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Diffusion of Enhanced Recovery principles in gynecologic oncology surgery: Is active implementation still necessary?

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HIGHLIGHTS

- Enhanced Recovery After Surgery (ERAS) reduces length of recovery and length of hospital stay for gynecologic oncology surgery.
- Despite the well-known effects of ERAS in general surgery, only little spontaneous diffusion to other closely related specialties took place.
- A structured and actively supported process is needed to successfully spread enhanced recovery practices.

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ABSTRACT

Objective. Spontaneous diffusion of the evidence-based Enhanced Recovery After Surgery (ERAS) program from an early adopter department (colorectal surgery) to other closely related departments (gynecologic surgery) within the same hospital could be expected. Given this diffusion hypothesis, this quality improvement study examines the value of active implementation of ERAS in addition to spontaneous diffusion.

Methods. A nonrandomized, pre-post intervention study was conducted at a tertiary referral hospital. Prospective data of consecutive patients who underwent abdominal surgery between March, 2010 and March, 2011 for gynecologic malignancies were collected and compared with those of a historical cohort of patients treated before the structured implementation of ERAS by an expert team. Outcomes were length of hospital stay, length of functional recovery, and compliance to protocol care elements.

Results. Seventy-seven patients treated after structured implementation of ERAS were compared with 38 patients included in the historical cohort. Most women had surgery for ovarian or endometrial cancer (48% and 37% respectively). Postoperative care mostly lacked ERAS elements and needed to be actively implemented. With structured implementation, a reduced time to functional recovery (median 3 versus 6 days, $p < 0.001$) and a shorter length of hospital stay (5 versus 7 days, $p < 0.001$) were achieved.

Conclusions. After several years of practicing ERAS in colorectal surgery, spontaneous spread of ERAS principles to gynecologic oncology surgery occurred partially. The results of this study underscore the need for a structured and supported pro-active process to implement the ERAS program in a complete and successful way.

Background

A major challenge in healthcare is to incorporate innovations into routine clinical practice. Many innovations require an intensive, well-planned approach to become widely adopted [1,2]. Although it usually takes many years to change well-established care, spontaneous spread of innovations can occur. Innovativeness is the essential factor in this process [3,4]. Apart from differences in diffusion rate, the completeness of adoption and the adherence in clinical practice also vary [2,5]. The multimodal Enhanced Recovery After Surgery (ERAS) program aims at a more evidence-based perioperative care and challenges the change in routine clinical practice [6]. ERAS was introduced to facilitate improvement of health care quality in elective colorectal surgery [7].

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The program aims to minimize surgical stress by maintaining normal physiology to the best possible extent. As a consequence, postoperative recovery quickens and length of hospital stay decreases [6,8–10]. The ERAS program consists of several preoperative, intraoperative, and postoperative elements and is currently general practice in colorectal surgery [10]. Because of positive results without additional morbidity or mortality, the program is gaining ground in other surgical fields such as orthopedics, thoracic surgery, urology, and gynecology [9,11]. However, no randomized controlled trials have been conducted in gynecologic surgery in general [12], although favorable evidence has been provided by several prospective and retrospective studies for both malignant and benign pathologies [13–20].

In the Netherlands, the introduction of the ERAS guideline was pioneered by the surgery department of Maastricht University Medical Centre (MUMC). The department participated in a collaboration of five European University or specialized hospitals in 2001 to develop, introduce, and evaluate a new evidence-based program with 19 key recommendations [21]. This program was based on the original multimodal concept of Kehlet [7]. In 2006, a breakthrough project was initiated to achieve nationwide implementation of the ERAS protocol in 33 colorectal surgery departments [22]. Although several studies performed in colorectal surgery reported that consistent implementation of ERAS in clinical practice is difficult [6,23,24], spontaneous uptake of ERAS guidelines in gynecology could be expected after several years. This could result from the nationwide positive results in colorectal surgery, the strong collaboration between clinicians in colorectal and gynecologic surgery, the involvement of the same anesthesiologists during operative procedures, and sometimes mixed surgical wards. Furthermore, the awareness of the need for high-quality perioperative care has increased in general. This raises the question of whether active implementation of ERAS is still necessary. This quality improvement study examines the level of spontaneous diffusion of ERAS in gynecologic oncology surgery and the additional value of a pro-active implementation process on the adoption of ERAS in clinical practice.

Methods

Study design

A single center, non-randomized, quality improvement study was conducted at the Department of Gynecology of Maastricht University Medical Centre in the Netherlands. This tertiary referral hospital is one of the Northern-European hospitals that pioneered the implementation of the ERAS guideline within the Department of Colorectal Surgery in 2001 [25] and is identified as one of the eleven centers of excellence of the ERAS Society (www.erassociety.org). A pre–post intervention design was used to assess the level of spontaneous uptake of ERAS elements and to examine the impact of active implementation on the adoption of the evidence-based ERAS program in gynecologic oncology surgery. After active implementation of ERAS at the Department of Gynecology in 2009, a prospective cohort of consecutive patients undergoing gynecologic surgery between March, 2010 and March, 2011 (post-implementation group) was compared with a historical cohort treated between January, 2007 and January, 2008 (pre-implementation group), before the ERAS program was actively introduced in gynecologic surgery. To exclude the possible influence of preparation activities, the one year period before implementation was randomly chosen as the period in which implementation of the ERAS program was not yet discussed. Considering the learning effect and to guarantee management according to a fully implemented program, analysis of the post-implementation study group was started six months after the initiation of the structured implementation of ERAS. The web-based Alberta Research Ethics Community Consensus Initiative (ARECCI) ethics screening tool for quality improvement research projects was used to determine the appropriate ethics review requirements [26]. Based on the assigned category of minimal risk, the study was exempted from institutional review board approval.

Patient population

All women aged 18 or over who underwent abdominal surgery through a transverse or midline incision for suspected or diagnosed ovarian, endometrial, or cervical cancer were included consecutively during the two predetermined study periods. Patients underwent operative cytoreduction or (radical) hysterectomy with bilateral salpingo-oophorectomy with and without pelvic lymphadenectomy. No exclusion criteria for participation in this study were used.

Implementation strategy

In October, 2009, the ERAS guideline [21] was actively introduced at the Department of Gynecology for patients undergoing major abdominal surgery. The implementation was directed by a multidisciplinary expert team who had already implemented the ERAS guideline for colorectal surgery in the Netherlands. This team involved a surgeon, an anesthesiologist, and an implementation expert. The expert team was completed with two gynecologic oncologists, a nurse practitioner, and the director of nursing of the gynecologic department. The team educated other professionals who were involved in the perioperative period and was responsible for the dissemination, execution, and evaluation of the implementation process. Monthly audit and feedback sessions were organized to evaluate daily practice and to add further refinements for the optimization of perioperative care.

Pre-implementation group

Perioperative care in the historical 2007–2008 cohort group, before the supported implementation of the ERAS guideline in gynecology, was based on spontaneous diffusion of ERAS elements from colorectal surgery and was not explicitly established in protocols. In essence, it depended more on the personal preferences of the responsible gynecologist. Providing thromboembolic and antimicrobial prophylaxis to operative patients was already standard practice.

Post-implementation group

Patients in the post-implementation group were managed in accordance with the ERAS protocol using a previously described, evidence-based perioperative pathway [21]. The protocol consisted of extensive preoperative counseling, no preoperative oral fluid restriction, no bowel preparation, and carbohydrate loading up to 2 h before surgery. Long acting anesthetics and opioids were avoided, and a thoracic epidural catheter was additionally used for analgesia. Use of drains and nasogastric tubes was limited. In the postoperative period early mobilization and oral intake were stimulated. The implemented elements of the ERAS protocol are described in more detail in Supplementary Table 1 (S1).

Outcome measures

The primary endpoint with respect to the successful adoption of ERAS management was the length of hospital stay, defined as the number of nights a patient stayed in the hospital after surgery. If readmission occurred within 30 days after surgery, the days of readmission were included in the total length of hospital stay. Secondary outcome measures were length of functional recovery and compliance to selected ERAS protocol elements. Functional recovery was achieved when patients tolerated a normal diet, mobilized independently and were comfortable on oral analgesia. The protocol elements scored were avoidance of preoperative bowel preparation, use of epidural anesthesia, avoidance of nasogastric tubes or removal at the end of surgery, early nutrition, and