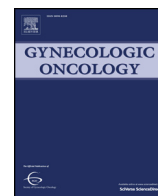




ELSEVIER

Contents lists available at ScienceDirect

Gynecologic Oncology

journal homepage: www.elsevier.com/locate/ygyno

Enhanced recovery pathways in gynecologic oncology

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HIGHLIGHTS

- Enhanced Recovery Pathways (ERP) are safe for patients undergoing complex gynecologic oncology operations, including colonic resection.
- Incorporation of a comprehensive ERP is associated with reduced length of stay, excellent patient satisfaction, and lower costs.
- Successful implementation of ERP requires standardization and cooperation within the care team.

ARTICLE INFO

Article history:

Received 18 August 2014

Accepted 5 October 2014

Available online xxxx

Keywords:

Enhanced recovery after surgery

Gynecologic oncology

Fast track surgery

ABSTRACT

Objective. Many commonplace perioperative practices are lacking in scientific evidence and may interfere with the goal of optimizing patient recovery. Individual components of perioperative care have therefore been scrutinized, resulting in the creation of so-called “enhanced recovery” pathways (ERP), with the goal of hastening surgical recovery through attenuation of the stress response. In this review we examine the evidence for ERP in gynecologic oncology using data from our specialty and general surgery.

Methods. We performed a systematic literature search on ERP in gynecologic oncology in June 2014 using PubMed/MEDLINE, EMBASE, and The Cochrane Library. All study types were included. References were hand reviewed to ensure completeness. The Enhanced Recovery After Surgery (ERAS) Society was contacted to identify any unpublished protocols.

Results. Seven investigations were identified that examined the role of ERP in gynecologic oncology. Common interventions included allowing oral intake of fluids up to 2 hours before induction of anesthesia, solids up to 6 hours before anesthesia, carbohydrate supplementation, intra- and postoperative euvoolemia, aggressive nausea/vomiting prophylaxis, and oral nutrition and ambulation the day of surgery. In addition, bowel preparations, the NPO after midnight rule, nasogastric tubes, and intravenous opioids were discontinued. While no randomized data are available in gynecologic oncology, significant improvements in patient satisfaction, length of stay (up to 4 days), and cost (up to \$7600 in savings per patient) were observed in ERP cohorts compared to historical controls. Morbidity, mortality, and readmission rates were no different between groups.

Conclusion. Enhanced recovery is a safe perioperative management strategy for patients undergoing surgery for gynecologic malignancies, reduces length of stay and cost, and is considered standard of care at a growing number of institutions. Our specialty would benefit from a formalized ERP such as ERAS which audits compliance to protocol care elements to optimize patient outcomes and value.

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67 Introduction

68 Individual components of perioperative care have increasingly been
 69 evaluated from an evidence-based perspective, resulting in the creation
 70 of so-called “enhanced recovery” pathways (ERP) [1,2]. This approach
 71 was founded over a decade ago by European surgeons who challenged
 72 traditional surgical paradigms such as preoperative bowel preparation,
 73 the overnight fasting rule, and delayed postoperative feeding. These re-
 74 searchers soon learned that many commonplace perioperative practices
 75 were not only lacking in scientific evidence, but in fact interfered with
 76 efforts to most effectively prepare patients for surgery and hasten con-
 77 valescence. These findings led to the adoption of practices thought to
 78 attenuate the stress response associated with surgery, including omis-
 79 sion of bowel preparation, euvoemia, early postoperative feeding, and
 80 avoidance of intravenous opioids. Formalized evidence-based Enhanced
 81 Recovery After Surgery (ERAS) protocols are now available in areas such
 82 as colorectal, pancreatic and urological surgery [3–5] with a correspond-
 83 ing audit system (ERAS Interactive Audit System, EIAS) to ensure
 84 compliance [6]. Measuring compliance has proven to be a key factor
 85 required for success and sustainability of ERAS protocols [7]. There has
 86 been widespread uptake of these protocols internationally, particularly
 87 in colorectal surgery. Meta-analyses have shown an average reduction
 88 in length of stay of 2.5 days [8,9] and a decrease in complications by as
 89 much as 50%. The weight of this evidence is demonstrated by the fact
 90 that the National Surgical Quality Improvement Program (NSQIP)
 91 recently developed enhanced recovery fields for patients undergoing
 92 colorectal surgery. From a health economics perspective, ERP have
 93 resulted in a mean savings of 1651€ (\$2245 USD) per patient [10]. Thus,
 94 adoption of ERP across diverse surgical disciplines has the potential to
 95 improve outcomes, reduce complications, reduce costs, and thereby in-
 96 crease the value of health care.

97 To date there has been little in the way of formal perioperative
 98 protocol development in the discipline of gynecologic oncology. Recogn-
 99 izing the need to continually improve the quality of care in the face of
 100 progressive economic constraints, all aspects of our surgical practice are
 101 likely to benefit from optimization and standardization. The goals of this
 102 review are: i) to determine the current extent of literature describing
 103 ERP in gynecologic oncology, ii) to examine the evidence within
 104 established protocols in surgical disciplines outside gynecologic oncology
 105 (eg: ERAS colorectal surgery) that may have implications for our practice,
 106 and iii) to set the stage for a comprehensive, standardized perioperative
 107 protocol in our specialty (ERAS Guideline).

108 Enhanced recovery pathways in gynecologic oncology

109 We performed a systematic literature search in June 2014 using
 110 PubMed/MEDLINE, EMBASE, and The Cochrane Library. Search terms in-
 111 cluded “enhanced recovery surgery”, “enhanced recovery programs”,
 112 “fast track surgery”, “ERAS”, and “gynecologic oncology.” No restrictions
 113 were placed on the search and all study types were included. The refer-
 114 ence lists of all studies were hand reviewed to ensure completeness. In
 115 addition, the ERAS society was contacted to determine if there were any
 116 unpublished protocols and their website (<http://www.erasociety.org/>)
 117 was reviewed. This search identified seven studies that examined the

118 role of enhanced recovery in the setting of gynecologic oncology sur-
 119 gery. The results are described as follows and summarized in Tables 1–3.

120 Marx et al. [11] were the first to evaluate accelerated recovery in our
 121 discipline. They compared 72 consecutive patients undergoing ovarian
 122 cancer surgery via laparotomy with conventional care (group 1) versus
 123 69 consecutive patients undergoing similar surgery but receiving what
 124 they called “multimodal rehabilitation” (group 2). There was an equiv-
 125 alent, but low, number of patients requiring colonic resection in each
 126 group (n = 5). The multimodal rehabilitation program for this investi-
 127 gation and those below is described in Table 2. The median post-
 128 operative stay was reduced from 6 days in group 1 (mean 7.3) to
 129 5 days in group 2 (mean 5.4) (p < 0.05). There was no difference in
 130 the overall complication rate, although severe medical complications
 131 were reduced in group 2 (14% versus 2%; p < 0.01). The readmission
 132 rate was higher in the conventional group compared with the multi-
 133 modal group (10% versus 3%, respectively; p < 0.05).

134 Eberhart et al. [12] evaluated 86 patients undergoing major abdom-
 135 inal surgery for ovarian cancer among which 40 patients were treated
 136 by a traditional algorithm (8 required bowel resection) compared to
 137 46 patients treated by a multimodal “fast-track” algorithm (10 required
 138 bowel resection). Indicators of postoperative recovery were document-
 139 ed using a validated quality-of-life tool (PPP33 questionnaire). The main
 140 study findings were that patients in the fast-track program reported
 141 improvement in “autonomy,” “physical complaints,” and “postoperative
 142 pain;” they also reported their recovery to be faster compared to
 143 patients in the traditional group. There was no difference in postoperative
 144 complications between groups.

145 Chase et al. [13] retrospectively reviewed 880 surgical admissions at
 146 an institution using a prescribed clinical pathway with no comparison
 147 cohort (Table 2). A preoperative diagnosis of cancer was present in
 148 31%. All patients underwent laparotomy with 40% of surgeries being
 149 categorized as radical and/or staging procedures. The median length of
 150 hospital stay was 2 days. Fifty-nine patients (7%) were reported to
 151 have significant complications (most commonly postoperative ileus);
 152 only 5% required readmission.

153 In the aforementioned studies, only a small fraction of patients re-
 154 quired bowel resection. Gerardi et al. [14] studied only those patients
 155 who required recto-sigmoid colectomy as part of cytoreductive surgery
 156 for advanced ovarian and primary peritoneal cancers. Nineteen patients
 157 had their postoperative management prescribed by a standardized clin-
 158 ical pathway (Group A) whereas the comparison group of 45 patients
 159 (Group B) had care directed by individual surgeon preference (conven-
 160 tional). Total parenteral nutrition was used for patients with a pre-
 161 operative serum albumin level ≤ 2.0 g/dl and/or if resumption of oral in-
 162 take was anticipated to be ≥ 7 days postoperatively. While the median
 163 time to flatus was equivalent between groups (6 days, p = 0.95), medi-
 164 an time to tolerance of diet was significantly shorter in the clinical path-
 165 way group compared to the conventional group (3 versus 6 days,
 166 respectively; p = 0.013). Group A had a shorter median length of
 167 hospital stay (7 days versus 10 days, p = 0.014) and there was a medi-
 168 an reduction in hospital cost of \$5410 per patient with implementa-
 169 tion of the clinical pathway. There was no difference in the 30-day readmis-
 170 sion rate (Group A 21% versus Group B 33%, p = 0.379).

171 Carter [15] reported on his single-surgeon experience involving 389
 172 patients who underwent fast track surgery via laparotomy for suspected

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