

## Closing the Gap between Guidelines and Practice in Perioperative Care

**P**ATIENTS undergoing noncardiac surgery are at risk of adverse perioperative and long-term outcome. For example, data from the PeriOperative Ischemic Evaluation trial (POISE), which enrolled 8,351 patients undergoing noncardiac surgery, showed a perioperative mortality rate of 2.7%, 1.6% had a cardiovascular death, whereas nonfatal myocardial infarction (MI) was observed in another 4.4% subjects.<sup>1</sup> The report by Ausset *et al.* in this issue of ANESTHESIOLOGY confirms this high risk of postoperative complications.<sup>2</sup> When considering a patient for noncardiac surgery, a careful preoperative clinical risk evaluation and subsequent risk-reduction strategies are essential to reduce postoperative complications. To assist physicians with decision-making, clinical guidelines are developed. The aim of clinical guidelines is to improve patient care by providing recommendations about appropriate health care in specific circumstances. Development of clinical guidelines is an important component in improving quality of care. By translating the best available scientific evidence into specific recommendations, guidelines can serve as useful tools to achieve effective and efficient patient care. Additionally, successful perioperative evaluation and management of patients undergoing noncardiac surgery require careful teamwork and communication among all involved healthcare professionals. In 2009, the first European Society of Cardiology guidelines on perioperative care were developed.<sup>3</sup> This decision-making process integrates clinical markers, early coronary evaluation, functional capacity, and the type of surgery involved.

Ausset *et al.* examined the impact of a quality improvement program in practice on the incidence of perioperative MI (PMI) detected by serial measurements of troponin and long-term cardiac outcome.<sup>2</sup> For this study, a total of 378 surgical procedures were included before (P1) and after quality enhancement (P2). The strength of this manuscript is the quality improvement program with a focus on multiple interventions instead of a single component. Their main results revealed a high incidence of 5.5% PMI with troponin release in the first 3 days after major orthopedic surgery. This type of surgery is categorized as intermediate-risk surgery in the European Society of Cardiology perioperative guidelines. The high incidence of PMI is in line with earlier research showing a 30-day incidence of troponin release of 6.9% in 1,066

intermediate noncardiac surgery procedures.<sup>4</sup> On the other hand, in vascular surgery patients, which are recognized as high-risk surgery, perioperative troponin is demonstrated to be as high as 20%.<sup>5</sup> These numbers underline the high cardiac risk of patients undergoing noncardiac surgery and the importance of careful perioperative risk management in these patients.

In their study, Ausset *et al.*<sup>2</sup> improved the quality of care with a relatively simple program. The protocol addressing issues such as hypovolemia, hypoxemia, and hyperglycemia was approved by and repeatedly explained to the staff and accessible in the operating rooms and the hospital electronic network. In our opinion, the addition of web-based patient management tools would be an ideal extra tool to assist physicians with providing decision support and collecting data. Quality of postoperative care was improved in different aspects. They report a tighter patient monitoring, with more patients receiving oxygen, insulin, and blood transfusion. Surprisingly, prescription of cardiovascular medication was not increased in P2, indicating room for further improvement. In our opinion, the improvement of quality care observed in the study of Ausset *et al.* is an important step in the improvement of contemporary care of noncardiac surgery patients. Unfortunately, they did not provide information on the performed or prescribed indicators in patients who had an indication for the specific quality of care indicator. This would give, besides the improvement of overall management, more insight in current status of evidence-based clinical practice.

Importantly, improvement of postoperative care resulted in a decrease of both early and late major cardiac events in the study of Ausset *et al.* Incidences of PMI and major adverse cardiac events were 8.9% *versus* 3.9% ( $P = 0.04$ ) and 8.1% *versus* 1.9 ( $P = 0.004$ ) for P1 and P2, respectively. Furthermore, the occurrence of PMI with troponin release was correlated with poor long-term cardiac outcome. These data suggest that improving long-term outcome can be achieved by targeting PMI.

There has to be some caution when interpreting these results. First, the study was not a randomized controlled trial,

◆ This Editorial View accompanies the following article: Ausset S, Auroy Y, Verret C, Benhamou D, Vest P, Cirodte A, Lenoir B: Quality of postoperative care after major orthopedic surgery is correlated with both long-term cardiovascular outcome and troponin Ic elevation. ANESTHESIOLOGY 2010; 113:529–40.

Accepted for publication May 28, 2010. The author is not supported by, nor maintains any financial interest in, any commercial activity that may be associated with the topic of this article.

and an effect of time could not be excluded. Furthermore, as the authors already mention, observed effects can be due to the so-called Hawthorne effect, referring to a situation in which an individual's behavior changes when they realize they are observed. The sample size was rather limited, which is also reflected by the large confidence intervals. Moreover, it would be very interesting to expand this study to a multicenter format because quality of care and patient outcome are known to vary widely among hospitals.

Guideline development needs to be completed with guideline implementation, which should ultimately lead to evidence-based clinical practice. To operationalize the recommendations in clinical practice guidelines, specific performance measures are generated. These are recommendations from guidelines that are measurable, actionable, and strongly associated with improved patient outcome. These performance measures are now increasingly used for public reporting as assessing quality of care is becoming more and more important in contemporary medical practice. Establishment of accurate and valid performance measures in noncardiac surgery is therefore highly recommended. These findings indicate the need for more initiatives improving quality of care in patients undergoing noncardiac surgery. Guidelines are continuously updated, and consequently ongoing registries are needed to reflect current clinical practice. In this respect, outcome measures can be used as an instrument to validate the guidelines. After all, the main goal of guidelines is to improve patient care and subsequent outcomes. Improvement of patient outcome per hospital can be achieved by targeting these performance parameters. Creation of institution-specific performance feedback reports can be of additional value. Internal (trends over time) and external (comparison with other institutions) benchmarking can further facilitate improvements of care. We would like to encourage initiation of such a large international multicenter ongoing registry in patients undergoing noncardiac surgery. In combination with effective quality improvement programs, in-

cluding critical pathways, continued physician and patient education, and multidisciplinary hospital teams, the gap between guidelines and clinical practice can be closed.

**Sanne E. Hoeks, Ph.D., Robert-Jan Stolker, M.D., Ph.D., Don Poldermans, M.D., Ph.D.,** Department of Anesthesiology, Erasmus Medical Center, Rotterdam, The Netherlands. d.poldermans@erasmusmc.nl

## References

1. Devereaux PJ, Yang H, Yusuf S, Guyatt G, Leslie K, Villar JC, Xavier D, Chrolavicius S, Greenspan L, Pogue J, Pais P, Liu L, Xu S, Málaga G, Avezum A, Chan M, Montori VM, Jacka M, Choi P: Effects of extended-release metoprolol succinate in patients undergoing non-cardiac surgery (POISE trial): A randomised controlled trial. *Lancet* 2008; 371:1839–47
2. Ausset S, Auroy Y, Verret C, Benhamou D, Vest P, Girod A, Lenoir B: Quality of postoperative care after major orthopedic surgery is correlated with both long-term cardiovascular outcome and troponin Ic elevation. *ANESTHESIOLOGY* 2010; 113:529–40
3. Poldermans D, Bax JJ, Boersma E, De Hert S, Eekhout E, Fowkes G, Gorenek B, Hennerici MG, Iung B, Kelm M, Kjeldsen KP, Kristensen SD, Lopez-Sendon J, Pelosi P, Philippe F, Pierard L, Ponikowski P, Schmid JP, Sellevold OF, Sicari R, Van den Berghe G, Vermassen F, Hoeks SE, Vanhorebeek I: Guidelines for pre-operative cardiac risk assessment and perioperative cardiac management in non-cardiac surgery: Task Force for Preoperative Cardiac Risk Assessment and Perioperative Cardiac Management in Non-cardiac Surgery of the European Society of Cardiology (ESC) and endorsed by the European Society of Anaesthesiology (ESA). *Eur Heart J* 2009; 30:2769–812
4. Dunkelgrun M, Boersma E, Schouten O, Koopman-van Gemert AW, van Poorten F, Bax JJ, Thomson IR, Poldermans D: Dutch Ecocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography Study Group: Bisoprolol and fluvastatin for the reduction of perioperative cardiac mortality and myocardial infarction in intermediate-risk patients undergoing noncardiovascular surgery: A randomized controlled trial (DECREASE-IV). *Ann Surg* 2009; 249:921–6
5. Winkel TA, Schouten O, Hoeks SE, Verhagen HJ, Bax JJ, Poldermans D: Prognosis of transient new-onset atrial fibrillation during vascular surgery. *Eur J Vasc Endovasc Surg* 2009; 38:683–8