage of large databases is to uncover relatively uncommon complications with subsequent focus on patient-centered outcome.[3] In addition, local databases may provide important data when results are compared and adjusted to updated, best-available evidence of care. However, the main question to be asked is how to take the next step with such data to actually achieve an improved outcome[4]; another question to answer is how do we get beyond the fact that major surgery is still a risky affair for the high-risk surgical patient.[5,6]

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History has shown that despite the availability of data and evidence-based guidelines, the translation of evidence into clinical practice often is slow, including in the provision of perioperative care. Although various checklists have been proposed to improve surgical quality,[7] they often have not been based on updated evidence or included the most important care or treatment principles. Thus, the way forward should be based on data-driven discussions and include the important caregivers, such as anesthesiologists, surgeons, surgical nurses, physiotherapists, and primary caregivers, together with hospital administrators.[8,9] These discussions should include an analysis of procedure-specific risk factors, the relevant perioperative pathophysiology, and whether the provided care was in accordance with existing evidence.[5,8] The multidisciplinary discussions on pathogenic mechanisms of the morbidity in question should be based on the simple question "Why is the high-risk surgical patient still at risk?"[5] Such discussions probably represent the most effective way forward, as shown, for instance, in the Danish Hernia Database Collaboration with two annual meetings and outcome data presentation and discussion, including those of anesthesiologists and surgeons. This process has led to major improvements on a nationwide basis.[10] In addition, the multidisciplinary approach is argued from the diversity of factors and care principles that must be adjusted to current evidence if major progress on early postoperative outcomes is to be achieved.[5,8] This has been illustrated especially in colonic surgery with documented improved outcomes.[11] However, such procedure-specific multidisciplinary discussions are relatively easy to perform in smaller regions such as Scandinavia, but more difficult in large countries where the approach must be organized on a reasonable population-based regional

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basis or within specific scientific societies or organizations. Unfortunately, many perioperative databases do not include such a multidisciplinary approach. They also do not include a detailed discussion on how to make progress[4] or specific information regarding the provided perioperative care principles, where each specialty may benefit from each other.[5,6,8,11] Relevant examples are the potential benefits provided by optimal dynamic analgesia from the anesthesiologists but without clear outcome effects, unless the surgical care is adjusted to use the physiologic benefit of improved analgesia on organ dysfunction and the potential for early rehabilitation.[8,9] However, major improvements in surgical technique by minimal invasive surgery in every procedure may not lead automatically to better outcomes unless they are combined with optimized anesthesia and analgesia, fluid management, and updated evidence-based surgical care principles according to the "fast-track" methodology.[8,9] The need for the multidisciplinary approach is emphasized by the risk data presentation from National Surgical Quality Improvement Program analysis of elderly colonic surgery patients,[6] for which the evidence-based care principles (the fast-track methodology)[8,11,12] have not been included or discussed.[6] Thus, the apparent lack of such multidisciplinary discussions and analysis of the database results may hinder optimal progress to improve outcome. Consequently, the results from outcome databases should be reassessed in relation to relevant factors that interact on outcome. Such factors may include surgical technique, type of anesthesia and analgesia, fluid management, and other perioperative care principles.[8] Thus, outcome databases may serve several purposes: monitoring, hypothesis generating for future research, and finally changing practices and improving outcomes.

In summary, more and procedure-specific anesthesiologic and surgical perioperative databases will be required to monitor and improve outcomes. In this process, data-driven multidisciplinary discussion and collaboration are needed on treatment and care principles and adjustment to current evidence. Thus, the cost-effectiveness of such large databases[13] may be even more cost-effective by integrating research and efforts to implement the fast-track methodology[5,8] that has led to better-than-average care.[11] In addition, there is a need to institute the necessary multidisciplinary collaborative research on the relative role of the many perioperative care principles when implementing new anesthesiological and surgical technology.[5,8] In this context, good examples exist from major abdominal surgery[8,11,12] and the potential improvement with newer minimal invasive techniques. This combined strategy has proven valid within the concept of "fast-track surgery"[8,11] and thus represents an expansion of providing hard outcome data *per se* into protocols that may improve early (and late) postoperative outcomes.[5,8,12]

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