

Advancing Surgical Outcomes Research and Quality Improvement Within an Enhanced Recovery Program Framework

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Surgical outcomes have been in increased focus during the last decades not only for humanitarian reasons but also as a prerequisite and potential driver to decrease health care costs. In this article, we want to argue that further improvements in surgical outcomes must stem from a combined approach that integrates quality improvement and surgical outcomes methodologies within the framework of updated, evidence-based perioperative practices (enhanced recovery programs).

Most would agree that up-to-date outcome data are an essential basis for future improvements as “without data on the present, you cannot improve in the future.” Consequently, many regional and national databases have been established around the world, with the American College of Surgeons National Surgical Quality Improvement Program being one of those with most outcome data combined with the necessary analysis of preoperative comorbidities. At the same time, the need for agreement for a uniform classification of surgical complications has been introduced by Clavien et al¹ in a series of important articles and adapted by several other institutions. More recently, the Clavien group has refined the Clavien-Dindo classification index into the novel “Comprehensive Complication Index,” which measures surgical morbidity not only in relation to the most severe, but also to the total burden of complications.

So far, so good. However, merely measuring outcomes may not be enough for improvement, as discussed in some recent provocative studies comparing institutions with and without the use of American College of Surgeons National Surgical Quality Improvement Program or other outcome data. Consequently, such reports call for considerations on future strategies for improvement, but with a continued monitoring through existing well-proven collection of data.²

Firstly, an improved understanding of the perioperative pathophysiology and pathogenesis of postoperative organ dysfunction is a prerequisite for quality improvement,^{3,4} and where future research should define strategies for reduction of undesirable stress responses to the surgical injury. In this context, the classical endocrine-metabolic responses to surgery are mitigated by enhanced recovery programs.⁴ However, with regard to inflammatory responses and the complex immunological postinjury dysfunctions and their consequences for recovery,⁵ there is a need for interventional studies. So far, preoperative administration of a high-dose glucocorticoid is

promising,⁶ but awaiting further procedure-specific outcome and safety data.

Secondly, the introduction of a multimodal, multidisciplinary approach to enhance recovery (the “fast-track” methodology or “enhanced recovery programs”) with a combination of improved surgical techniques including minimal invasive surgery, anesthetic and postoperative pain management, and optimized evidence-based perioperative care principles has led to improved surgical outcomes.^{3,4} In addition, a way forward may be to ask the basic simple questions “why is the surgical patient in hospital today?” or “why is the surgical high-risk patient at risk?”⁷ Such analyses made on a procedure-specific basis will allow the necessary detailed documentation of the patients’ postoperative recovery problems, thereby serving as a basis for further improvement and reduction of morbidity. As an example, in hip and knee replacement often including elderly high-risk patients, these analyses have shown that pain, loss of quadriceps function, and orthostatic intolerance together with organizational issues are the key players and where subsequent focused interventions have led to improved recovery.⁸ However, several future challenges lie ahead for further improvement including optimized procedure-specific opioid-sparing analgesic programs, optimized fluid management including the concept of goal-directed fluid therapy, antiileus programs, organizational challenges with early reinstatement of mobilization to decrease the risk of thromboembolic and pulmonary complications, oral nutrition, and to facilitate rehabilitation programs where necessary.⁴ Other relevant outcomes may include risk of falls, readmissions, cognitive dysfunction, and so on.⁴ Similar efforts, such as the “perioperative surgical home” program, have been initiated in the US with initial findings as demonstrated within fast-track and enhanced recovery programs.

Thirdly, although the benefits of enhanced recovery programs have been demonstrated and are continuously being developed,⁴ several key questions remain to be defined or answered. The first one being how to identify high-risk patients,⁷ thereby providing a basis for potential interventions such as intensified ward care or intensive care use. Secondly, there is a general agreement on the usefulness of predictive risk indices,⁹ but they have so far had little impact on outcomes, and the main question is whether existing predictive indices based on traditional care programs can be translated to institutions with implemented evidence-based updated enhanced recovery programs.^{4,7} In this context, a few well-defined fast-track programs have demonstrated that conventional risk factors such as diabetes, preoperative smoking, and alcohol use may have less impact than usually documented,¹⁰ calling for a reassessment of established risk assessment tools within a fast-track setting with concomitant reduced risk of postoperative organ dysfunctions.

Finally, another important factor for future outcome studies is assessment of the timing of the complications (which comes first?).⁷ Thus, if the reason for staying in hospital is an initial “medical”

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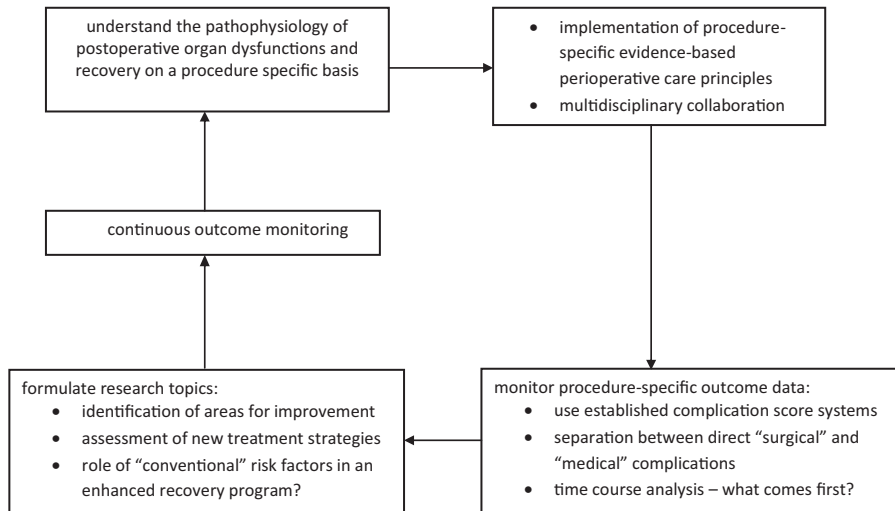


FIGURE 1. Action plan for integrating surgical outcome research and quality improvement as a continuous process.

complication such as cardiopulmonary, thromboembolic, fluid disturbance, paralytic ileus, and so on, the future strategy for improvement will be to further refine the fast-track methodology.^{3,4,7} On the other hand, if the initial postoperative event is a direct “surgical” complication such as wound dehiscence, major bleeding, anastomotic dehiscence, and so on, there is a subsequent risk of developing a “medical” complication.⁷ Consequently, the strategy would be to improve surgical technique.⁷ The focus on “what comes first” is important for future improvement as initial “medical” complications may increase the risk of a subsequent “surgical” complications and vice versa. Unfortunately, there is a lack of detailed large-scale studies for such stratification of surgical complications,⁷ thereby limiting interpretation of previous data with regards to strategies for future improvement.

In conclusion, the future strategy for improving surgical outcomes will require studies with a combination of well-established and validated preoperative risk indices, with use of established complication score systems and considering what came first (“medical” vs “surgical” complications), and within an enhanced recovery program framework with updated evidence-based care principles (Fig. 1). Finally, the approach needs a multidisciplinary collaborative effort.^{3,4,7} These combined strategies that integrate quality improvement, surgical outcomes methodologies, and updated enhanced recovery programs may together with other systems aiming at improving quality¹¹ lead to a promising future for surgical outcomes improvement.

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