
Feasibility of same day discharge after robotic assisted pelvic floor reconstruction

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Introduction: Robotic surgical procedures have become more common in female pelvic reconstruction. Purported benefits of robotic assisted pelvic floor reconstruction (RAPFR) procedures include shorter hospital stay, faster recovery, lower blood loss, and decreased postoperative pain. Following RAPFR procedures, the current accepted practice is discharge after a one-night hospitalization. We assessed whether same day discharge (SDD) affects the short term safety of and patient satisfaction with robotic assisted pelvic floor reconstructive procedures, relative to those who remain hospitalized overnight.

Materials and methods: We retrospectively reviewed the charts of women who underwent RAPFR procedures between October 2015 and October 2016. A same day discharge protocol for RAPFR was initiated in July 2016. To date, 10 patients have undergone SDD. These patients were compared to the consecutive patients from the prior 9 months who stayed overnight. To evaluate short term safety, we reviewed the medical record for any unscheduled Cleveland Clinic emergency department (ED) and/or office visits within 30 days of the RAPFR procedure. We then sent a mailed survey to all patients, querying their pelvic organ prolapse-related PGI-I and

also offering a postoperative satisfaction questionnaire. Demographic, perioperative, postoperative data and survey results were compared using Student's *t* test and Fisher's exact test.

Results: In our series, 38 patients (95%) underwent robotic assisted sacrocolpopexy (RASC). Only 2 (5%) had a different RAPFR procedure, a robotic assisted vaginal mesh excision. Concomitant robotic assisted supracervical hysterectomy (SCH) was performed in 9 patients (30%) in the overnight group, whereas 1 of the SDD patients underwent SCH (10%). Demographics and operative characteristics did not differ between groups. Ultimately, patients in the SDD group were no more likely than the overnight group to require an unscheduled ED or office visit in the early postoperative period. With respect to satisfaction, no significant differences were observed between groups, with both groups noting substantial improvement in POP symptoms following surgery.

Conclusions: In this pilot study, same day discharge after RAPFR procedures appears to be safe and feasible. RAPFR procedures were well-tolerated, with no difference in ED or non-urology office visits occurring during the early post-operative period in our series, regardless of length of stay. Patient satisfaction was equivalent between groups and universally high.

Key Words: pelvic organ prolapse, robotic surgery, female urology

Introduction

Robotic approaches are rapidly becoming the procedures of choice for anterior sacrocolpopexy and other female pelvic floor reconstructive surgeries. Following introduction of the da Vinci robotic surgery system (Intuitive Surgical; Sunnyvale, CA, USA) in 1999, robotic pelvic surgery became a mainstay of this technology. Rapid recovery after these operations and improved

postoperative management have led to progressively shorter hospital stays following robotic pelvic surgical procedures.

In this era of emphasizing safe, high-value care, timely discharge is a common goal, both for its potential cost-savings as well as for the avoidance of nosocomial infections, DVTs due to immobility, the untoward consequences of medical errors, interrupted sleep, and other such suboptimal outcomes. Indeed, patients who undergo robotic assisted pelvic floor reconstruction (RAPFR) are often discharged on the first postoperative day.¹ However, these cases are almost universally low in their postoperative morbidity – intraoperative blood loss is typically modest and transfusion nearly unheard of. Return of bowel function is prompt, as the bowel is not entered and only minimally manipulated.²⁻⁴

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Postoperative pain medications given on the nursing ward are often delivered orally. Given these parameters, there is increasing interest in same-day-discharge for patients who undergo pelvic genito-urinary procedures.⁵ Indeed, in 2010, 46% of hysterectomy patients in the United States were discharged home on the same day as their operation.⁶ With this in mind, we sought to investigate the feasibility of day-of-surgery discharge for patients undergoing RAPFR.

Our aims were twofold: first, to retrospectively assess the safety and efficacy of same-day-discharge for patients undergoing RAPFR and second, to assess patient satisfaction with same-day-discharge in women undergoing RAPFR relative to those who were hospitalized overnight following their procedure.

Materials and methods

After Institutional Review Board approval, the medical records of all patients who underwent RAPFR by a single surgeon at our tertiary care referral center from October 2015 through October 2016 were reviewed. Inclusion criteria were age ≥ 18 years, ECOG status 0-1, female gender and history of either robotic assisted sacrocolpopexy or robotic assisted pelvic mesh excision during the study period. Concomitant surgeries, such as hysterectomy and mid-urethral sling placement, were permitted. Patients who stayed two or more nights in the hospital were excluded, as this marks a deviation from our standard of care. Information was collected about patient demographics, the type of surgery performed, the case length, EBL, preoperative diagnosis, relevant comorbidities, and postoperative outcomes.

In addition to chart review, these patients were then sent an anonymous mailed survey including both the Patient Global Impression of Improvement Index ("how would you rate your pelvic organ prolapse or pelvic pain now, as compared to how it was before your surgery," scored on a 7-point Likert scale) and a proprietary survey aimed at differentiating patient preferences for overnight stay versus same-day-discharge (SDD). A cover letter explaining the purpose of the study and that completing the survey conveyed consent was included. Self-addressed stamped envelopes were provided for return of the survey. Patients were contacted via phone prior to the survey being mailed, and then again several weeks later. At the later phone call, patients who reported not having completed the survey were offered the opportunity to answer the survey questions via phone. For the purpose of this survey, the control population was those with uncomplicated overnight hospitalization (OH) following their procedure and the intervention cohort was those who underwent SDD.

Descriptive summarization of the data was performed to analyze the patient demographics, operative parameters (eg. EBL, length of case, etc), outcomes, complications, and survey responses. All continuous variables were summarized using means/medians, standard deviations and ranges. Categorical variables (e.g. race, dichotomized outcomes, surgical or medical interventions, etc.) were described using frequencies and percentages.

Associations of medical and surgical management with outcomes of categorical variables like complications/complaints were examined using chi-squared tests, while associations with continuous variables like age, BMI, and continuous values of baseline demographics were assessed using non-parametric Wilcoxon signed rank test when the variables were non-normally distributed, or by using t-test when the variables were normally distributed. Categorical variables were assessed using the Fisher's Exact test, given the small sample size.

Results

A total of 40 patients underwent RAPFR during the study period, of which 30 were hospitalized overnight and 10 were discharged on the day of surgery. The median age of all included subjects was 65 years (60-72), with BMI 26.9 kg/m² (24.3-28.5) and median duration of symptoms was 1.2 years (0.6-3). Comorbidity burden was moderate and did not differ between groups, Table 1. Twelve patients underwent surgery following initiation of the SDD protocol; of these, 10 were discharged on the day of surgery and two were hospitalized overnight. Each of these two patients failed to meet SDD criteria, due to surgical case completion in the late evening, beyond the pre-set 6pm case-completion criteria for consideration of SDD. All other patients cared for after protocol initiation were eligible for SDD and ultimately were discharged on the day of surgery.

With regard to operative procedures, 38 patients underwent robotic assisted sacrocolpopexy (RASC), with two undergoing removal of pelvic mesh. Ten patients underwent concomitant supracervical hysterectomy and 15 underwent midurethral sling placement. Median operative length was 225 minutes (208-270), and EBL 25 mL (5-50), Table 2. On chart review, one OH patient had an ED visit within our health system for a mechanical fall, unrelated to surgery, on POD#20. No other medical records revealed visits to an ED, urgent care, PCP, or some other non-GU provider within our health system in the 30 day postoperative period. No unscheduled urology office visits occurred. In each group, 90% of patients successfully passed their postoperative trials of void. Small numbers of patients

TABLE 1. Demographics

	All (n = 40)	Standard one night hospitalization (n = 30)	Same day discharge (n = 10)	p value
Age at surgery (y)	65 (60-72)	66 (61-72)	62 (59-64)	0.32
Body mass index (kg/m ²)	26.9 (24.3-28.5)	27.5 (24.9-28.9)	24.4 (23.8-24.8)	0.26
Comorbidities (n, %)				0.07
Neurologic	2 (5%)	0	2 (20%)	
CAD	0	0	0	
DM	2 (5%)	2 (7%)	0	
Depression	4 (10%)	3 (10%)	1 (10%)	
Anxiety	2 (5%)	1 (3%)	1 (10%)	
Poor function	0	0	0	
Other	3 (8%)	2 (7%)	1 (10%)	
Duration of symptoms (y)	1.2 (0.6-3)	1.8 (0.5-3)	1.2 (1.0-2.2)	0.88

CAD = coronary artery disease; DM = diabetes mellitus

complained of postoperative urinary tract infection, new stress incontinence, urinary retention, or other concerns they attributed to their surgical intervention, Table 3. All patients did attend at least one postoperative clinic visit for assessment, and no major complications requiring procedural interventions, the prescription of new medications, or additional interventions were noted in either group during the perioperative period. Ultimately, the groups did not differ with regard to these surgical and postoperative parameters.

With regard to the postoperative satisfaction surveys, we received 18 responses, 14 from the OH group and 4 from the SDD group, for 47% and 40% response rates, respectively. Results were again equivalent between groups. The patients largely felt their symptoms were "greatly" or "somewhat" improved after surgery. Patients largely felt they were "somewhat" or "mostly"

able to drink the types and amounts of fluids they wanted, eat the types and amount of food they desired, rest well, and move around after surgery. There was no difference in the responses to questions directed at how safe patients felt at home after their surgery regardless of discharge time, nor with respect to the ability of their caretakers to adequately look after them following their RAPFR procedure. A small number of patients reported severe pain (6%) and lightheadedness (17%) postoperatively, though none reported bothersome nausea or vomiting. Two (11%) reported seeking medical care (either at an ED or non-urology clinic such as PCP or urgent care) and 6 (33%) called their surgeon's office with questions. The patients who reported visits to an ED, urgent care, PCP, or some other non-GU provider were both in the OH group. Given that these were anonymous surveys, we cannot link them to a specific

TABLE 2. Operative characteristics

	All (n = 40)	Standard one night hospitalization (n = 30)	Same day discharge (n = 10)	p value
Surgery type (n, %)				0.45
RASC	38 (95%)	29 (97%)	9 (90%)	
Pelvic mesh removal	2 (5%)	1 (3%)	1 (10%)	
Incl SC hyst	10 (25%)	9 (30%)	1 (10%)	
Incl Sling	15 (38%)	10 (33%)	5 (50%)	
Operative length (min)	225 (208-270)	224 (207-264)	247 (220-313)	0.18
Estimated blood loss (mL)	25 (5-50)	25 (5-50)	35 (13-50)	0.40

RASC = robotic assisted sacrocolpopexy; SC = supracervical hysterectomy

TABLE 3. Postoperative findings

	All (n = 40)	Standard one night hospitalization (n = 30)	Same day discharge (n = 10)	p value
Unscheduled ED or non-GU visit (n, %)	2 (5%)	2 (7%)	0	1.0
Unscheduled urology office visit, (n, %)	0	0	0	1.0
Successful postop trial of void (n, %)	36 (90%)	27 (90%)	9 (90%)	1.0
Complications (n, %)				0.13
Pain	0	0	0	
Bleeding	0	0	0	
Infection	0	0	0	
UTI	1 (3%)	0	1 (10%)	
Nausea/vomiting	0	0	0	
Retention	1 (3%)	0	1 (10%)	
SUI postop	3 (8%)	3 (10%)	0	
Other	4 (10%)	3 (10%)	1 (10%)	

ED = emergency department; GU = genito-urinary; UTI = urinary tract infection; SUI = stress urinary incontinence

medical record. However, it is conceivable that these visits occurred outside the Cleveland Clinic Foundation health enterprise, or that at least one was referring to the patient with a mechanical fall noted on chart review. When asked "if I could have this surgery all over again, I would want to go home on:", the most common answer in each group was 'the day after my surgery', with 1 OH patient (3%) and 1 SDD patient (25%) reporting that they favored SDD. Four patients in the OH group reported a desire to stay for more than one night, while no SDD patients desired this length of stay. The remainder in each group (9/14 and 3/4, respectively) reported a desire for a one night hospitalization, Table 4.

Discussion

In this era of value-driven care, both patients and physicians are eager to minimize unnecessary hospitalization. This offers benefit both in terms of decreased financial toxicity, but also diminished risk of nosocomial infection, medical errors, deep vein thrombosis and other risks of hospital care. We assessed the safety profile and patient satisfaction associated with day-of-surgery discharge relative to overnight hospitalization following RAPFR procedures. In our cohort, we found no demographic differences between those patients who were hospitalized overnight, and those who underwent SDD. There was no increased risk of ED visit or unscheduled medical care between

groups. Though the majority of patients in both groups did favor a single-night hospital stay, overall satisfaction rates were equivalent between groups.

Our study hinged on a comprehensive protocol with pre, intra, and postoperative guidelines. Many of these principles were first delineated in the enhanced recovery after surgery literature.⁷ Key among these were preoperative counseling for goal and expectation setting.⁸ Anesthetists were encouraged to give anxiolytic medications sparingly, as these impair patients' ability to mobilize and eat postoperatively. Fluid resuscitation was goal directed based on maintenance of cardiopulmonary homeostasis, and normothermia was maintained. Premedication with antiemetics was provided to patients with a history of postoperative nausea and vomiting. Potential SDD procedures were typically scheduled as first-start cases and preference was given to an experienced robotic surgical team when staffing the cases. At trocar placement, bupivacaine was injected from skin to fascia, and these sites were re-injected at the conclusion of the case. Ketorolac was routinely provided for non-opioid analgesia before transfer to the recovery unit.

In the recovery room, non-opioid analgesics (eg. acetaminophen, ketorolac) were also favored over opioids. Patients undergoing SDD were discharged with an indwelling Foley catheter, which typically remained in place for 48 hours, with subsequent removal in the clinic for trial of void. Minimum discharge criteria included adequate analgesia with

TABLE 4. Survey results

	All (n = 18)	Standard one night hospitalization (n = 14)	Same day discharge (n = 4)	p value
PGII	1.2	1.2	1	0.17
Able to drink	3.4	3.6	2.5	0.16
Able to eat	3.2	3.5	2	0.21
Caregivers able to for patient	3.2	3.4	2.5	0.12
Able to rest	3.1	3.2	2	0.27
Able to move	3.2	3.3	3	0.36
Felt safe at home	3.5	3.6	3	0.22
Symptoms at home				0.11
Lightheadedness	3 (17%)	1 (7%)	2 (50%)	
Pain	1 (6%)	0	1 (25%)	
Nausea/vomiting	0	0	0	
Sought non-GU care?				0.41
No	16 (89%)	13 (93%)	3 (75%)	
Yes	2 (11%)	1 (7%)	1 (25%)	
Called surgeon's office?				0.57
No	12 (67%)	10 (71%)	2 (50%)	
Yes	6 (33%)	4 (29%)	2 (50%)	
Ideally would go home on				0.38
Day of surgery	2 (11%)	1 (7%)	1 (25%)	
Day after surgery	12 (67%)	9 (64%)	3 (75%)	
More than 1 day after	4 (22%)	4 (29%)	0	

oral agents, toleration of oral intake, and completion of catheter-care education by nursing staff.

Same-day discharge offers a variety of potential benefits. First, decreased length of stay generates fewer billing charges, offering potential cost-savings to both the health system and the patient. Indeed, when comparing six overnight-hospitalization patients in our cohort to six matched SDD patients, the total cost to the payor was \$1134.50 less. This would suggest that routine SDD would allow for an approximate savings of \$15,127 per surgeons-year without apparent increase in costs associated with emergency room visits or readmissions. As alternative payment models, in particular bundled payments, become more common, such opportunities for increasing value are likely to be of greater and greater interest.

Beyond the financial implications, it is known that hospitalization also creates risks for patients in the form of medical errors, nosocomial infections and the like, as well as decreasing their autonomy for basic functions, such as taking analgesics on their preferred scheduled, walking when they desire, and eating the foods that they find palatable. The work herein is

comparable to an abstract presented recently by Polin et al, who reported on their series of 272 women status post RASC, 80 of whom underwent SDD versus 192 who were discharged on postoperative day ≥ 1 (187 on POD#1 versus 5 on POD#2).⁹ In their group, SDD patients had slightly lower BMIs (26 versus 28 kg/m²), were older (61 versus 59 years), and were more likely to have had surgery before noon without concomitant mid-urethral sling or posterior repair, all of which met statistical significance. When reviewing their series, the authors noted no significant differences between groups in unplanned clinic visits [14/80 (17.5%) versus 47/192 (24.5%), $p = 0.21$], emergency department visits [1/80 (1.3%) versus 8/192 (4.2%), $p = 0.22$], or readmissions [1/80 (1.3%) versus 5/192 (2.6%), $p = 0.49$]. Their secondary outcome of unplanned postoperative phone calls also revealed similar proportions between those discharged same day versus later [22/80 (27.5%) versus 53/192 (27.6%), $p = 0.99$]. All of these findings held true in multivariable logistic regression analyses for potential confounders. However, this group did not have access to patient satisfaction measures.

We assessed for demographic and clinical differences between our SDD and OH groups; however, there were no statistically significant findings, suggesting that the majority of patients who are active and healthy enough to desire RAPFR are typically also well enough for consideration of SDD. In their study of robotic hysterectomy, Rivard and colleagues found that the two predictors of SDD were patient age and surgery end time,⁵ which corresponds to the findings of Polin's group.⁹ Other findings that correlated with longer hospitalization (> 23hrs) included baseline functional limitations, postoperative pulmonary and cardiac concerns, urinary retention, poor pain control, long distance between hospital and the patient's home, late surgical end time, dizziness, the need for patient education, and postoperative nausea/vomiting. Similar studies have reported overall operative length, case completion before 6pm, and the administration of ketorolac at the end of the procedure as predictors of successful SDD.¹⁰ Surgeons may wish to keep these in mind as they develop their own SDD protocols.

Our group is not the first to have identified similar rates of satisfaction between SDD and OH patients. In their prospective, randomized trial, Johansson et al identified equivalent postoperative quality of life in 100 patients undergoing laparoscopic cholecystectomy.¹¹ This group used the Hospital Anxiety and Depression Scale (HADS – detects emotional disturbances in hospitalized patients) and the Psychological General Well-Being Index (PGWB – assesses anxiety, mood, well-being, self-control, general health, and vitality). Scores between the OH and SDD groups were compared and no statistically significant differences were observed, though the PGWB scores did suggest a trend toward preference for OH. In this model, direct costs were 9% lower in the SDD group. Within the field of urology, Martin and colleagues discharged 11 patients on the day of extraperitoneal robotic assisted radical prostatectomy, and found unanimously high satisfaction scores in all patients, mostly over 90% on the Patient Judgment System-24, though there was no control group for comparison.¹²

While our study is unique within the study of female pelvic medicine in its inclusion of patient satisfaction parameters assessing SDD; however, it is not without limitations. As with any retrospective review, we are limited by the amount and quality of clinical information captured in the medical record. Additionally, in the absence of randomization, there is a real risk of selection bias, though the similarity in baseline demographics between the groups is reassuring. We must also note that this is a single-surgeon pilot study at a high-volume center and may not be generalizable to all practices. We purposefully selected one well-known, validated

survey instrument, the PGII, to balance the proprietary postoperative satisfaction survey we generated, given that this instrument has not been validated. Finally, we must note the survey response rate of 45%; while this compares favorably to other urologic survey studies, it does mark an incomplete dataset and, due to the anonymous nature of the survey, we cannot quantitate potential differences between responders and non-responders.

Conclusion

Our study suggests that SDD after RAPFR is safe, feasible, and generally well-tolerated by patients. However, preoperative expectations must be set appropriately, as many patients do anticipate an overnight stay. Moreover, the goal of prompt discharge appears best achieved when the entire perioperative team, including anesthesia providers, preop and post-op nurses, and the surgeon are well-versed in the principles of same day discharge and committed to the same goal of safe and timely discharge. □

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