

Same-Day Discharge After Robotic Hysterectomy: A Resource Utilization and Quality Improvement Project

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ABSTRACT

Background: We implemented a low-cost education initiative to improve the rate of same-day discharge following hysterectomy performed for malignancy and assessed feasibility and impact on resource utilization.

Methods: Development and implementation of faculty, patient, clinical, and perioperative staff education regarding the goal of same-day discharge for patients undergoing robotic hysterectomy and staging by gynecologic oncologists was started in July 2019. Chart review of 103 patients prior to the intervention and 112 patients after the start of the intervention was completed.

Results: The rate of same-day discharge increased from 5% to 32% following the low-cost process change initiative, and a total of approximately 682 inpatient care hours were saved per 31 patients.

Discussion: The rate of same-day discharges after hysterectomy and staging performed by gynecologic oncologists can be safely increased with a simple educational intervention, which can save significant patient care resources.

BACKGROUND

Hysterectomy is one of the most common surgical procedures for women; by age 60, over one-third of all women in the United States have undergone a hysterectomy.¹ About 9% of all hysterectomies from 2000 through 2004—totaling nearly 300,000 US women—were performed to treat a diagnosis of gynecologic malignancy.¹⁻⁴ Minimally invasive surgical approaches, including laparoscopic, vaginal, and robotic methods, frequently

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are utilized. These techniques repeatedly demonstrate decreased blood loss, improved wound healing, shorter recovery time, less pain, and shorter hospital stays.⁵⁻⁷ Multiple studies have proven the safety and feasibility of eliminating hospital stays entirely through same-day discharges following minimally invasive hysterectomies for both benign and malignant conditions.⁸⁻¹⁰ Nationally, the number of same-day discharges for women with endometrial malignancy, in particular, have increased from 5.6% in 2011 to 16.3% in 2016,⁹ without a significant change in hospital readmission rates. In an effort to save hospital costs while also improving patient satisfaction, some institutions have implemented

patient and provider education initiatives to promote same-day discharge.¹⁰

The Division of Gynecologic Oncology at the Medical College of Wisconsin (MCW) sought to align its practice with current literature and increase same-day discharge following robotic-assisted total hysterectomy and staging. The intent was to determine whether same-day discharges after minimally invasive surgery for malignancy could be affected over the course of a year and the approximate number of inpatient care hours saved by same-day discharge. As each inpatient hour of care is associated with significant costs in any institution, hours saved would thus serve as a surrogate marker of improved resource utilization and cost savings.

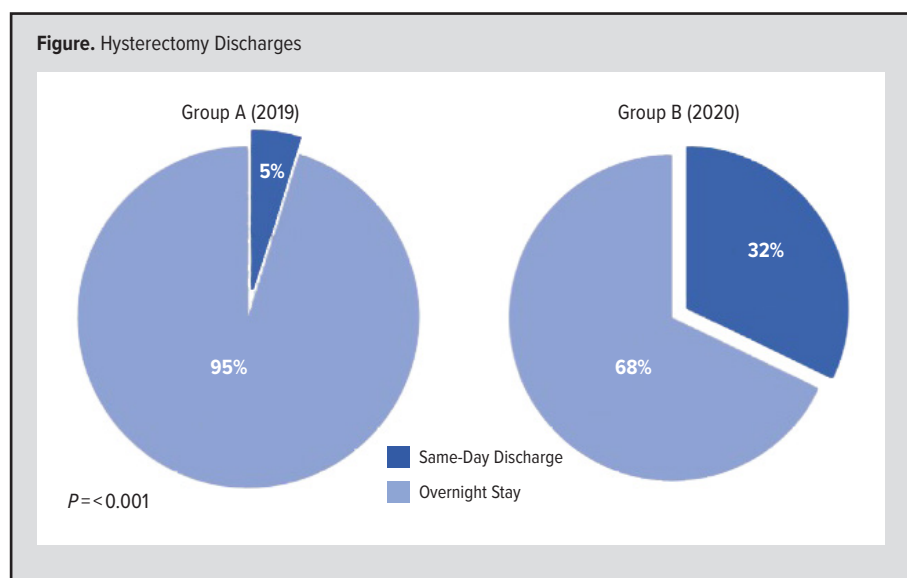
METHODS

This project was undertaken at Froedtert and the Medical

College of Wisconsin, a tertiary academic medical center located in Milwaukee, Wisconsin. Retrospective data on the rate of same-day discharge and postoperative emergency department visits and hospital admissions were collected for the period of July 2018 through June 2019 (Group A). This served as the baseline same-day discharge rate. We then sought to improve the rate of same-day discharge after robotic hysterectomy and staging performed by gynecologic oncologists through an educational and process change initiative. Data on same-day discharge was collected post-intervention from July 2019 through June 2020 (Group B) to determine the educational intervention's efficacy.

The initiative included review and discussion of the current literature on same-day discharge for oncology patients by the gynecology oncology faculty, residents, advance practice providers, and clinic staff. Time spent reading was approximately 1 to 2 hours per clinician, and group discussion of literature was approximately 1 to 2 hours total. The goal to implement same-day discharge was accepted by the practice after clinicians agreed upon the initiative's overall safety and feasibility. The team discussed ways to set expectations for same-day discharge with patients and reviewed standard institutional criteria patients needed to meet in order to be discharged to home: appropriate pain control, ability to tolerate oral intake without nausea, ambulating at baseline, voiding, hemodynamic stability, appropriate respiratory status, transportation home, and supervision for the first 24 hours after surgery. In addition, the initiative was shared institutionally with the perioperative clinic staff, the anesthesia providers in the pre-anesthesia testing clinic, and nursing staff in the pre- and postoperative care units so that all patient contacts were aware of the initiative. During their initial clinic consultation, all patients deemed surgically appropriate and undergoing minimally invasive hysterectomy with staging surgery were included in this initiative. Patients with a surgical plan that included laparotomy were not included. At the initial consultation, patients were provided verbal and printed information regarding their procedure and the expectation for same-day discharge if meeting institutional standard discharge criteria. Hospital admission following a minimally invasive hysterectomy was reserved for patients not meeting the standard discharge criteria.

Interval assessments were performed to determine progress and safety of increasing same-day discharges. Interval reminders to clinicians in care units outside of gynecologic oncology occurred ad hoc to reinforce the process change. Initially,



reminders were needed approximately every few months, as we found the perioperative teams that were not accustomed to same-day discharge would make the assumption that patients were to be admitted. This, in turn, resulted in patient confusion and altered patient expectations. The progress updates were disseminated at regular intervals in the monthly gynecologic oncology division meetings where additional reminders to clinicians in gynecologic oncology were needed for the first few months. Repeat reminders for gynecologic oncology clinicians became unnecessary after about 6 months, whereas occasional reminders to perioperative teams were still needed throughout the year. Retrospective chart review was utilized to collect clinical information about patients and surgical procedures performed. The Honest Broker tool (CTSI Clinical Research Data Warehouse, 2020, <https://ctsi.mcw.edu/ctri/>) was used to extract self-reported demographic information from patient charts. Surgical data, such as operative procedures performed and time of completion in the recovery room visit, were detailed. Approximate hours saved by same-day discharge were calculated by using the mean duration/hours of patient stay (admitted) versus the mean duration/hours of patient stay (discharged).

All statistical analyses were carried out using R (R Core Team, 2020, <http://www.R-project.org/>) and a 2-sided P value of less than 0.05 was considered statistically significant, unless otherwise noted. For continuous data, median and interquartile range were utilized. For categorical data, results were summarized as percentages and compared by chi-square or Fisher exact tests. Continuous variables between groups were compared using Mann-Whitney, Wilcoxon, or Kruskal-Wallis tests.

RESULTS

One hundred three patients underwent robotic hysterectomy and staging by a gynecologic oncologist during July 2018 – June 2019 (Group A); 4.9% (5 patients) were discharged home on the day of

Table 1. Demographic Factors All Patients

Characteristic	Group A (2019) N = 103	Group B (2020) N = 112	P value
Age ^a	62 (57-71)	65 (58-70)	0.3
Body Mass Index ^a	35 (29-43)	34 (28-42)	0.7
Same-Day Discharge ^b			<0.001
Overnight Stay	98 (95%)	76 (68%)	
Same-Day Discharge	5 (4.9%)	36 (32%)	
Malignant ^b	86 (83%)	92 (82%)	0.8
Stage ^b			0.3
Benign	17 (17%)	20 (18%)	
IA	52 (50%)	56 (50%)	
IB	23 (22%)	17 (15%)	
II	5 (4.9%)	5 (4.5%)	
III	3 (2.9%)	11 (9.8%)	
IV	3 (2.9%)	3 (2.7%)	
Histology ^b			0.2
Benign	10 (9.7%)	6 (5.4%)	
Endometrial intraepithelial neoplasia	7 (6.8%)	12 (11%)	
G1 endometrioid	54 (52%)	43 (38%)	
G2 endometrioid	12 (12%)	18 (16%)	
High grade	17 (17%)	29 (26%)	
Ovary malignancy	3 (2.9%)	4 (3.6%)	
Prior abdominal surgery ^b	64 (62%)	70 (62%)	>0.9
Marital status ^b			0.7
Married	59 (57%)	60 (54%)	
Single	23 (22%)	25 (22%)	
Widowed	10 (9.7%)	17 (15%)	
Other	11 (11%)	10 (8.9%)	
Employment ^b			0.8
Employed	44 (43%)	43 (38%)	
Not employed	12 (12%)	13 (12%)	
Retired	47 (46%)	56 (50%)	
Race ^b			0.010
Asian	0 (0%)	4 (3.6%)	
Black or African American	4 (3.9%)	13 (12%)	
White or Caucasian	98 (95%)	95 (85%)	
Ethnicity ^b			0.051
Hispanic	4 (3.9%)	0 (0%)	
Non-Hispanic	99 (96%)	112 (100%)	

^aMedian (interquartile range), n (%).
^bWilcoxon rank sum test; Pearson's chi-square test; Fisher exact test; n (%).

surgery. One hundred twelve patients underwent robotic-assisted hysterectomy during July 2019 – June 2020 (Group B); 32% (36 patients) were discharged home on the day of surgery ($P < 0.001$) (Figure). The rate of same-day discharge after robotic hysterectomy performed by gynecologic oncologists at our institution was significantly increased ($P < 0.001$). Of the 5 patients in Group A who were discharged on the day of surgery, there were no re-admissions or ED visits. In Group B, of 36 patients undergoing same-day discharge, there was 1 ED visit, 1 urgent care visit, and no readmissions.

In the post-intervention group (Group B), the mean hours an admitted patient stayed in the hospital was 25. Patients discharged home the same day stayed a mean of 3 hours. Thus, approxi-

Table 2. Demographic and Clinical Factors Group B Post-Intervention

Characteristic	Overnight Stay N = 76	Same-Day Discharge N = 36	P value
Age ^a	66 (59-72)	60 (55-66)	0.024
Body Mass Index ^a	35 (29-42)	32 (26-41)	0.2
Malignant ^b	65 (85%)	27 (75%)	0.2
Stage ^b			0.7
Benign	11 (14%)	9 (25%)	
IA	38 (50%)	18 (50%)	
IB	13 (17%)	4 (11%)	
II	3 (3.9%)	2 (5.6%)	
III	8 (11%)	3 (8.3%)	
IV	3 (3.9%)	0 (0%)	
Histology ^b			0.10
Benign	3 (3.9%)	3 (8.3%)	
Endometrial intraepithelial neoplasia	6 (7.9%)	6 (17%)	
G1 endometrioid	26 (34%)	17 (47%)	
G2 endometrioid	13 (17%)	5 (14%)	
High grade	25 (33%)	4 (11%)	
Ovary malignancy	3 (3.9%)	1 (2.8%)	
Prior abdominal surgery ^b	56 (61%)	24 (67%)	0.5
Marital status ^b			0.015
Married	41 (54%)	19 (53%)	
Single	15 (20%)	10 (28%)	
Widowed	16 (21%)	1 (2.8%)	
Other	4 (5.3%)	6 (17%)	
Employment ^b			0.028
Employed	23 (30%)	20 (56%)	
Not employed	9 (12%)	4 (11%)	
Retired	44 (58%)	12 (33%)	
Race ^b			0.08
Asian	3 (3.9%)	1 (2.8%)	
Black or African American	10 (13%)	3 (8.3%)	
White or Caucasian	63 (83%)	32 (89%)	
Time recovery room complete ^b			<0.001
8 a.m. – 11:59 a.m.	3 (3.9%)	9 (25%)	
12 p.m. – 3:59 p.m.	30 (39%)	26 (72%)	
4 p.m. – 7:59 p.m.	37 (49%)	1 (2.8%)	
8 p.m. – 12 a.m.	6 (7.9%)	0 (0%)	
Operative procedures ^b			
Sentinel lymph node dissection	52 (68%)	31 (86%)	0.046
Pelvic lymph node dissection	35 (46%)	13 (36%)	0.3
Para-aortic lymph node dissection	27 (36%)	3 (8.3%)	0.002
Other procedures	8 (11%)	2 (5.6%)	0.5

^aMedian (interquartile range), n (%).
^bWilcoxon rank sum test; Pearson's chi-square test; Fisher exact test; n (%).

mately 22 hours of patient care could be saved for each patient discharged home the same day. Given we increased same-day discharges from 5 patients in Group A to 36 patients in Group B, we calculated that approximately 682 inpatient care hours were saved by this intervention over the course of 1 year.

One hundred three patients in Group A and 112 patients in Group B underwent robotic hysterectomy with a gynecologic oncologist at our institution. There was no significant difference between most demographic and clinical factors of patients in the 2 groups (Table 1). However, a difference in race and

ethnicity was noted between the groups as Group B had more Asian and African American patients ($P=0.010$), and Group A had 4 patients identifying as Hispanic, compared to none in Group B ($P=0.051$); these represent small numbers of patients overall.

When comparing the patients post-intervention (Group B) who were discharged on the day of surgery ($n=36$) to those who stayed overnight ($n=76$), several differences were noted (Table 2). Patients discharged on the same day often were employed and younger than those who stayed overnight. There was no significant difference between stage of malignancy, histology, or history of prior abdominal surgery between patients with overnight stay versus the same-day discharge group (Table 2).

Among patients in Group B, additional procedures were performed as follows: pelvic sentinel lymph node dissection (83/112, 74%), pelvic lymphadenectomy (48/112, 43%), and para-aortic lymphadenectomy (30/112, 27%), as well as other procedures including midurethral sling, pelvic organ prolapse surgery, and hernia repair (10/112, 9%). There was a significant difference between the overnight and same-day discharge groups, with more same-day discharge patients having undergone a sentinel lymph node biopsy ($P=0.046$) and more overnight stay patients having undergone a para-aortic lymph node dissection ($P=0.002$) (Table 2), the latter of which adds complexity and time to the surgical operation. More same-day discharge patients completed their recovery room stay between noon and 4 PM (72%), whereas more overnight stay patients completed the recovery room between 4 PM and 8 PM (49%) ($P<0.001$).

DISCUSSION

Same-day discharge after minimally invasive hysterectomy previously has been determined safe in gynecologic oncology patients.⁹⁻¹⁰ Same-day discharge in this population has the potential for substantial cost savings without compromising safety or patient satisfaction. By instituting an effective educational intervention and process change management strategy across multidisciplinary clinical teams, our practice significantly increased the rate of same-day discharges from 5% to 32% in 1 year. This low-cost intervention saved approximately 682 inpatient hours of care. This process change was supported by evidence-based practice, but reminders to all clinicians and teams were needed initially. After approximately 6 months, reminders were needed mainly for the perioperative teams to reinforce the new protocol. Safety of the new protocol was confirmed in our study as there was only 1 subsequent ED visit for pain control, 1 urgent care visit for rash, and no readmissions to either our facility or any other local facility during the postoperative period.

A number of trends in our study have been noted previously in the literature. Younger patient age, lower surgery complexity, and earlier procedure completion time all have been associated with higher likelihood of same-day discharge. Although we did not

explore reasons for this finding specifically, it is conceivable that it may be attributed to several factors, such as additional medical comorbidities, extended traveling distance from hospital, lack of comfort with evening discharge by either patient or support person, or possibly lack of an available support person in the first 24 hours after anesthesia.

The primary objective of this initiative was to successfully execute a process change surrounding same-day discharges in the division of gynecologic oncology. The minimal cost of educating patients and staff members and significant increase in same-day discharges achieved in 1 year's time demonstrate the feasibility of promoting same-day discharge, but several limitations to our findings are present. The correlation of decreased inpatient hours with cost savings seems intuitive but does not provide an actual dollar amount per hour saved. We did not perform a formal cost analysis, and the approximate number of clinical hours of care saved is calculated based on mean values of groups studied. The complexity of calculating cost (direct and indirect costs, variable or fixed) is challenging on many levels and can be affected by myriad factors. Being mindful of resource utilization to control costs is an important consideration, as the majority of hospital care costs are related to building space, equipment, salaried labor, and overhead.¹¹ Thus, we concluded that decreasing inpatient hours was an important surrogate for cost reduction. This initiative took place at an academic tertiary care institution and our results, while not generalizable to all institutions, provide an example for others who seek to promote same-day discharge and save valuable resources while dedicating minimal time and costs toward an intervention. This initiative also demonstrates that impactful results can be achieved safely in the short time period of 1 year.

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