Perioperative Care Pathways for Enhanced Recovery and Anesthesia

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Introduction
Enhanced Recovery (ER), also known as Enhanced Recovery After Surgery (ERAS), is more than fast-track surgery and anesthesia. It refers to multimodal care pathways designed to accelerate patient recovery by reducing the surgical stress response and supporting the physiologic function.1,2 These procedure and anesthesia-specific pathways form an integrated continuum, as the patient moves from home through the preoperative, intraoperative, and postoperative phases of surgery and home again. A key component of ER is patient and family engagement, which helps patients better prepare for surgery and discharge.3 In this article, we provide an overview of ER and discuss facilitators and challenges to its implementation.

Background
Suboptimal care in the preoperative, intraoperative, or postoperative phases of surgery may compromise the entire care pathway, resulting in poor patient outcomes.4 The incidence of postoperative complications in patients undergoing surgery in the United States remains high. The rate of surgery and anesthesia-related complications has been shown to vary from 25 to 48 percent, depending on the complexity of the surgery.5-7 As of October 2008, Medicare no longer pays hospitals for costs associated with certain preventable errors (e.g., surgical site infections, poor glycemic control, and iatrogenic pneumothorax) and “never events” (e.g., surgery on the wrong patient, the wrong surgical procedure, and surgery on the wrong body part).8 Patients who develop postoperative complications are at increased risk for short- and long-term morbidity and mortality.9

The costs associated with postoperative complications are substantial, significantly adding to the total cost of care. For example, after examining records of 1,200 patients undergoing major abdominal surgery, Vonlanthen et al.10 found that the mean cost for patients with one or more postoperative complications was more than double that of the patients with an uneventful procedure ($62,392 vs $27,946).10 In another analysis of 2,250 patients undergoing general or vascular surgery, patients with one, two, and three or more complications added $6,358, $12,802, and $42,790 respectively, to the cost of the procedure.11

These findings highlight the pressing opportunity for the broad-based adoption of interventions to improve quality of care, reduce variation in care, postoperative complications, and cost. ER facilitates the transition from traditional to evidence-based practices to improve patient satisfaction and outcomes, while decreasing cost of care.12

A growing body of evidence shows significant improvements in patient care after introducing ER, such as reduced length of stay without readmission, lower pain scores, faster return to bowel function, and earlier mobilization.1,3 In one study, implementation of ER for colorectal surgery was associated with a significantly reduced length of stay (five days in the ER group vs. seven days in the traditional group).13

Components of an Enhanced Recovery Pathway
Integrated, procedure-specific ER pathways offer a comprehensive approach to engage and optimize the patient across the perioperative period. The patient, as a member of the multidisciplinary team, communicates and collaborates with the healthcare team to develop the plan of care specific to the procedure and ER pathways.14 The main components of ER include preoperative counseling, optimization of nutrition, standardized analgesic and anesthetic regimens, and early mobilization.2 A list of common ER components is presented in Table 1.

Table 1. Common Components of Enhanced Recovery2,3,15

<table>
<thead>
<tr>
<th>Preoperative Phase</th>
<th>Intraoperative Phase</th>
<th>Postoperative Phase</th>
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<tbody>
<tr>
<td>* Patient/family education</td>
<td>* Epidural/regional blocks</td>
<td>Early removal of urinary catheter</td>
</tr>
<tr>
<td>* Shortened fasting</td>
<td>* Laparoscopic/minimally invasive surgery</td>
<td>No nasogastric tube</td>
</tr>
<tr>
<td>* Fluid &amp; carbohydrate loading</td>
<td>* Normothermia</td>
<td>* Avoid salt and water overload</td>
</tr>
<tr>
<td>* No bowel preparation</td>
<td>* Perioperative fluid management Avoidance of tubes, drains, and lines</td>
<td>* Prevention of PONV</td>
</tr>
<tr>
<td>* Antibiotic prophylaxis</td>
<td>* Early mobilization</td>
<td>* Non-opioid oral analgesia</td>
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<tr>
<td>* Thromboprophylaxis</td>
<td>* Defined discharge criteria and patient education</td>
<td>Early oral nutrition</td>
</tr>
<tr>
<td>* No premedication</td>
<td>* Gum chewing</td>
<td>** Early mobilization</td>
</tr>
</tbody>
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Notes: * Anesthesia-specific areas of care ** Maintain lower extremity function, if using regional anesthesia

Anesthesia-Specific Areas of Enhanced Recovery
There are several components of ER outlined in Table 1 that are specific to anesthesia. During the preoperative phase, anesthesia professionals are responsible for the patient assessment and contribute to the understanding of the perioperative and post-discharge experience. This information supports the patient to set realistic expectations for anesthesia, surgery, and recovery. The patient’s ability to actively participate in their care may decrease anxiety and improve safety, even after discharge. The American Society of Anesthesiologists 2011 Prac-
tice Guidelines for Preoperative Fasting no longer recommend NPO after midnight.16 The fasting recommendations include a light meal six hours before surgery and clear fluids until two hours prior to surgery. A 12.5 percent carbohydrate clear beverage received two hours prior to surgery decreases preoperative hunger, thirst, anxiety, and insulin resistance postoperatively.4 If indicated, patients may also receive antibiotic prophylaxis to reduce the risk of infection related to the surgical procedure.2,4,17

During the intraoperative phase, anesthesia professionals consider multimodal pain management strategies that eliminate or significantly reduce use of opioids to facilitate early mobilization and return to normal diet while also reducing postoperative nausea and vomiting (PONV). Regional anesthesia should be used whenever possible.17 A preoperative, multimodal regimen may include non-steroidal, acetaminophen, gabapentin, and/or tramadol to reduce or eliminate the need for opioids.18 Active warming is used to maintain normothermia. To maintain euvolemia and minimize salt and water overload fluid during surgery, balanced crystalloid solution is infused at 1 to 3-mL/kg per hour.17

During the postoperative phase, avoiding salt and water overload, preventing PONV, and administering non-opioid oral analgesia continues to be important. Early mobilization and being out of bed is encouraged to begin on the day of surgery and progress to normal levels of activity. Patients are discharged after they meet specific discharge criteria and receive detailed instructions to engage in self-care to facilitate fast recovery.17

Brief History
Pioneered by Danish Professor Henrik Kehlet in 1993, ER was initially adopted to manage patients undergoing colorectal surgery. These multimodal interventions significantly reduced postoperative hospital stay (from 8-12 days to 2-3 days) and related hospital costs.19 Following the initial success in Denmark, in 2000, the ERAS collaboration was formed between five centers in Northern Europe: Kehlet’s group in Denmark, the Netherlands, Norway, Sweden, and England. The goal of this collaboration was to develop and implement a set of standardized perioperative protocols in all the participating centers in order to achieve comparable outcomes in a variety of surgical specialties.20

In 2009, the Department of Health in England established the Enhanced Recovery Programme across eight elective surgical procedures in four specialties—orthopedics, colorectal surgery, gynecology, and urology. To evaluate the program, key outcome measures (e.g., patient experience, length of hospital stay, and readmission rates) were collected. The findings showed an improved patient experience (e.g., increased patient participation in their care) and a significant reduction in length of stay (170,000 fewer bed days compared to the year before).3

In 2010, the ERAS Society was founded and headquartered in Kista, Sweden. The mission of the ERAS Society is to “develop perioperative care and to improve recovery through research, audit education and implementation of evidence-based practice.”21 The Society website (http://www.erasociety.org/) offers procedure-specific guidelines, useful information, and resources related to enhanced recovery.

ER is also now recommended by the French Society of Anesthesiology. Despite demonstrated success in Europe, ER protocols have not been widely adopted in the United States.

Implementation: Challenges and Facilitators of Enhanced Recovery Adoption in the United States
The transition to evidence-based ER has been slow in surgical and anesthesia practice in the United States, partly because of a lack of awareness and reluctance of some healthcare team members to embrace change.15

Despite these challenges, ER research and implementation are occurring in various healthcare settings across the United States. These ER programs have demonstrated improvements in patient outcomes and a cost reduction in postoperative resource utilization.13,22,23 Successful adoption of ER depends on several factors including: 1) evidence-based principles within the healthcare teams; 2) healthcare team leadership; 3) staff education materials related to ER; and, 4) feedback reports.24

Focusing on the goal of ER implementation in the United States, efforts are underway to raise awareness of ER’s value among patients, professionals, and facilities. The American Society for Enhanced Recovery (ASER) is in process of developing a website with information and resources related to ER (www.aserhq.org). On June 10, 2014, the Center for Medical Technology Policy hosted a multi-stakeholder forum in Baltimore, Md., to discuss challenges and strategies required for successful adoption of enhanced recovery as the standard of care in the United States. This forum led to a creation of a high-level agenda to advance enhanced recovery for surgical patients, with the following objectives:15

1. Identify stakeholder evidence needs and generate data on:
   a. Individual complications as cost drivers, and
   b. Effectiveness of enhanced recovery programs at reducing both individual and overall complications in the United States.
2. Identify and develop quality measures related to enhanced recovery.
3. Identify and test new payment and delivery models.
4. Generate visible support from U.S. leaders for broad adoption of enhanced recovery protocols in practice.
5. Create national awareness and public demand for the adoption of enhanced recovery programs.

Conclusion
Research has consistently shown that adoption of enhanced recovery leads to reduced variation in care, significant improvements in patient satisfaction, outcomes, and a reduction in cost of care. Specifically, patients experience faster recovery, shortened hospital stay, and significantly fewer complications. To successfully integrate ER into practice, a structured, collaborative, multidisciplinary approach accompanied by an education and awareness campaign may be valuable. CRNAs are integral members of the ER team. To learn more about enhanced recovery, please visit our webpage at www.aana.com/EnhancedRecovery.
References


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