Predicted morbidity and mortality in major gastroenterological surgery

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Published online: 15 October 2011

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Predicting outcome in GI surgery can be important for several reasons. It is an indicator of quality that can help patients and surgeons in decision-making—should the patient be advised to undergo surgery, it can aid in the selection of procedures and suggest the ranges of postoperative morbidity and mortality for these procedures. A risk-scoring system can be utilized for patient counseling and informed consent discussions, for identifying high-risk patients who would benefit from disease optimization, and for risk adjustment when comparing outcomes between institutions. Further, risk adjustment and stratification play an important role in quality assurance and clinical research. For patients, reported figures on morbidity and mortality may also be useful when choosing the hospital that they wish to treat them. Every hospital is concerned about its own reputation and ability to attract the most competent staff, and it is a generally accepted assumption that surgical audits between hospitals will drive quality improvement. Health authorities could also use these markers to help achieve the economic stimulation of specific hospitals.

Adequate stratification and scoring of risk should be considered an essential aid to clinical practice. In gastric cancer, this is exemplified by D1 versus D2 resection, among which D2 resection is assumed to incur a greater risk of morbidity and mortality. Patients with severe comorbidity may therefore be advised to undergo operations that imply lower risks of complications and mortality in return for an assumed to be acceptable risk of a reduced

long-term prognosis. Scoring systems could therefore be applied in audits, multidisciplinary team meetings, by national health authorities to encourage the centralization of a specific therapy and to accredit specific hospitals, as well as in the establishment of national guidelines for specific disease therapies.

One of the most commonly used scoring systems is the ASA classification, although this is subjective and has wide interobserver variability. The ASA score has been used to categorize preoperative risk, and is a good indicator of postoperative mortality, although it does not quantify morbidity or mortality. Several scoring systems such as the Surgical Risk Scale and POSSUM include the ASA classification, thus implying that there is a subjective element in these scoring systems too. On the other hand, several studies have shown the importance of subjective assessment; the surgeon's gut feeling is very important, and compares favorably with well-known scoring systems. It should also be noted that there are still no scoring systems that take into account quality of life or return to pre-existing function.

One requirement when applying scoring systems for quality is that they are robust and validated. In order to be effective for comparisons, the results should not differ across country borders or hospitals. Most systems include varying constants in addition to 10–20 variables, and for practical purposes a computer program is needed to calculate the scores. The systems should also be simple to understand and use in daily life. There are several systems that report quality of care, such as Ranson, Possum, P-Possum, M-PASS, and mE-PASS, of which the last is the easiest to apply. Several authors have analyzed patient series using POSSUM scores, and this has also been applied in gastric cancer patients. One of the most interesting studies was performed by Bollschweiler et al. [1],

This editorial refers to the article doi:[10.1007/s10120-011-0052-2](https://doi.org/10.1007/s10120-011-0052-2).

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who found that the POSSUM score was valuable for assessing peri- and postoperative courses in patients undergoing D2 gastrectomy, but of no use for the preoperative prediction of postoperative courses. Haga and coworkers [2] are the main proponents and developers of E-PASS and the subsequent mE-PASS, and their results following surgery for gastric cancer are presented in the current edition of *Gastric Cancer*. mE-PASS is a further development and refinement of E-PASS, and the benefit of this system is that it can be used in a preoperative setting. The authors' main conclusion is that the mE-PASS scoring system is a good marker of morbidity and mortality in most gastroenterological procedures. The E-PASS scoring system has also been validated in patients outside Japan, where it was developed. In addition to gastric cancer, it was also shown that it reliably predicts morbidity and mortality in pancreatic resections [3], whereas it was found that it was a most reliable scoring system for mortality but not morbidity with liver resections [4]. A specific problem related to mE-PASS is that the scoring is performed preoperatively, so it does not account for the possibility that the planned surgical procedure may be changed intraoperatively. This can be accounted for in surgical audits by recalculating the mE-PASS using the actual operative procedure and not the preoperatively planned one. In order to function as a benchmark between hospitals, it is very important to perform the scoring preoperatively, since any postoperative scoring will hide operative complications that could have been avoided by better surgery. Haga et al. [2] found that later study periods gave better goodnesses of fit for mE-PASS. The explanation for this might be that treatments improve over time, and this implies that every scoring system should be re-evaluated and recalculated periodically. Following such a re-evaluation, and as a consequence of progress in medicine, in order to get the best observed versus expected morbidity and mortality

rates, the specific scoring system can be corrected by changing the constants attached to the various variables incorporated into the scoring system.

If perioperative morbidity and mortality scoring is going to be of continuous importance, every major procedure in a specific country should be scored. In order to reach nationwide importance, the scores should be part of the patient's electronic documentation, and probably also part of the reimbursement system. If the scoring system is easy to apply, this can be done on a regular basis, thus avoiding any selection bias. However, the continuous scoring or registering of patient data implies non-negligible expenses for society or the patient. In addition, some of the doctors time is directed away from patient work, which is also a cost to society. So far, perioperative morbidity and mortality scoring is most important in scientific publications. Before establishing a permanent scoring system, it is probably worth analyzing and possibly also simulating the cost-effectiveness of such a system.

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