Enhanced recovery after minimally invasive gynecologic oncology surgery to improve same day discharge: a quality improvement project

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HIGHLIGHTS
• We implemented a perioperative program to increase same day discharge rate after minimally invasive hysterectomy.
• Our perioperative program significantly improved the same day discharge rate while maintaining a low complication rate.
• Longer surgery, timing of surgery, and narcotic use were significantly associated with overnight admission.

ABSTRACT
Objectives Same day discharge after minimally invasive hysterectomy has been shown to be safe and feasible. We designed and implemented a quality improvement perioperative program based on early recovery after surgery principles to improve the rate of same day discharge from 30% to 75% after minimally invasive gynecologic oncology surgery over a 12 month period.

Methods We enrolled 102 consecutive patients undergoing minimally invasive hysterectomy at a single cancer center during a 12 month period. A pre-intervention cohort of 100 consecutive patients was identified for comparison of clinicodemographic variables and perioperative outcomes. A multidisciplinary team developed a comprehensive perioperative care program and followed quality improvement methodology. Patients were followed up for 30 days after discharge. A statistical process chart was used to monitor the effects of our interventions, and a multivariate analysis was conducted to determine factors associated with same day discharge.

Results Same day discharge rate increased from 29% to 75% after implementation (p<0.001). The post-intervention cohort was significantly younger (59 vs 62 years; p=0.038) and had shorter operative times (180 vs 211 min; p<0.001) but the two groups were similar in body mass index, comorbidity, stage, and intraoperative complications. There was no difference in 30 day perioperative complications, readmissions, reoperations, emergency department visits, or mortality. Overnight admissions were secondary to nausea and vomiting (16%), complications of pre-existing comorbidities (12%), and urinary retention (8%). On multivariate analysis, longer surgery, timing of surgery, and narcotic use on the ward were significantly associated with overnight admission. Overall, 89% of patients rated their experience as ‘very good’ or ‘excellent’, and 87% felt that their length of stay was adequate.

Conclusions Following implementation of a perioperative quality improvement program targeted towards minimally invasive gynecologic oncology surgery, our intervention significantly improved same day discharge rates while maintaining a low 30 day perioperative complication rate and excellent patient experience.

INTRODUCTION
Minimally invasive hysterectomy through laparoscopic or robotic approaches is commonly used in the surgical management of early endometrial cancers. Numerous studies have demonstrated that same day discharge after minimally invasive hysterectomy for benign or malignant conditions is feasible, safe, and cost effective, without any increase in 30 day postoperative complications or readmission rates.1–4 The rate of same day discharge after minimally invasive hysterectomy for non-oncologic conditions is high, reported at approximately 90%,5,6 but the rate for malignant conditions tends to be lower at 40–86% due to the complexity of the procedures, longer surgical time, and patient characteristics.7,8 Although there have been previous studies aimed to improve same day discharge rates after minimally invasive procedures for gynecologic malignancies, they often focus on a single intervention rather than a multifaceted approach based on root cause analysis.

Enhanced recovery after surgery is a multimodal program of evidence based interventions aimed to improve patient outcomes, decrease length of stay, and decrease healthcare cost in hospitalized surgical patients.9–13 Implementation of enhanced recovery after surgery for gynecologic oncology patients undergoing laparotomy has been associated with a significant reduction in complications by 30%, as well as a significant decrease in length of stay by 1.6 days,
leading to a net cost savings of US$2129 per patient. There are
limited data examining the potential benefit of applying enhanced
recovery after surgery strategies to patients undergoing minimally
invasive gynecologic oncology procedures and whether these strat-
gegies will lead to similar benefits.

At our center, over 200 minimally invasive procedures are
performed each year for the management of various gynecolo-
gic malignancies. Unexpected overnight admissions after mini-
mally invasive hysterectomy are common (70%) due to potentially
modifiable factors, such as postoperative nausea and vomiting,
drowsiness, urinary retention, pain, and patient expectations for
overnight stay. These complications can be decreased through
well established interventions, but adherence to best practices has
been variable due to the lack of a standardized guideline, physician
preference, timing of surgery, choice of anesthetic protocol, and
pain management.

We developed and implemented a comprehensive perioperative
care program based on enhanced recovery after surgery principles
for patients undergoing minimally invasive gynecologic oncology
procedures using an iterative, quality improvement methodology.
Specifically, the aim was to improve the rate of same day discharge
after minimally invasive gynecology oncology surgery from 30% to
75% over 12 months.

METHODS

After approval by research ethics board of the University Health
Network (No 19–5151), our quality improvement initiative was
implemented at a tertiary cancer center in Ontario, Canada. The
team included seven gynecologic oncologists who see approxi-
mately 1000 new consultations and operate on 500 cases annually.

Before our intervention, all patients scheduled for minimally inva-
sive hysterectomy were planned for same day discharge unless
the surgical or anesthesia teams identified specific concerns that
would require overnight admission. There were no predefined
criteria or guidelines to assist this decision making process. After
surgery, patients stayed in the post-anesthesia care unit until they
were fully awake with normal vital signs; they were then briefly
admitted to the surgical ward. If they met the discharge criteria,
they went home the evening of their surgery after an assessment
by the surgical team; otherwise, they were admitted for overnight
monitoring.

To guide the development of our quality improvement interven-
tions, we first performed a retrospective audit of 100 consecutive
patients (pre-intervention cohort) who underwent minimally inva-
sive hysterectomy between March 2018 and March 2019 at our
center to examine the baseline rate of same day discharge, to
determine 30 day complication rates, and to identify factors asso-
ciated with unplanned admission. Informed by this review, a multi-
disciplinary team consisting of surgeons, anesthesiologists, nursing
leaders, and quality improvement experts conducted root cause
analysis to identify barriers and facilitators to same day discharge.

Preoperative interventions were implemented at the time of initial
gynecologic oncology consultation and preadmission clinic visit. To
be included in the perioperative program, patients had to undergo
minimally invasive hysterectomy for (1) endometrial cancer, (2)
suspicious pelvic mass <10 cm in size, or (3) microinvasive cervical
cancer, and provide informed consent. Exclusion criteria from same
day discharge eligibility were: (1) >80 years old, (2) no social support
(if patients could not identify someone from their social network to
spend the first 24 hours with them after discharge), (3) living more
than 2 hours away (based on their chosen mode of transport), (4)
body mass index >50 kg/m² (due to anesthetic risks), (5) diagnosis
of dementia, or (6) two or more of uncontrolled hypertension, atrial
fibrillation, obstructive sleep apnea, renal failure, previous stroke,
or significant coronary artery disease. Exclusion criteria were deter-
mined from a consensus based decision making process involving
all the stakeholders and published studies. Patients who met the
same day discharge criteria were asked to have someone from
their social network stay with them after discharge for 24 hours.
The surgical team provided postoperative pain medications on a
standardized prescription (online supplemental Figure S1). Bowel
preparation was discouraged. At the preadmission visit, 1 week before surgery, patients were educated by the nurse prac-
titioner about the correct duration of preoperative fasting and
instructed to consume 50 g of complex carbohydrate drink 3 hours
before surgery, using written and visual education materials (online
supplemental Table S3). They were also advised to stop smoking,
to avoid alcohol, and to shower the night before surgery using
chlorhexidine soap. A reminder telephone call was made within
7 days before surgery.

Intraoperative interventions included goal directed fluid therapy,
optimization of antiemetics and analgesics, as well as limiting the
use of narcotics (online supplemental Table S1). For intraopera-
tive fluid administration, if the case remained as minimally inva-
sive, most patients received 1–2 L of balanced electrolyte solution,
provided there were no significant fluid shifts or blood losses. If
converted to laparotomy, specific target parameters (such as mean
arterial pressure or urine output) were used to determine the need
and responses to fluid boluses. Target volume was 4–6 mL/kg/
hour. All anesthesiologists involved in same day discharge cases
were recommended to use lidocaine 1–1.5 mg/kg/hour, ketamine
0.2–0.5 mg/kg/hour, magnesium 20–50 mg/kg, and marcaine infil-
tration at the incision site. In the post-anesthesia care unit and
on the ward, non-sedating analgesia and antiemetics were used.
Opioids were avoided if possible. A standardized voiding protocol
was developed and implemented. A standardized set of discharge
criteria was also developed and implemented: (1) pain and nausea
well controlled (visual analag scale score 3 or less), (2) vital signs
within normal limits, (3) patients had to confirm someone would be
staying with them for the first night, and (4) patients had to pass
their trial of void. All patients were assessed by the surgical team
before discharge when they objectively met all criteria, on average
4–6 hours after surgery. A follow-up telephone call was arranged
24–72 hours after discharge by the clinical nurse specialist. If the
patient was admitted overnight or readmitted, reasons were docu-
mented in the chart.

Once the comprehensive perioperative program was developed,
it was introduced to the surgical and anesthesia team during one of
the educational meetings (grand rounds). The multidisciplinary team
met every 2 weeks to audit the same day discharge rate, examine the reasons for unexpected admissions (at our own and external institutions, if applicable), monitor adherence to each component of the perioperative program, and plan adjustments. The team performed monthly run charts and introduced a series of interventions to increase compliance with the perioperative program.

Data were collected from January to December 2020 from electronic medical records. The primary outcome measure was the same day discharge rate. Patients discharged home before midnight on the day of surgery were classified as same day discharge. The secondary process measures were length of stay and patient experience, as reported by a questionnaire completed 30 days after surgery. Balancing measures were rates of readmission (presented to the emergency room and admitted to hospital), reoperation, emergency room visits (presented to the emergency room and discharged after assessment/treatment), and morbidity and mortality within 30 days of surgery. Morbidity was defined as one or more of the 21 specific postoperative complications defined by the National Surgical Quality Improvement Program.23

Demographic variables, patient outcomes, and adherence to interventions were compared between the pre-intervention and post-intervention cohorts. The $\chi^2$ or Fisher’s exact test was used for categorical variables and the Student’s $t$ test or Wilcoxon rank sum test was used for continuous variables. A multivariable logistic regression model was constructed to assess which patient factors or interventions were most predictive of same day discharge. Finally, a statistical process chart (p chart) was created to establish whether the intervention had a significant and sustained impact on the primary outcome. When data points fall outside of the present control limits (at $p<0.05$), the change in the process is interpreted as due to special cause variation, which suggests that it is not due to chance alone.24 All statistical analyses were performed using the R statistical programming language.25 Standards for Quality Improvement Reporting Excellence (SQUIRE 2.0) was used for the formatting of this report.26

RESULTS
In total, 102 consecutive patients were enrolled in our comprehensive perioperative program and compared with 100 patients in the pre-intervention cohort. The post-intervention cohort was younger (59 vs 62 years; $p=0.038$) but there was no difference between body mass index, Charlson comorbidity index, or rate of
For both cohorts, the most common preoperative diagnosis was uterine cancer (71% and 85%), followed by ovarian neoplasms (15% and 11%) (p=0.015). The laparoscopic approach was more frequent in the post-intervention cohort compared with the robotic approach (79% vs 63%; p=0.015). The rate of nodal assessment was similar in both cohorts (72% vs 74%; p=0.8). There was no difference in the order of surgery between the two cohorts (first case of the day 60% vs 70%; p=0.16), rate of intraoperative transfusions (2% vs 2%; p=1.00), rate of intraoperative complications (3% vs 1%; p=0.630), or median blood loss (50 vs 0 mL; p=0.33) but the post-intervention cohort had significantly shorter surgeries (180 vs 211 min; p<0.001) and a lower rate of conversion to laparotomy (1% vs 8%; p=0.018).

*Other refers to one case of myometrium lipoleiomyoma and another case of cervical spindle cell proliferation not otherwise classified.

SD, standard deviation; MIS, minimally invasive surgery; FIGO, International Federation of Gynecology and Obstetrics.

Table 1  Demographics and outcomes of patients before and after the intervention

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pre-intervention (n=100)</th>
<th>Post-intervention (n=102)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) (mean (SD))</td>
<td>62 (10.6)</td>
<td>59 (10.5)</td>
<td>0.038</td>
</tr>
<tr>
<td>Body mass index (mean (SD))</td>
<td>32 (9.5)</td>
<td>32 (9.2)</td>
<td>0.8</td>
</tr>
<tr>
<td>Charlson comorbidity index (n (%))</td>
<td></td>
<td></td>
<td>0.54</td>
</tr>
<tr>
<td>0</td>
<td>14 (14)</td>
<td>16 (16)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>19 (19)</td>
<td>27 (26)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>33 (33)</td>
<td>30 (29)</td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>34 (34)</td>
<td>29 (28)</td>
<td></td>
</tr>
<tr>
<td>Previous abdominal surgery (n (%))</td>
<td>56 (56)</td>
<td>44 (43)</td>
<td>0.092</td>
</tr>
<tr>
<td>Preoperative diagnosis (n (%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine cancer</td>
<td>85 (85)</td>
<td>72 (71)</td>
<td>0.015</td>
</tr>
<tr>
<td>Ovarian cancer</td>
<td>1 (1)</td>
<td>10 (10)</td>
<td></td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>3 (3)</td>
<td>3 (3)</td>
<td></td>
</tr>
<tr>
<td>Ovarian neoplasm (benign/borderline)</td>
<td>11 (11)</td>
<td>15 (15)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>2 (2)*</td>
<td></td>
</tr>
<tr>
<td>MIS approach (n (%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laparoscopic</td>
<td>63 (63)</td>
<td>81 (79)</td>
<td>0.015</td>
</tr>
<tr>
<td>Robotic</td>
<td>37 (37)</td>
<td>21 (21)</td>
<td></td>
</tr>
<tr>
<td>Nodal assessment (n (%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>26 (26)</td>
<td>29 (28)</td>
<td>0.17</td>
</tr>
<tr>
<td>Sentinel node assessment</td>
<td>43 (43)</td>
<td>51 (50)</td>
<td></td>
</tr>
<tr>
<td>Full lymphadenectomy</td>
<td>31 (31)</td>
<td>22 (22)</td>
<td></td>
</tr>
<tr>
<td>Order of case (n (%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First case of the day</td>
<td>70 (70)</td>
<td>61 (60)</td>
<td>0.16</td>
</tr>
<tr>
<td>Second or third case of the day</td>
<td>30 (30)</td>
<td>41 (40)</td>
<td></td>
</tr>
<tr>
<td>Length of surgery (min) (mean (SD))</td>
<td>211 (68.8)</td>
<td>180 (59.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Conversion to laparotomy (n (%))</td>
<td>8 (8)</td>
<td>1 (1)</td>
<td>0.018</td>
</tr>
<tr>
<td>Intraoperative transfusions (n (%))</td>
<td>2 (2)</td>
<td>2 (2)</td>
<td>1</td>
</tr>
<tr>
<td>Intraoperative complications (n (%))</td>
<td>1 (1)</td>
<td>3 (3)</td>
<td>0.62</td>
</tr>
<tr>
<td>Blood loss (mL) (median (range))</td>
<td>0 (0–500)</td>
<td>50 (0–800)</td>
<td>0.33</td>
</tr>
<tr>
<td>Final FIGO stage (n (%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign/borderline</td>
<td>1 (1)</td>
<td>19 (19)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1</td>
<td>80 (80)</td>
<td>64 (63)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15 (15)</td>
<td>11 (11)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3 (3)</td>
<td>7 (7)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1 (1)</td>
<td>1 (1)</td>
<td></td>
</tr>
<tr>
<td>Uterine weight (g) (median (range))</td>
<td>117 (45–298)</td>
<td>120 (11–641)</td>
<td>0.34</td>
</tr>
</tbody>
</table>

*Other refers to one case of myometrium lipoleiomyoma and another case of cervical spindle cell proliferation not otherwise classified.
The rate of same day discharge increased from 29% before the intervention to 75% after the intervention (p<0.001) (Figure 2, Table 2). Median length of post-surgical stay was significantly shorter after the intervention (8.2 vs 22 hours; p<0.001). After the intervention, 25 patients (25%) stayed overnight; 23 patients stayed for 1 night and 2 patients stayed for 2 nights or longer. The most common reasons for overnight stay were nausea/vomiting (16%), followed by complications related to their underlying comorbidities (12%), drowsiness (12%), urinary retention (8%), and pain (4%) (Table 2). Readmission rates were similar (2% vs 2%; p=1.0), as were reoperation (1% vs 3%; p=0.60), or emergency department visits at 30 days (8% vs 8%; p=1.0). There was no increase in the 30 day morbidity (10% vs 7%; p=0.64) or mortality (0% vs 1%; p=0.99) (Table 2). We performed a subgroup analysis to examine the same day discharge rate in our pre-intervention cohort excluding any patients that met our exclusion criteria, and this was 37% (25/67).

Adherence to planned interventions was tracked (online supplemental Table S1). There was high adherence to patient education and counseling (97%), ordering of preoperative analgesia (81%), administration of acetaminophen (85%), and preoperative carbohydrate loading (86%). There was also a significant decrease in the mean use of fentanyl intraoperatively (204 vs 233 µg; p=0.002), lower rate of narcotic use in the post-anesthesia care unit (48% vs 64%; p=0.032), and narcotic use on the ward (27% vs 50%; p=0.002). In total, 82% of patients received a postoperative follow-up call within 24–72 hours of discharge.

On multivariate analysis, factors associated with a reduced chance of same day discharge included longer length of surgery (odds ratio (OR) 0.55, 95% confidence interval (CI) 0.34 to 0.89; p=0.015), timing of surgery (second or third case, OR 0.26, 95% CI 0.09 to 0.75; p=0.013), and narcotic use on the ward (OR 0.20, 95% CI 0.07 to 0.56; p=0.002) (Figure 3). Having nodal assessment increased the odds of same day discharge (OR 4.3, 95% CI 1.4 to 13.9; p=0.014).

All patients in the post-intervention cohort completed patient satisfaction surveys (online supplemental Table S2). After the intervention, 97% of patients rated ‘good’, ‘very good’, or ‘excellent’ the quality and quantity of information they received from their care providers regarding the expected length of stay (online supplemental Table S2). In total, 87% of patients had very good or excellent control of nausea and pain, and 84% of patients felt that their length of stay was adequate. For rating their overall experience, 58% rated ‘excellent’, 31% ‘very good’, and 7% ‘good’.

**DISCUSSION**

**Summary of Main Results**

Through our comprehensive perioperative program designed using enhanced recovery after surgery principles and following a quality improvement framework, we were able to significantly increase our same day discharge rate while minimizing complications and maintaining an excellent patient experience. We achieved our goal of increasing the rate of same day discharge from 30% to 75% over a 12 month period, and the median length of post-surgical stay was reduced by almost 14 hours. Our rates for 30 day readmission, reoperation, emergency room visits, and morbidity and mortality remained low throughout our implementation. The overall rates...
of adherence to our interventions were high, and the majority of patients felt that their length of stay was adequate.

Results in the Context of Published Literature
Enhanced recovery after surgery has been an integral component of surgical care in the field of gynecologic oncology, with clear evidence for clinical improvement and cost savings. Enhanced recovery after surgery interventions have been well established for laparotomy but there is scant evidence that implementation of these principles in minimally invasive gynecologic oncology surgery leads to a reduction in length of stay as well as costs. Chapman described 55 patients that underwent minimally invasive surgery for gynecologic malignancy and were enrolled in their enhanced recovery pathway; these patients were more likely to be discharged on postoperative day 1, with significant improvement in recovery time and pain control. Interestingly, most of their patient population stayed overnight, with no report of patients going home on the same day. Our data support the efficacy of similar protocols being implemented and their suitability to facilitate same day discharge.

Our multivariate analysis revealed specific patient and perioperative characteristics (longer length of surgery, timing of the surgery, and narcotic use on ward) that predicted a longer duration of stay. Previous studies have identified older age, preoperative lung disease, and later surgical end time as risk factors for prolonged hospital stay. This highlights the importance of having clear same day discharge patient eligibility criteria to prevent unplanned admissions. Before our intervention, all patients who signed consent for minimally invasive hysterectomy were deemed candidates for same day discharge. Careful selection of candidates also led to shorter surgeries (other reasons being a higher proportion of laparoscopic compared with robotic surgeries, and frequent use of sentinel lymph node assessment) and a lower rate of conversion in our study.

Of 25% of patients that stayed overnight after the intervention, the most common reason was postoperative nausea and vomiting (16%). This highlights a difference from what has been published previously, in which urinary retention or inadequate pain control

### Table 2  
Same day discharge outcomes and balancing measures

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pre-intervention (n=100)</th>
<th>Post-intervention (n=102)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome measures (n (%))</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same day discharge</td>
<td>29 (29)</td>
<td>77 (75)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Overnight stay</td>
<td>71 (71)</td>
<td>25 (25)</td>
<td></td>
</tr>
<tr>
<td>One night (n)</td>
<td>56</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Two or more nights (n)</td>
<td>15</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Reasons for overnight stay</strong></td>
<td>n=71</td>
<td>n=25</td>
<td></td>
</tr>
<tr>
<td>Comorbidity (n (%))</td>
<td>7 (10)</td>
<td>3 (12)</td>
<td>0.064</td>
</tr>
<tr>
<td>Drowsiness (n (%))</td>
<td>2 (3)</td>
<td>3 (12)</td>
<td></td>
</tr>
<tr>
<td>Nausea/vomiting (n (%))</td>
<td>8 (11)</td>
<td>4 (16)</td>
<td></td>
</tr>
<tr>
<td>Oxygen desaturation (n (%))</td>
<td>2 (3)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Pain (n (%))</td>
<td>1 (1)</td>
<td>1 (4)</td>
<td></td>
</tr>
<tr>
<td>Urinary retention (n (%))</td>
<td>12 (17)</td>
<td>2 (8)</td>
<td></td>
</tr>
<tr>
<td>Not specified (n (%))</td>
<td>39 (55)</td>
<td>12 (48)</td>
<td></td>
</tr>
</tbody>
</table>

| Process measure                  |                          |                           |         |
| Total length of post-surgical stay (h) (median (range)) | 22 (4.5–173) | 8.2 (3.1–71.6) | <0.001  |

| Balancing measures (n (%))        |                          |                           |         |
| Readmission in 30 days            | 2 (2)                    | 2 (2)                     | 1.000   |
| Reoperation in 30 days            | 3 (3)                    | 1 (1)                     | 0.370   |
| Emergency room visits in 30 days  | 8 (8)                    | 8 (8)                     | 1.000   |
| Morbidity in 30 days              | 7 (7)                    | 10 (10)                   | 0.640   |
| Superficial incisional SSI (n)    | 0                        | 4                         |         |
| Deep incisional SSI (n)           | 0                        | 1                         |         |
| Organ/space SSI (n)               | 1                        | 0                         |         |
| Pneumonia (n)                     | 1                        | 0                         |         |
| Urinary tract infection (n)       | 1                        | 4                         |         |
| Wound disruption (n)              | 4                        | 1                         |         |
| Mortality in 30 days (n (%))      | 1 (1)                    | 0                         | 0.500   |

SD, standard deviation; SSI, surgical site infection
were often the most common reasons for overnight admissions. This may be due to the younger age in our post-intervention cohort, which is a risk factor for postoperative nausea and vomiting, or changes in the anesthetic protocol. Also, more importantly, we followed a standardized voiding protocol post-intervention, which essentially prevented any unnecessary overnight stays due to urinary retention alone.

Strengths and Weaknesses
Our interventions included multiple opportunities for patient and provider education, in order to align patient and physician expectations regarding the plan for same day discharge. It has been demonstrated in the literature that a large number of patients requiring hospitalization did so for social and cultural reasons, such as lack of transport from hospital, lack of home support from family or friends, and lack of reassurance regarding the safety and feasibility of same day discharge. In fact, there were 39 patients in our pre-intervention cohort with a prolonged stay in the hospital with no specific medical reasons. Many of these admissions were likely secondary to surgeon or patient preferences. To address this issue, patient education and counseling about expectations was incorporated at the initial time of consultation, their preadmission clinic visit, the preoperative bay, and immediately in the postoperative setting.
Original research

Our study has several limitations that warrant discussion. Our interventions were implemented simultaneously, making it difficult to determine the individual impact of each intervention. In order to circumvent this issue, we examined the impact of each intervention in our multivariable analysis. Furthermore, we were not able to collect self-reported patient experience data for the pre-intervention cohort, and the patient questionnaire was not a validated study instrument. Although we did not use the formal enhanced recovery after surgery interactive audit system, we did meticulously track compliance to each element of our interventions using a specific internal database (online supplemental Table S1).

Implications for Practice and Future Research

Our findings clearly demonstrate the need for a multifaceted approach when working to increase the rate of same day discharge; furthermore, through our bi-weekly audit of our compliance to interventions, we have identified specific components that need further effort (preoperative non-steroidal anti-inflammatory drug use and eliminating bowel preparation). Future research should focus on the cost effectiveness of these approaches and ways to sustain high rates of same day discharge.

CONCLUSION

In conclusion, our comprehensive perioperative program was effective in improving same day discharge rates while maintaining excellent patient outcomes and patient experience in the gynecologic oncology population. We have provided real world data on how to implement a same day discharge program in a tertiary cancer center to impact length of stay and improve perioperative outcomes.

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Original research


