



Enhanced recovery after surgery: a continuous evolving pathway

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More than 15 years have been passed since Henrik Kehlet introduced the concept of “Fast Track”, intended as a multimodal approach to optimize perioperative care in patients with colorectal diseases, subsequently named enhanced recovery after surgery (ERAS) program (1,2). This revolutionary process was initially hampered by a phase of skepticism, to a fear in abandoning consolidated traditions and to the poor quality of evidence available in literature, but in force of an increasing amount of body of scientific evidence by means of high-quality randomized controlled trials (RCT). ERAS pathway is now applied to different surgical specialties and procedures and promoted through society’s educational meeting and guidelines (3). Nevertheless, data from different countries reporting length of stay around 8–10 days following colorectal resections indicated that the ERAS pathway is still not widely adopted (4).

The ERAS Society is now responsible for publishing guidelines for perioperative care following different type of surgery and pathologies. The Guidelines are published by the ERAS® Society and in some cases also as a joint effort with other medical societies such as the European Society for Clinical Nutrition and Metabolism (ESPEN) and the International Association for Surgical Metabolism and Nutrition (IASMEN), part of the International Surgical Society (ISS). Colorectal surgery was the first specialty to implement ERAS in the early 2000’s. Several consensus reviews and guidelines for colorectal surgery have been published so far (3,5,6). The clinical practical guideline from the American Society of Colon and Rectal Surgeons and the Society of American gastrointestinal and Endoscopic Surgeons are the latest published (7).

The majority of the ERAS elements were given strong recommendation grading according the GRADE system in the last two published guidelines (6,7). However, there is still a lack of high level of evidence of the included studies for the majority of the items evaluated and thus, despite the efforts of the different societies in adjourning and revising the current guidelines in light of new evidence, a continuous lack of sufficient implementation of the available scientific evidence has been recently reported (8). Should we consider this phenomenon as a tendency of the scientific community to regard conclusions of the current guidelines with some reservation, or a normal process as reported by Lassen, that changes in the clinical practice occur after 15 years after clear evidence is available? (5). A lack in the implementation process is confirmed by data coming from a multi-institutional North American data registry recently published (9). The paper shows that among 8,139 colectomies distributed over 113 hospitals a low (0–5 items) to moderate adherence (6–9 items) to ERAS protocol was observed in 5,374 cases accounting for 66.1%. Similarly, a review paper from Europe including 34 studies reports a pooled rate of adherence of 68% pre, 72% intra, and 53 % postoperatively (10). This trend, of course, goes in the opposite direction of the increasing body of evidence of the predictive role of single ERAS elements identified in the more recent guidelines. Moreover, it undermines the basic principle that a high adherence to Enhanced Recovery Protocols (ERPs) components is associated to an earlier recovery, shorter length of stay, and decrease in the postoperative complication rate, as demonstrated by the majority of studies available in the literature and

by the largest meta-analysis on this issue which include 2,376 patients, from 16 different RCT papers (11). A possible explanation to this phenomenon should be ascribed to the fact that guidelines include too many components of care to be instituted. Moreover, it is difficult to identify which are the most beneficial components among the “whole package” since they are generally implemented simultaneously, and probably there is no a standardized framework for evaluating ERAS programs. The components identified as major predictors of better postoperative outcomes, in fact, varies from studies to studies, confirming an objective difficulty in assessing the most beneficial in predicting a better outcome (12,13). The identification process of outcome predictors was easier at the beginning of the experience with enhanced recovery in the “Fast Track Era”. The initial program in colonic surgery used only few principles of ERAS, such as epidural analgesia, preoperative counselling, early mobilization, early feeding, removal of nasogastric tube and drains (10,11). Since then about 17 items have been proposed and introduced, the application of which, especially in low and low volume, remains difficult and incomplete (12). Many authors, including some notable ERAS founders, calls for a return to the basic pathophysiological principles of the program. In particular, Henrik Kehlet in a recent review paper suggest that these essential elements of care with proved high scientific evidence should be in focus rather than expanding adherence to all the other less evidence-based components in most ERP protocols. At the same time, the author recommends the implementation of the current established scientific evidence for ERAS practices, in order to fill the gap between theory and clinical practice (14).

It should be emphasized that studies employing the colorectal guidelines show that with better compliance significant improvements in patient's outcomes is obtained, as well the reduction in postoperative complications rate (12). ERAS protocol and thus the related guidelines should be considered as a dynamic continuing evolving process which requires continued audit in place to guide compliance and to improve quality, according to changes in the clinical and surgical practice. The case of laparoscopy is emblematic, since mini-invasive approach has been widely demonstrated by means of large RCT trials to improve outcome in ERAS (15,16). Moreover, it carries some changes in the surgical practice and in ERAS protocol accomplishment, such as for thoracic epidural, which was a mainstay for open surgery but not obligatory in laparoscopic approach (17). Under this view, it is of paramount

importance for further development of ERAS to recognize that current elements of ERAS may need to be modified to take into account the growing literature with a continuous critical analysis of the evidence and the guidelines.

Current problems in order to implement and obtain an optimal functioning of the ERAS process are represented by the identification of barriers to implementation. This is a relative new topic with growing interest (18,19). In recent papers a series of interview were carried out with key stakeholders in order to identify barriers preventing optimal functioning of the program. Patient-related factors such as elderly age and associated comorbidities, patients own expectation and self-limitations, or staff related factors (lack of willingness in changing attitude in physicians) were identified as possible barriers to implementation. Moreover, practice-related issues and lack of resources were also recognized as hampering factors (18). These findings have been recently confirmed in a study (19) which has shown significant differences in protocol compliance in a group of 639 patients who differed from the socio-economic and racial viewpoint. Their findings suggest that short-term differences in the process adherence appear to be mitigated by quality monitoring. Practice innovation within colorectal surgery, which has been remarkable in recent years, has specifically been found to discriminate by underlying patients' demographics. Surgical disparities have been shown to decrease when surgery is conducted in high volume centers and quality-oriented environments (19). This seems to confirm the thesis that, although colorectal surgery is rather widespread in the territory, adherence to the ERAS protocol is higher in dedicated and high-volume centers. Moreover, ERAS pathways may be a useful component of a quality improvement program to reduce difference in surgical care. Indeed, although differences in the various socio-economic sub-populations are reported in the aforementioned study, these have been considerably reduced in the transition from pre-ERAS to post-ERAS era.

A further challenge that the ERAS program is now facing is about its role in major oncologic surgery. Nowadays many patients undergo neoadjuvant and adjuvant therapies, since these treatments will lead to “multiple hits” on bodily functions, including integrity of the immune system, and thereby potentially cancer survival. ERAS program in such patients may be beneficial, as the reduction of medical morbidity in colorectal ERAS patients is documented (20) and may be important for long-term survival, since several studies have shown early postoperative morbidity to impair long-term outcomes (21).

Another actual and hot topic pertains the different figures that need to be involved in the ERAS pathway and their education and re-education process necessary for the good implementation of the protocol. In the initial Fast-Track pathway introduced by Henrik Kehlet, a multidisciplinary collaboration among anesthesiologist, surgeons, nurses and physiotherapists has been indicated as a fundamental prerequisite for a successful ERAS program (1,2). The same author also suggests the use of a specific ward, dedicated anesthesiologists, and a leader responsible for coordination of updates and training, regular auditing, and dissemination of results. Nevertheless, repetitive and continuous education is fundamental for implementing the adherence. In the Netherlands, a 10-month specific structured implementation program in accordance to ERAS guidelines and protocol has led to a decrease of length of stay from 9–10 to 6 days, however in the subsequent 10-month period of follow-up, length of stay increased again, due to absence of ongoing education and audit (22). A recent study evaluated the role of residents in the application of the ERAS protocol, making a distinction between junior and senior residents (23). In the literature, the mention of the resident role in the perioperative management is very poor. This suggests that there is an assumption that residents play a passive role in decision making, which is not true, since many decisions, particularly about postoperative care, are made by residents. The study theorized the high turnover rates in the staff to be a barrier to ERAS implementation. These evidences suggest that particular attention should be paid to staff training and monitoring; dedicated ERAS staff, responsible for protocol implementation and quality, significantly reduced duration of stay and improved outcome. A recent study hypothesizes the use of an “ERAS implementation program”, consisting of detailed coaching and supervision in “Train the Trainer” sessions, including a surgeon, an anesthesiologist and a nurse leader acting as coordinators, at a given site in a particular surgical area (24). A reflection about that is mandatory, since ERAS program requires complete collaboration and integration among those figures, as far as concern pre-operative counselling, patient's education, early discharge and post-operative requirements. The organization of quarterly or half-yearly meetings, including all the aforementioned figures, could be an excellent solution to emphasize any progresses or regressions in ERAS application, in order to accomplish development and improvement in some ERAS item implementation, if necessary. This meeting could be very useful to correct and educate any new collaborator and to

focus on every fault or oversight committed.

In conclusion, the future of ERAS, depends on new concepts of team-works, continuous audit and support of data driven change and improvement. This latter process is mainly dependent on societies educational meetings, in publishing and revising the guidelines in light of new evidence. The ERAS society, under this view is very active in coordinating activities worldwide and with the available ERAS interactive audit research. However, although much work has been done, so much remains to do before the goal of “risk and pain-free surgery” is reached.

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