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ORIGINAL ARTICLE

Enhanced recovery program for minimally invasive and vaginal urogynecologic surgery

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Abstract

Introduction and hypothesis Enhanced recovery protocols (ERPs) are evidenced-based interventions designed to standardize perioperative care and expedite recovery to baseline functional status after surgery. There remains a paucity of data addressing the effect of ERPs on pelvic reconstructive surgery patients.

Methods An ERP was implemented at our institution including: patient counseling, carbohydrate loading, avoidance of opioids, goal-directed fluid resuscitation, immediate postoperative feeding and early ambulation. Patients undergoing elective pelvic reconstructive surgery before and after implementation of the ERP were identified in this cohort study.

Results One hundred eighteen patients underwent pelvic reconstructive surgery within the ERP compared with 76 historic controls. Reductions were seen in length of hospital stay (29.9 vs. 27.9 h, $p = 0.04$), total morphine equivalents (37.4 vs. 19.4 mg, $p < 0.01$) and total intravenous fluids administered (2.7 l vs. 1.5 l, $p < 0.0001$). Hospital discharges before noon doubled (32.9 vs. 60.2%, $p < 0.01$). More patients in the ERP group ambulated on the day of surgery (17.1 vs. 73.7%, $p < 0.01$) and ambulated at least two times the day following surgery (34.2 vs. 72.9%, $p < 0.01$). No differences were seen in average pain scores (highest pain score 7.39 vs. 7.37, $p = 0.95$), hospital readmissions (3.9 vs. 3.4%, $p = 0.84$), or postoperative complications (6.58 vs. 8.47%, $p = 0.79$). Patient satisfaction significantly improved. ERP was not associated with an increase in 30-day total hospital costs.

Conclusions Implementation of ERP for pelvic reconstructive surgery patients was associated with a reduced length of hospital stay, improved patient satisfaction, and decreased administration of intravenous fluids and opioids without an increase in complications, readmissions, or hospital costs.

Keywords ERP · Vaginal hysterectomy · Vaginal reconstruction · Fast track recovery

Introduction

The last several decades have witnessed innumerable advances in gynecologic surgical technology and procedural technique with the advent of robotics and the evolution of minimally invasive surgery. These practice changes have reduced surgical morbidity and improved patient outcomes [1]. Despite these paradigm shifts, conventional perioperative management strategies, such as preoperative fasting, liberal administration of intravenous fluids, opioid-centric pain control, bed rest, gradual introduction of oral feeding, and intra-abdominal and nasogastric drains, have remained relatively unchanged, with unproven patient benefit.

The "enhanced recovery" concept, first proposed by Kehlet in the 1990s, challenges traditional perioperative practices with an evidence-based foundation [2]. A variety of protocolized enhanced recovery paradigms have been developed to attenuate the surgical stress response by maintaining normal physiology perioperatively and encouraging early mobilization postoperatively. Enhanced recovery programs (ERPs) require multidisciplinary collaboration among

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patients, surgeons, anesthesiologists, and nurses—working toward comprehensive recovery after surgery rather than acutely managing postoperative problems or pain [2, 3]. These evidenced-based multimodal interventions are designed to standardize perioperative care, limit postoperative organ dysfunction, and expedite recovery to baseline functional status after surgery.

Enhanced recovery models have shown benefit in patients undergoing hysterectomy for benign indications [4–9] and gynecologic oncology patients, including those undergoing complex cytoreductive and staging procedures [4, 7, 10, 11] as well as minimally invasive surgery for gynecologic cancer [12]. Our institution has previously established the safety and efficacy of ERPs in a pooled group of gynecologic oncology and benign gynecology patients [11]. However, there remains a paucity of data in the literature specifically addressing the use of ERPs for patients exclusively undergoing pelvic reconstructive surgery. Notably, as the female patient population ages, the number of surgical procedures for pelvic floor disorders are predicted to increase by nearly 48% [13]. Additionally, elderly patients have higher perioperative morbidity and mortality [14, 15]. Considering these factors, it becomes increasingly important to optimize perioperative care for patients undergoing surgery for pelvic floor disorders so that medical centers can seek to adapt best practices. Our study specifically evaluated outcomes following minimally invasive and vaginal pelvic reconstructive surgery before and after ERP protocol implementation.

Materials and methods

To improve clinical outcomes in patients undergoing urogynecologic surgery at the University of Virginia, an institution-specific urogynecologic ERP was developed and implemented on March 1, 2015. This protocol was created using a model developed and implemented by our colorectal surgery colleagues in August 2013 and with input from a multidisciplinary team consisting of gynecologic surgeons, post-anesthesia care unit and acute care nurses, as well as anesthesiologists and pain medicine physicians [3]. To examine the efficacy of our ERP quality initiative, the outcomes of patients undergoing minimally invasive and vaginal pelvic reconstructive surgery before and after protocol application were compared.

Our Institutional Review Board provided this study with exempt status as a quality improvement project. Pathway elements were founded on evidence-based recommendations from the colorectal surgery and gynecologic surgery literature and adapted for patients undergoing minimally invasive pelvic reconstructive surgery. These elements include preoperative patient education, a pre-procedure carbohydrate-loading drink, multimodal analgesia with avoidance of intravenous opioids, intraoperative goal-directed fluid resuscitation, immediate postoperative feeding, and early ambulation [3] (Fig. 1). Patient ambulation and oral intake were ordered on the day of surgery while patients were still in the post-anesthesia care unit. Patients underwent active voiding trials at 6 a.m. on the 1st day after surgery (POD#1). Notably, patients did not receive nerve blocks or regional anesthesia in this study. All patients enrolled in the ERP received standardized one-on-one preoperative teaching by a nurse trained in the ERP. Each patient received a handbook, which the nurse reviewed, delineating ERP concepts and setting expectations for postoperative goals. Additionally, a trained staff member called each patient 1–2 days prior to surgery to reiterate ERP expectations, outline preparation for surgery, and answer any outstanding questions.

We identified consecutive patients undergoing elective minimally invasive and vaginal pelvic reconstructive surgery by two board-certified urogynecologic surgeons before (January 2014 to February 2015) and after (March 2015 to February 2016) implementation of the ERP. These patients all had planned inpatient hospital observation (1 midnight) stays. All patients were followed for at least 30 days. Enhanced recovery patients were compared with historic controls. Patients undergoing planned exploratory laparotomy—that is, non-minimally invasive or vaginal surgery—were excluded.

Both surgeons are board-certified urogynecologists in practice for over 10 years. No significant changes in technology, surgical techniques, or surgical teams took place between the study period and the period from which historic controls were drawn. There was no standardization of perioperative care prior to the study period. Discharge requirements remained identical throughout.

The outcomes investigated included length of hospital stay, hospital discharges prior to noon, numeric pain scores (0–10), length of time to first ambulation and quantity of ambulation, amount of intraoperative and total intravenous fluids administered, and amount of intraoperative and total morphine equivalents administered. Other outcomes included patient satisfaction, hospital costs, readmission to any medical facility within 30 days, surgical site infections, urinary tract infections, transfusions, unplanned return to the operating room, pneumonia, thromboembolic events, unplanned intubation, acute renal failure, cardiac arrest, sepsis/septic shock, death within 30 days, and total complications.

Our historic controls consisted of patients identified by the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database who had surgery with our two board-certified urogynecologists during the appropriate time frame. A multitude of perioperative variables are abstracted and entered into the NSQIP database by a dedicated surgical clinical nurse reviewer. The NSQIP definitions for all demographic

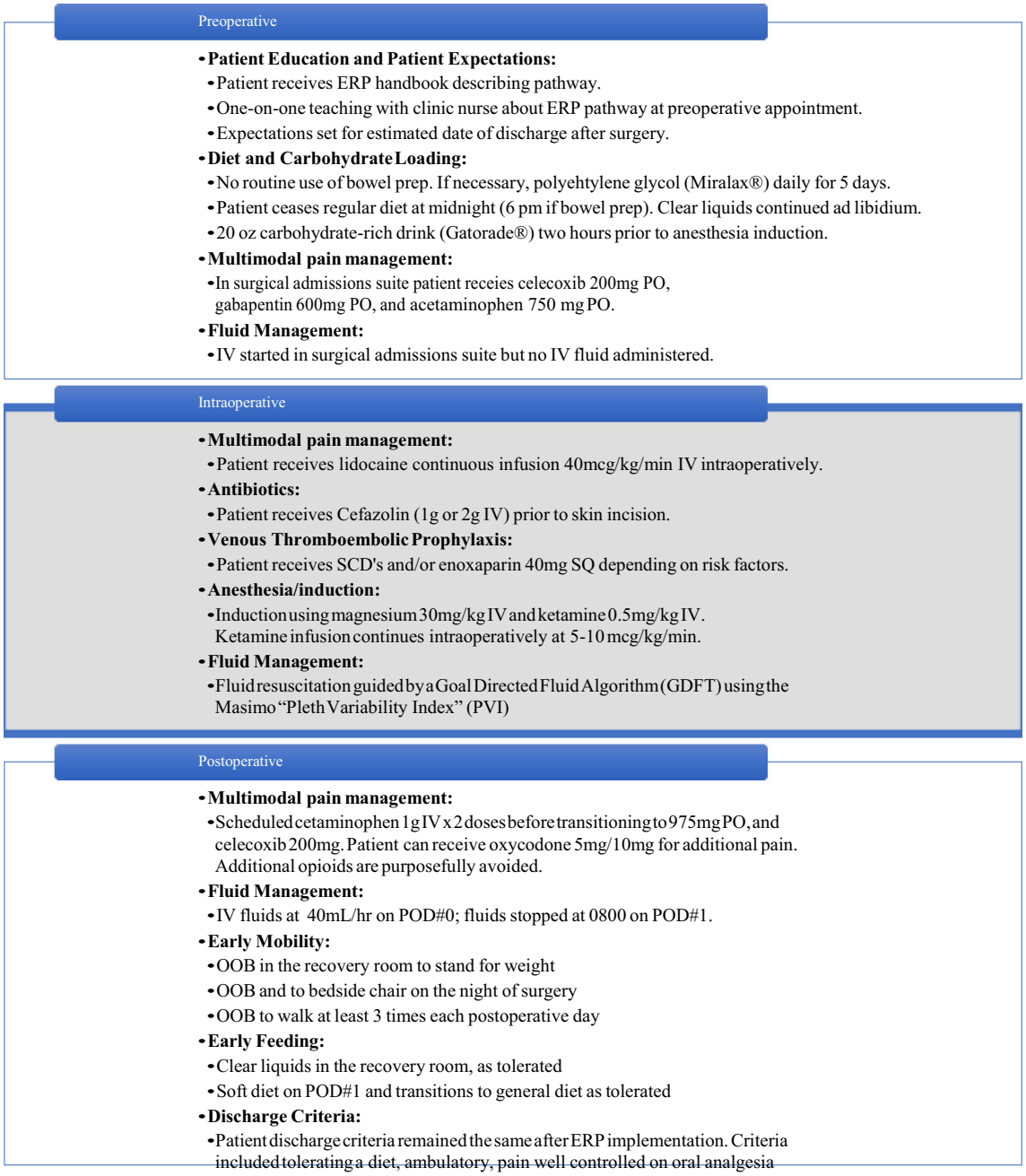

Fig. 1 Enhanced recovery protocol elements

and outcomes data were strictly adhered to during data collection in accordance with NSQIP participation. Additional data points specific to the ERP, which were not collected by NSQIP, included intravenous fluid amounts, morphine equivalents, numeric pain scores, and compliance with protocol measures and were collected prospectively in a separate quality improvement database. Patient satisfaction was assessed using Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) voluntary patient surveys administered after hospital discharge [16]. The Press Ganey info EDGE database was queried for all patients who had surgery with our two urogynecologic surgeons discharged during the two study time frames (before and after ERP). Top box and mean scores were compared with facilities of similar size to obtain percentiles. Observed financial data were provided by our institution to the University Health System Consortium clinical database. Cost was calculated using direct and indirect components. Direct costs are easily identified and specific to products and services such as physician and staff labor, supplies used to deliver services, and equipment costs. Allocating

the supporting overhead or indirect costs to these services results in a total hospital cost. We then compared our performance against risk-adjusted expected 30-day direct and total costs and the relative performance of peer institutions.

For length of hospital stay, the time of first preoperative vitals and nursing intake in the preoperative area was defined as admission time; discharge time was as documented in the electronic medical record. Pain control was assessed daily starting on POD#0 until hospital discharge by nursing staff using a pain scale of 0–10. Time to first ambulation after surgery was also documented in nursing flowsheets during the patients' hospitalization. Patients were discharged when pain was controlled with oral medications alone, they were tolerating solid food without intravenous hydration and independently ambulatory, and there was no concern for complications.

Two-sample t-test was used for continuous variables, and chi-square or Fisher's exact test were used for categorical variables. Given an estimated baseline rate of discharge by noon of 30% in the pre-ERP population and a predicted increase in the rate to 50% in the ERP group, 186 patients were required to achieve statistical power (1-β) of 0.80.

Results

Demographics

One hundred eighteen consecutive patients underwent pelvic reconstructive surgery within the ERP compared with 76 consecutive historic controls. Table 1 represents patient characteristics included in the analysis. The two groups were similar regarding age, body mass index, race, smoking status, ASA score, preoperative hematocrit, estimated blood loss, duration of surgery, and number of clean/contaminated and contaminated procedures. More patients in the ERP group underwent robotic procedures. More patients in the ERP group had diabetes mellitus although this did not reach statistical significance. There was no difference in the proportion of patients

Table 1 Demographics

	Pre-ERP - NSQIP ($n = 76$)	Post ERP ($N = 118$)	p value
Patient demographics			
Age	60 (23–76)	57 (25–83)	0.08
Race			
White or Caucasian	67 (88.2%)	109 (92.4%)	0.24
African American	4 (5.3%)	6 (5.1%)	
Other	5 (6.6%)	3 (2.5%)	
BMI (kg/m^2)	28.2 (18–57)	28.3 (18–51)	0.90
Smoker	4 (5.3%)	4 (3.4%)	0.71
ASA score			
ASA I	5 (6.6%)	13 (11.0%)	0.57
ASA II	59 (77.6%)	87 (73.7%)	
ASA III	12 (15.8%)	19 (16.1%)	
Preoperative hematocrit	40.0 (29.2 – 47.8)	40.1 (28.9 – 47.4)	0.71
Diabetes mellitus	3 (3.9%)	13 (11.0%)	0.05
Surgery demographics			
Clean	2 (2.6%)	8 (6.8%)	0.10
Clean/contaminated	74 (97.4%)	109 (92.4%)	
Contaminated	0 (0%)	1 (0.8%)	
Estimated blood loss (ml)	101.7 (5–300)	96.7 (5–1100)	0.72
Duration of surgery (min)	165.3 (83–322)	155.7 (62–287)	0.19
Reconstructive	75 (98.7%)	108 (91.5%)	0.01
With vaginal hysterectomy	64	69	
Robotic reconstructive	6	27	
Other vaginal reconstructive[a]	5	12	
Obliterative	1 (1.3%)	10 (8.5%)	

[a] Anterior repair and/or posterior repair without hysterectomy, with or without TVT/TOT sling, with or without vault suspension; TVT/TOT sling alone; mesh excision surgery

who were 65 years or older in the historic group or the ERP group (35.5% vs. 31.4%, $p = 0.08$).

Protocol compliance

Table 2 shows that 94.9% of ERP patients were compliant with preoperative carbohydrate loading 2 h prior to induction of anesthesia. In the ERP group, 73.7% of patients ambulated on the day of surgery per protocol guidelines, while 72.9% of ERP patients ambulated > 2 times on POD#1 per protocol guidelines.

Perioperative fluid management

The ERP was successful in reducing the average amount of intravenous fluids patients received intraoperatively (1403 ml vs. 690 ml, $p < 0.0001$) and in total during their hospitalization (2694 ml vs. 1473 ml, $p < 0.0001$). Total net hospital fluid balance decreased from +945.5 to +17.8 ml ($p < 0.0001$). Notably there were no incidences of acute renal failure in either group (Table 2).

Analgesic use and pain scores

Average total morphine equivalents administered during a patient's hospitalization decreased by nearly 50% (37.40 mg vs. 19.40 mg, $p < 0.0001$). Intraoperative morphine equivalents decreased from 16.02 to 1.92 mg ($p < 0.0001$). Despite this decrease in morphine equivalents received and the increase in postoperative ambulation, there was no difference in the highest rated pain score (7.39 vs. 7.37, $p = 0.946$), average pain score on the day of surgery (4.49 vs. 4.29, $p = 0.545$), or average pain score on the first day after surgery (3.40 vs. 3.36, $p = 0.904$). See Table 2. Furthermore, more patients reported that their pain was always well controlled during their hospitalization after ERP (63.6 vs. 81.8%, $p = 0.0065$) according to HCAHPS patient surveys (Table 3).

Length of stay and complications

Average length of hospital stay was reduced by 2.07 h (29.93 vs. 27.86 h, $p = 0.041$). The number of patients discharged before noon nearly doubled: 32.9% of patients were discharged before noon prior to ERP versus the 60.2% of patients after ERP implementation ($p = 0.0002$). See Fig. 2. Of note, the average LOS projected by the NSQIP risk calculator was the same for both groups as 1.11 ± 0.307 days for the control group and 1.08 ± 0.232 days for the ERP group ($p = 0.5597$). There was notably no increased rate of hospital readmissions, from 3.9 to 3.4% ($p = 0.841$). Overall, there was no change in 30-day postoperative complications after implementation of the protocol ($p = 0.956$) (Table 2).

Patient satisfaction scores

ERP patients reported that they would recommend our hospital more often than patients in the control group (71.4 vs. 90.9%, $p = 0.0005$; Fig. 1). Compared with peer institutions, this rating improved from the 42%ile to 97%ile. ERP patients were also more satisfied with the overall hospital environment ($p = 0.04$) and the overall transition of care from the hospital to home ($p = 0.003$). ERP patients were more likely to report that their pain was always well controlled ($p = 0.007$), that they had a good understanding of managing their health after discharge ($p = 0.0001$), and that they understood the purpose of discharge medications ($p = 0.006$) (Table 3).

Financial data

Average total 30-day hospital costs were not significantly different between the two groups. Mean indirect hospital costs decreased from $\$3631 \pm 1407$ to $\$3407 \pm 2081$ ($p = 0.445$). Mean direct hospital costs increased from $\$4277 \pm 1956$ to $\$4571 \pm 2124$ ($p = 0.375$). Average total 30-day hospital costs were $\$7908 \pm 3339$ ($n = 70$) prior to ERP compared with $\$8072 \pm 4077$ ($n = 85$) after ERP ($p = 0.787$) (Table 2).

Discussion

Following the implementation of an ERP protocol for inpatient pelvic reconstructive surgery patients at our institution, we found improvements in patient surgical outcomes. Specifically, ERP implementation was associated with reduced length of hospital stay, improved patient satisfaction, decreased administration of intravenous fluids and opioids without an increase in complications, readmissions, or total hospital costs.

In the last few years, our medical center has embarked on creating standardized surgical protocols as part of an institution-wide patient safety initiative (Be Safe) that emphasizes the Lean Methodology as well as adherence to best practices. A key component of this collective, system-wide initiative includes the concept of standard work, which aims to eliminate process variability and improve outcomes. A critical aspect of the standard work is that the process has clearly specified and standardized steps. Our enhanced recovery program is an example of how a multidisciplinary team can develop standard work that addresses processes in the pre-, intra-, and postoperative phases that improve the patient experience and safety.

Our findings are like other studies investigating the effect of enhanced recovery or "fast track" models on patients undergoing gynecologic surgery for benign conditions. Yoong et al. reported on a retrospective case-control study of 50 patients undergoing vaginal hysterectomy after implementation

Table 2 Outcomes of pre- and post-ERP implementation for minimally invasive pelvic reconstructive procedures

	Pre ERP - NSQIP ($n = 76$)	Post ERP ($N = 118$)	p value
ERAS protocol elements			
Opioid consumption (mg)			
Morphine equivalents - intraoperative mean (SD)	16.0 (9.33)	1.9 (4.60)	< 0.0001
Morphine equivalents - postoperative mean (SD)	21.4 (17.54)	17.6 (16.35)	0.1
Total morphine equivalents	37.40 (21.48)	19.4 (17.22)	< 0.0001
Pain scores mean (range)			
Highest pain score	7.39 (1–10)	7.37 (2–10)	0.94
POD 0 pain score	4.49 (0–10)	4.29 (0–9.5)	0.54
POD 1 pain score	3.40 (0–9)	3.36 (0–8.1)	0.90
Fluid administration (ml)			
Intraoperative mean (SD)	1403.5 (519.92)	690.0 (354.67)	< 0.0001
Total hospital mean (SD)	2694.2 (721.23)	1473.7 (607.91)	< 0.0001
Total hospital net fluid balance	945.5	17.8	< 0.0001
Preoperative carb loading	n/a	112 (94.9%)	n/a
Ambulation			
Day of surgery	13 (17.1%)	87 (73.7%)	< 0.0001
> 2 times POD 1	26 (34.2%)	86 (72.9%)	< 0.0001
Length of stay and readmissions			
LOS (hours)			
Mean (range)	29.93 (21.9–54.9)	27.86 (19.9–77.1)	0.041
NSQIP predicted LOS days mean (SD)	1.11 (0.31)	1.08 (0.23)	0.55
Discharges before noon	25 (32.9%)	71 (60.2%)	0.0002
Hospital readmissions	3[a] (3.9%)	4[b] (3.4%)	0.84
Postop day from discharge to readmission, average (range)	10.7 (6–20)	14.5 (11–20)	0.53
30-Day hospital cost ($)			
Average (SD)			
Direct	4277 (1956)	4571 (2124)	0.36
Indirect	3631 (1407)	3407 (2081)	0.45
Total	7908 (3339)	8072 (4077)	0.79
30-Day postoperative complications			
Surgical site infection	0	0	
Urinary tract infection	0	4	
Transfusion	1[a]	0	
Unplanned return to OR	0	1[b]	
Pneumonia	0	0	
Pulmonary embolism	1[a]	0	
Unplanned intubation	0	0	
Acute renal failure	0	0	
Cardiac arrest	0	0	
Sepsis/septic shock	0	1[b]	
Death within 30 days	0	0	
Readmission	3[a]	4[b]	
Any complications or readmissions	5 (6.6%)	10 (8.5%)	0.79

[a] Pre-ERP readmissions: thigh hematoma requiring blood transfusion, pulmonary embolism, upper GI bleed

[b] Post-ERP readmissions: fever secondary to diverticulitis, postoperative bleeding requiring examination under anesthesia, fever and pain with concern for postoperative hematoma vs. seroma, sepsis of urinary origin

Table 3 Hospital consumer assessment of healthcare provider and system (HCAHPS) voluntary patient survey responses

HCAHPS question	Pre-ERP $N = 13$		ERP $N = 11$		p value
	% Always rating	%ile rank vs. all peer institutions	% Always rating	%ile rank vs. all peer institutions	
Would recommend hospital	71.4	42	90.9	97	0.0005
Satisfied with overall hospital environment	62.9	31	76.8	89	0.04
Pain always well controlled	63.6	52	81.8	99	0.007
Satisfied with care transitions (from hospital to home)	60.1	86	80.1	99	0.003
Good understanding managing health (after discharge home)	57.1	74	90.9	99	0.0001
Understand purpose of discharge medications	69.2	90	85.7	99	0.006

of an enhanced recovery protocol. The results of this trial showed a reduction in median length of stay from 45.5 to 22.0 h, increased number of women discharged in less than 24 h (78 vs. 16%), and cost savings of $159.45 per patient [4]. Kalogera et al. reported on a retrospective comparison between an ERP program and conventional care, including 76 women undergoing vaginal reconstructive procedures for pelvic organ prolapse [4]. They found a decreased length of hospital stay (2.7 vs. 3.2 days) without increased 30-day hospital readmissions or postoperative complications in the vaginal reconstructive ERP cohort [4].

The strengths of our study include use of NSQIP historical controls. Advantages of the NSQIP database include: (1) data are from the patient's medical chart, not insurance claims or billing data, (2) data are risk-adjusted, (3) data are based on 30-day patient outcomes, and (4) data collection is performed by a surgical clinical nurse reviewer who adheres to rigorous data collection standards. In addition, our institution is a large, university-affiliated academic medical center; thus, our patient population likely reflects the experience of most academic centers that manage patients with increased medical morbidities and complex surgical cases. Lastly, our study focused specifically on outcomes of the ERP in an urogynecology population undergoing minimally invasive and vaginal reconstruction. Most published gynecologic ERP studies have focused on the gynecology oncology population [7, 11], and a few studies have reported on ERP outcomes following vaginal hysterectomy performed for benign indications and not for repair of pelvic floor disorders [4].

Due to the pre-existing shorter length of stay associated with the minimally invasive nature of vaginal and laparoscopic surgery (average LOS 1–2 days) [1], we were not anticipating shorter LOS since earlier we say we powered our study based on an improved rate of discharges prior to noon from 30 to 50%. We suspect that the improved rate of discharges by noon can be explained by "standard work" of the ERP, which clearly specified steps for all phases of the perioperative experience, thus decreasing the variation in postoperative care. Patients are provided with this early discharge expectation well in advance of their surgery. Prior studies have reported the advantages of standardized protocolized workflow in the perioperative period [17]. Prior to instituting ERP, we had no standardization of care and most physicians had different

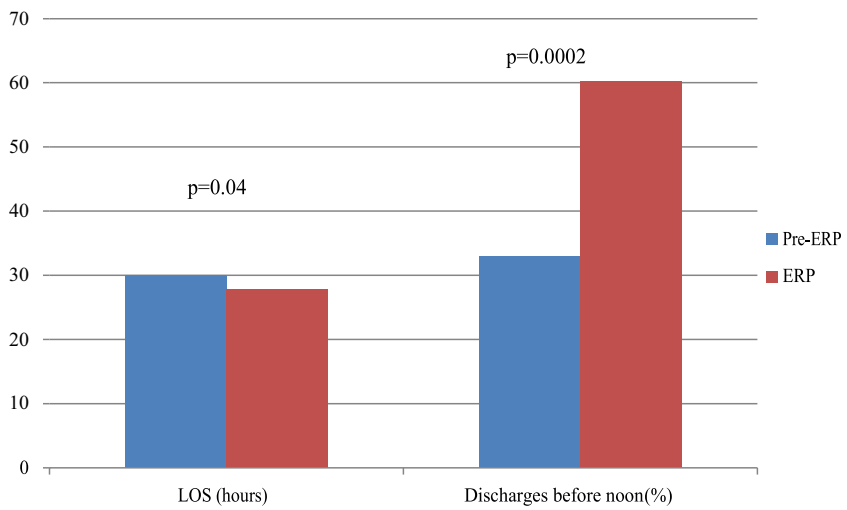

Fig. 2 Length of stay and discharges before noon before and after ERP implementation

postoperative care instructions. In addition, as a large, university-affiliated teaching institution, we continually have rotating house staff, which also introduces further variation in the delivery of patient care. While this could have been a detriment to the success of our program, the house staff welcomed and were engaged in the process of creating and implementing a standardized ERP. A 2014 study examining the challenges to ERP implementation for surgery residents demonstrated the importance of including this group in education efforts [18]. At our institution, we held monthly training sessions for new surgical residents, interns, and medical students with a dedicated ERP nurse coordinator. Together, they covered the ERP, specific uses within our electronic order sets, and caveats related to deviations in patient care. The sessions also allowed opportunity for resident feedback and questions. This provided yet another opportunity for staff input and contributor buy-in to help ensure success of the program within our institution.

This study is limited in that it represents a single institution's experience and may not be generalizable to all other patient care centers. This investigation was not designed as a randomized controlled trial but rather a quality improvement practice change considering accumulating data on the success of ERP in other surgical subspecialties. Inherent to implementing and studying ERP pathways, it is difficult to assess which specific aspects were most important in improving patient experience and clinical outcomes. We are reporting on the bundle of items we implemented as part of our data-driven, evidence-based ERP pathway. Our study evaluated outcomes after comprehensive implementation of a standardized protocol rather than investigating individual elements of the protocol. We cannot conclude from our study which elements of the ERP are most effective in contributing to the favorable outcomes reported. The patient satisfaction data were limited by their sample size and short follow-up period, yet we found significant differences in the patient experience before and after the implementation of the ERP. For this reason, we have subsequently reassessed the ERP cohort with a survey about their experience specific to the individual elements of the protocol. Despite the limitations of study design, it is noteworthy that our patients are more satisfied, discharged sooner, and have less opioid use following ERP implementation.

It is possible that patient satisfaction scores from a hospitalization may have been influenced by far more than the implementation of our ERP protocol. Improved outcomes may have resulted from patients having specific perioperative expectations and encouraging hospital staff to focus on patient education to meet specific clinic metrics. Expectation management is a key ERP element in addition to opioid avoidance, early ambulation, and standardization—all working in concert to effect change and improve outcomes.

Future directions for study include evaluating which components of the ERP are most beneficial/effective in improving patient functional outcomes such as decreasing fatigue and improving bladder and bowel function. Further studies are needed focusing on patient-related outcomes, such as patients' experience of the process and quality of life perceptions as well as provider experiences and satisfaction. Provider expectations would also be an area for future investigation. Finally, we are in the process of evaluating an outpatient ERP care model to see if these benefits are sustained in the same-day surgical setting.

Implementation of an ERP for pelvic reconstructive surgery patients in our patient population was associated with a reduced length of hospital stay, improved patient satisfaction, decreased administration of intravenous fluids and opioids without an increase in complications, readmissions, or total hospital costs. Creating and implementing fast-track recovery protocols can be achieved by collaborating in a multidisciplinary team. The involvement of gynecologists, anesthesiologists, and nursing staff in the perioperative period encourages interdisciplinary cooperation for standardization of care and sharing of best practices [10]. Despite the already short LOS and decreased morbidity associated with vaginal surgery, meaningful improvements can be made in the care of our patients.

Compliance with ethical standards

Conflicts of interest None.

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