

Original Article

Can Enhanced Recovery Pathways Improve Outcomes of Vaginal Hysterectomy? Cohort Control Study

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ABSTRACT **Study Objective:** To assess the effect of enhanced recovery pathway implementation on patient outcomes after vaginal hysterectomy (VH) performed to treat benign indications.

Design: Case-control study examining outcome measures including length of stay, pain scores, postoperative morbidity, and readmission rates after implementation of the Enhanced Recovery after Surgery (ERAS) program for VH (Canadian Task Force classification II).

Setting: Teaching hospital.

Patients: Fifty patients who underwent VH after implementation of ERAS were compared with 50 control patients before ERAS. Patients were matched for age, indication for surgery, American Society of Anesthesiologists grade, and surgeon.

Intervention: ERAS pathway.

Measurements and Main Results: Length of stay, percentage of patients discharged within 24 hours, use of urinary catheter and vaginal packing, and readmission rates were determined. Perioperative expenditures were compared, and cost-effectiveness of ERAS was assessed. Median patient vs control age (49.0 vs 51.0 years), parity (2.0 vs 2.0), and body mass index (26.5 vs 28.3) were statistically comparable. After ERAS implementation, the median length of stay was reduced by 51.6% (22.0 vs 45.5 hours; $p < .01$), and the percentage of patients discharged within 24 hours was increased by 5-fold (78.0 vs 15.6%; $p < .05$). Frequency of catheter use (82.0% vs 95.6%) and use of vaginal packing (52.0 vs 82.2%) were significantly lower in the post-ERAS group, and these devices were removed earlier (14.5 vs 23.7 hours and 16.0 vs 23.0 hours, respectively; $p < .05$ in all cases). Attendance in the Accident and Emergency Department (12.0% vs 0%; $p > .05$) and in-patient readmission rate (4.0% vs 0%; $p > .05$) were similar in both groups. Despite having to start a "gynecology school" and employ a specialist Enhanced Recovery nurse, a cost savings of 9.25% per patient was demonstrated.

Conclusion: The ERAS program in benign VH reduces length of stay by 51.6% and enables more women to be discharged within 24 hours, with no increase in patient readmissions rates. *Journal of Minimally Invasive Gynecology* (2014) 21, 83–89 © 2014 AAGL. All rights reserved.

Keywords: Enhanced recovery; Fast-track surgery; Vaginal hysterectomy

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The authors declare no conflict of interest.

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Enhanced recovery after surgery (ERAS) or fast-track surgery pathways are multimodal interventions developed to accelerate recovery by minimizing incisions and optimizing the perioperative stress response [1]. Recent data have demonstrated that postoperative morbidity is reduced after implementation of such pathways in colorectal surgery [2] and possibly in gynecologic oncology [3,4], with a corresponding reduction of up to 100% in median length of stay (LOS) [5]. With health economics being extremely relevant in the current financial climate, national recommendations have now been made in the United Kingdom to adopt ERAS protocols as standard management of perioperative care [6–8] because these are thought to increase hospital productivity, thereby saving “bed days” and gaining potential to either close wards or treat more patients without an increase in expenses [9,10].

The EVALUATE study [11] and a subsequent Cochrane Review [12] have confirmed that for treatment of non-malignant uteri, vaginal hysterectomy (VH), as compared with the abdominal or laparoscopic routes, is associated with lower morbidity, greater patient satisfaction, and reduced health care costs. In our unit, removal of the uterus via VH is the default procedure unless there are specific contraindications.

The objectives of the present study were to assess the effects (including a brief discussion of cost) of introducing an ERAS program in an existing ambulatory process by comparing the following 3 outcomes of VH before and after implementation of the pathway: Does introduction of an ERAS pathway improve measurable perioperative outcomes? Is day case (<24 hours) VH achievable using ERAS techniques? Is implementation of such pathways cost-effective?

Material and Methods

We designed a case-control study to assess outcomes in patients undergoing VH before and after implementation of an ERAS program in a North London teaching hospital. The study group comprised women undergoing VH who had been enrolled in an ERAS program during the 17 months between November 2010 and March 2012. The control

group consisted of women, matched for age, body mass index (BMI), American Society of Anesthesiologists (ASA) scores (Table 1), and indication for surgery, who had undergone VH under the care of the same 3 surgeons (W.Y., F.E.) during the 12 months before ERAS implementation. To further reduce bias, the same gynecologists, who were experienced vaginal surgeons (with 98% VH rate for indications other than prolapse), either performed or directly supervised all procedures in the study and control groups so that intraoperative surgical techniques were standardized. The design of the study therefore conforms to Canadian Task Force classification II, a case-control study.

Initial criteria for enrolment in the ERAS program were as follows: i) appropriate counseling and patient education; ii) ASA grade I or II; iii) intraoperative blood loss <500 mL; and iv) family support at discharge. Our multidisciplinary ERAS pathways for vaginal surgery were derived and modified from previous work by Fearon et al [2], Kehlet [13], and Ottesen et al [14] and consisted of i) avoidance of abdominal and/or laparoscopic incisions; ii) pre-admission information and education (gynecology school); iii) thromboprophylaxis and antimicrobial prophylaxis; iv) avoidance of intraoperative hypothermia (temperature <36°C); v) minimizing the use and duration of vaginal packing and indwelling catheters (during implementation of ERAS, we standardized our unit practice to not pack the vagina or retain an indwelling catheter unless specifically indicated); vi) intraoperative analgesia (pudendal and uterosacral nerve blocks) and postoperative analgesia (visual analog scale [VAS] pain score <3 a requisite for discharge); and vii) early mobilization and planned ERAS nurse-led discharge. These principles are given in Table 2.

Table 1

American Society of Anesthesiologists grading system		
Grade	Definition	Mortality, %
I	Healthy individual with no systemic disease	0.05
II	Mild systemic disease that does not limit activity	0.4
III	Severe systemic disease that limits activity but is not incapacitating	4.5
IV	Incapacitating systemic disease that is constantly life-threatening	25
V	Moribund, not expected to survive 24 hours with or without surgery	50

Adapted from [15].

Table 2

Principal ERAS components to enhance postoperative recovery
Preoperative components
Patient education: the “gynecology school”
Optimization of patient physiologic condition
Contemporary fasting guidelines
Intraoperative components
Fluid optimization
Regional anesthesia
Avoidance of use of laparotomy/laparoscopic incisions
Thromboprophylaxis and antimicrobial therapy
Short-acting opioid agents/local nerve blocks
Avoidance of use of drains/vaginal packs
Maintenance of normothermia
Postoperative components
Fluid optimization
Analgesic optimization
Revise use of drains/vaginal packs
Early oral nutrition and ambulation
Defined discharge pathways

ERAS = Enhanced Recovery after Surgery program.
Adapted from [1].

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