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Original Article

Peri- and Postoperative Outcomes of Outpatient vs Inpatient Laparoscopic Apical Prolapse Repair

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ABSTRACT **Study Objective:** To assess the feasibility of outpatient laparoscopic management of apical pelvic organ prolapse along with indicated vaginal repairs and anti-incontinence procedures.

Design: Retrospective cohort study.

Setting: Tertiary-care academic center, Boston, MA.

Patients: Total of 112 patients seen in the minimally invasive gynecologic surgery and urogynecology clinics with symptomatic pelvic organ prolapse.

Interventions: Laparoscopic hysterectomy, sacrocervico- or sacrocolpopexy along with vaginal prolapse and anti-incontinence procedures as indicated from 2013 to 2017 at Brigham & Women's Hospital and Brigham & Women's Faulkner Hospital performed by a minimally invasive gynecologic surgery and urogynecology team.

Measurements and Main Results: Of the 112 patients, 52 were outpatient and 60 were admitted (median stay in admission group = 1 day; range 1−3). Patient baseline characteristics, American Society of Anesthesiologists' class, and pelvic organ prolapse quantification stage were similar between the outpatient and admitted cohorts. Most patients underwent hysterectomy at the time of the sacropexy (65.4% outpatient vs 73.3% admitted, p = .08). Concomitant apical prolapse repair was more common in the outpatient group (98.1% vs 85%, p = .02). The proportion of outpatient procedures increased from 17% in 2013 to a peak of 70% in 2016. Operating room time was shorter for the outpatient cohort (103.9 minutes vs 115.5 minutes, p = .04), but other perioperative outcomes were similar. There were no intraoperative complications. The numbers of postoperative complications, readmission, and reoperations were low and similar between outpatient and admitted cohorts. No factor was predictive of admission on regression analysis.

Conclusion: Laparoscopic apical prolapse repair with concomitant vaginal repairs can be performed safely as an outpatient procedure. A unique team approach may foster a shorter, more efficient procedure without compromising short-term outcomes. Journal of Minimally Invasive Gynecology (2021) 28, 1508−1513. © 2020 AAGL. All rights reserved.

Keywords: Sacrocolpopexy; Laparoscopy

Pelvic organ prolapse is a common condition with an estimated lifetime risk of surgical intervention of 12.6% in the United States population [1]. Anatomically, the prolapse can involve the uterus, the anterior vaginal wall, the posterior vaginal wall or the vaginal cuff. Surgical repair of the prolapsed compartment can be approached vaginally or abdominally. Abdominal sacrocolpopexy is associated with higher success rates for the management of apical prolapse when compared with a vaginal approach [2,3]. As with other pelvic surgeries, the benefits of laparoscopy over laparotomy haves also been documented for sacrocolpopexy, namely decreased blood loss, shorter hospital stay, quicker recovery, albeit with longer operative times for the laparoscopic approach [3−9]. Laparoscopic apical prolapse repair can be performed with conventional laparoscopy or robot-assisted laparoscopy.

Sacrocolpopexy involves significant suturing, a task that is technically challenging with conventional laparoscopy. With the robotic platform overcoming some of the challenges of conventional laparoscopy, such as 3-dimensional vision and wristed instrumentation, the 2 modalities have been compared for the management of apical prolapse.

The authors declare that they have no conflict of interest.

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Robotic sacrocolpopexy results in longer operative time and increased cost compared with conventional laparoscopy [10,11]. Mean length of stay is shorter for both robotic and laparoscopic sacrocolpopexy than for the abdominal route, but most studies still admit patients for the minimally invasive routes. The length of stay for robotic and laparoscopic sacrocolpopexy vary in literature: Coolen et al [5] 2 days; Freeman et al [6] 3.2 days; Biler et al [12] 2 days; and Matanes et al [13] 2 days.

Same-day discharge after minimally invasive surgery has been successfully instituted for benign and malignant minimally invasive hysterectomies [14−19]. Data have been recently emerging demonstrating the feasibility and safety of outpatient laparoscopic apical prolapse repair but are however still relatively scant [20−22]. The aim of this study was to report our experience and patient outcomes after outpatient laparoscopic apical prolapse repair and to compare the perioperative outcomes of women admitted with those discharged on the day of surgery.

Materials and Methods

The study was reviewed and approved by the Partners Institutional Review Board. A retrospective cohort study was performed including all patients who underwent a laparoscopic sacrocervico- or sacrocolpopexy with or without hysterectomy, along with vaginal prolapse and anti-incontinence procedures as indicated from 2013 to 2017 as a combined procedure between minimally invasive gynecologic surgery (MIGS) and female pelvic medicine and reconstructive surgery (FPMRS) physicians at Brigham & Women's Hospital and Brigham & Women's Faulkner Hospital.

Unique to our service, the procedures are performed by a team of fellowship-trained MIGS and FPMRS physicians. All study subjects underwent preprocedure evaluations by both FPMRS and MIGS services. During these visits, aside from the typical preoperative counseling, the outpatient nature of the procedure and postoperative expectations were also reviewed. All patients also had an appointment with the Anesthesia-led Center for Perioperative Medicine, where along with preoperative clearance, the procedure, anesthesia types, and outpatient nature of the surgery were reviewed. With shared decision making and based on patient and physician comfort level often supported by comorbidities, the plan may have been for overnight admission. Patients were also reassured that despite expected outpatient surgery, intraoperative or postoperative findings may necessitate admission.

The laparoscopic portion of the procedure was performed by MIGS, using a 4-port configuration: 12-mm port in the umbilicus as the visual port and also to pass sutures; 2, 5-mm ports in bilateral lower quadrants; and a 5-mm left paramedian port placed along the left midclavicular line at the level of the umbilicus. A laparoscopic total or supracervical hysterectomy was performed in the standard fashion in cases in which one had not been performed historically. Apical suspension was performed using a either a prepackaged Y-shaped polypropylene mesh (IntePro; American Medical Systems, Minnetonka, MN) or Gynecare Gynemesh (Ethicon, Inc., Johnson and Johnson, Somerville, NJ). The mesh was secured to the anterior and posterior cervix and/or vagina with 6 interrupted sutures of 2-0 PDS (or 2-0 Ethibond; Ethicon, Somerville, NJ) anteriorly and 6 sutures posteriorly, tying knots intracorporeally. The tail of the mesh was then secured to the anterior longitudinal sacral ligament with 3, 5-mm tacks (ProTack; Medtronic, Minneapolis, MN). The mesh was then completely retroperitonealized using 2-0 Monocryl suture (Ethicon, Somerville, NJ). Midurethral slings, anterior colporrhaphy, and posterior colpoperineorrhaphy were additionally performed as indicated by the FPMRS team in the usual fashion.

The objective of the study was to compare the perioperative outcomes between same-day discharge and admitted patients. The following demographic data were abstracted from the electronic medical records: patient age, race, body mass index, parity, American Society of Anesthesiologists' physical status, pelvic organ prolapse quantification stage, previous abdominal surgery, and previous prolapse surgery. Concurrent performance of hysterectomy, type of hysterectomy performed (total vs supracervical), concurrent colpoperineorrhapy, and concurrent performance of midurethral slings were also recorded. The perioperative information collected included: operative time (defined as time from incision to closure), estimated blood loss (EBL in milliliters, per surgeon estimate in operative note), uterine weight (grams), hospital stay (days), intraoperative complications (injuries to the urinary tract, the bowel, or EBL >1000 mL), conversion to laparotomy, Clavien-Dindo complication rating [23], readmission, and reoperation. The Clavien-Dindo classification system is graded on a 1 to 5 scale, with grade 1 including any deviation from the normal postoperative course; grade 2 requiring the need for pharmacologic treatment; grade 3 requiring surgical, endoscopic, or radiologic intervention (grade 3a, not under general anesthesia; grade 3b, under general anesthesia); grade 4 including a life-threatening complication (grade 4a, single organ dysfunction; grade 4b, multiorgan dysfunction); and grade 5 being death of a patient.

Continuous data were compared using *t* tests or Wilcoxon rank sum tests, depending on the distribution of data. Categoric variables were compared using either chi-square or Fisher exact tests. Multivariable adjusted logistic regression models were used to assess the factors predictive of admission and occurrence of any complication. The results of the multivariable adjusted logistic regression analysis were expressed as adjusted odds ratios with 95% confidence interval. A p-value of .05 was considered the cutoff point for a significant difference. Data were analyzed using SAS software (v.9.3; SAS Institute Inc., Cary, NC).

Results

A total of 112 patients underwent laparoscopic apical prolapse repair with concomitant pelvic floor and anti-

incontinence procedures at our institution between 2013 and 2017, of whom 52 (46%) were outpatient and 60 (54%) were admitted. Of the 60 patients, 56 (93.3%) stayed 1 night, 3 (5%) stayed 2 nights, and 1 (1.7%) stayed 3 nights (data not shown). Baseline demographic data are summarized in Table 1 and are similar between the 2 groups. Pelvic organ prolapse quantification staging was distributed similarly between outpatients and admitted patients, with most being stage 2 or 3 (90.4% vs 80%, p = .412). Most patients were American Society of Anesthesiologists' class 1 or 2 (90.4% for outpatient vs 86.7% for admitted, p = .656). The rates of previous prolapse surgery (vaginal) were similar between outpatients and admitted patients (38.5% vs 31.7%, p = .551). A total of 18 of the 52 (34.6%) outpatients vs 16 of the 60 (26.7%) admitted patients had undergone a previous hysterectomy, p = .081. Most women underwent concomitant supracervical hysterectomy (59.6% for outpatient vs 73.3% for admitted, p = .081) with the prolapse repair. Five women in the outpatient group underwent total laparoscopic hysterectomy, whereas none did in the admitted group. More women in the outpatient group underwent concomitant anterior/posterior colporrhaphy compared with the admitted group (98.1% vs 85%, p = .019). Concomitant midurethral sling performance was similar between the outpatient and admitted groups (28.9% vs 31.7%, p = .838).

Perioperative outcomes are summarized in Table 2. Operative time was shorter for the outpatient group than for the admitted group (103.9 ± 22.5 minutes vs 115.5 ± 33.9 minutes, p = .0383). No significant differences were noted in EBL, uterine specimen weight, postoperative complications, readmission, or reoperation. There were no intraoperative complications. The postoperative complications in both groups were mostly Clavien-Dindo grade 1 or 2, 17.3% for outpatients vs 16.7% for admitted patients, p = .710 (Table 3). A total of 6 of the 52 (11.5%) outpatients and 9 of the 60 (15%) admitted patients had urinary retention that required discharge with a catheter (data not shown). They were seen in the clinic 3 to 5 days after surgery for a repeat voiding trial, which were all successful. One patient in each group was reoperated on. The patient in the outpatient group was noted to have vaginal bleeding and suture separation in the proximal posterior colporrhaphy repair while in the recovery room. She returned to the operating room, and the area was sutured. The patient in the admitted group underwent the excision of a perineal skin tag with placement of the suture under local anesthesia in the office on postoperative day 6. One patient in each group was readmitted, 1.9% in the outpatient vs 1.7% in the admitted groups, p = 1.000. The outpatient patient was readmitted on postoperative day 5 because of abdominal pain and distension. She was noted to have severe urinary retention with a distended bladder and elevated creatinine (8.2 mg/dL). The creatinine was followed until it normalized the following day (1.0 mg/dL), and she was discharged with a Foley catheter. The patient who was readmitted from the inpatient cohort had a syncopal episode on postoperative day 1 while waiting in the lobby after discharge. She was transferred to the emergency department and readmitted for dehydration. She was discharged the following day in stable condition.

Multivariable logistic regression was performed for predictors of admission, adjusting for baseline characteristics and surgical factors (Table 4). No factor was predictive of

Table 1

Demographics and patient characteristics

Category	Outpatient, n = 52	Admitted, n = 60	p-value
Age, yrs			
Mean ± SD	61.5 ± 9.0	60.4 ± 11.5	.597
BMI, kg/m^2			
Mean ± SD	26.4 ± 4.3	26.2 ± 3.2	.742
Parity			
Median (IQR)	3(2−3)	2(2−3)	.239
Race			
White	45 (86.5)	56 (93.3)	.341
Nonwhite	7(13.5)	6 (6.7)	
ASA class			
Unknown	1 (1.9)	0	.656
1	2 (3.9)	3 (5.0)	
2	45 (86.5)	49 (81.7)	
3	4 (7.7)	8 (13.3)	
4	0	0	
POP-Q stage			
Unknown	4 (7.7)	12 (20.0)	.412
1	0	0	
2	28 (53.9)	24 (40.0)	
3	19 (36.5)	24 (40.0)	
4	1 (1.9)	0	
Previous laparotomy			
No	37 (71.2)	36 (60.0)	.239
Yes	15 (28.9)	24 (40.0)	
Previous laparoscopy			
No	34 (65.4)	42 (70.0)	.686
Yes	18 (34.6)	18 (30.0)	
Previous prolapse surgery			
No	32 (61.5)	41 (68.3)	.551
Yes	20 (38.5)	19 (31.7)	
Type of apical support			
Sacrocervicopexy	33 (63.5)	43 (71.7)	.419
Sacrocolpopexy	19 (36.5)	17 (28.3)	
Type of hysterectomy			
Previous hysterectomy	18 (34.6)	16 (26.7)	.081
Total hysterectomy	3 (5.8)	0	
Supracervical	31 (59.6)	44 (73.3)	
Anterior/Posterior repair			
No	1 (1.9)	9 (15.0)	.019
Yes	51 (98.1)	51 (85.0)	
Midurethral sling			
No	37 (71.2)	41 (68.3)	.838
Yes	15 (28.9)	19 (31.7)	

ASA = American Society of Anesthesiologists; BMI = body mass index; IQR = interquartile range; POP-Q = pelvic organ prolapse quantification; SD = standard deviation.
Values are given as number (%) unless otherwise noted.

Table 2

Perioperative outcomes

Category	Outpatient, n = 52	Admitted, n = 60	p-value
OR time, min			
Mean ± SD	103.9 ± 22.5	115.5 ± 33.9	.0383
Median (IQR)	100 (87−118.5)	109 (93.5−132)	.0843
EBL, mL			
Mean ± SD	33.1 ± 33.8	25.6 ± 15.1	.128
Median (IQR)	20 (20−30)	20 (20−30)	.548
Uterine weight, g			
Mean ± SD	62.9 ± 57.7	67.1 ± 72.1	.7909
Median (IQR)	46.2 (37−69.6)	44.8 (33.6−72)	.581
Postop complication, Clavien-Dindo			
Unknown	3 (5.8)	2 (3.3)	.710
None	40 (76.9)	48 (80.0)	
1	3 (5.8)	3 (5.0)	
2	5 (9.6)	6 (10.0)	
3a	0	1 (1.7)	
3b	1 (1.9)	0	
Any postop complication			
Unknown	3 (5.8)	2 (3.3)	1.000
No	40 (76.9)	48 (80.0)	
Yes	9 (17.3)	10 (16.7)	
Reoperation			
Unknown	3 (5.8)	2 (3.3)	1.000
No	48 (92.3)	57 (95.0)	
Yes	1 (1.9)	1 (1.7)	
Readmission			
Unknown	3 (5.8)	2 (3.3)	1.000
No	48 (92.3)	57 (95.0)	
Yes	1 (1.9)	1 (1.7)	

EBL = estimated blood loss; IQR = interquartile range; OR = operating room; Postop = postoperative; SD = standard deviation. Values are given as number (%) unless otherwise noted.

Table 3

Postoperative complications

Length of stay, d	Clavien-Dindo rating, 1−5	Postoperative complication
0	3b	Vaginal cuff bleeding
0	2	Bacterial vaginosis
0	2	Vaginal cuff hematoma; Urinary tract infection
0	2	Yeast vaginitis
0	1	Vulvar irritation
0	1	Urinary retention
0	2	Superficial surgical site infection
0	2	Yeast vaginitis
0	1	Incisional pain secondary to cough
1	3a	Skin tag along perineorrhaphy
1	2	Abdominal pain
1	2	Urinary tract infection
1	2	Yeast vaginitis
1	2	Superficial surgical site infection
1	1	Urinary incontinence
1	1	Syncope-dehydration
2	2	Yeast vaginitis; Urinary tract infection
2	1	Urinary frequency
3	2	Large abdominal wall hematoma

admission. The proportion of outpatient procedures increased over the course of the studied years (Fig. 1).

Discussion

This single-center cohort demonstrated similar peri- and postoperative outcomes for both outpatients and admitted patients undergoing laparoscopic pelvic organ prolapse surgery. Anterior/posterior colporrhaphies were performed more often in women who had outpatient surgery than in those who were admitted. The only significant difference in perioperative outcomes was a quicker procedure time in the outpatient group compared with the admitted group, 104 minutes vs 116 minutes.

A retrospective cohort study compared unscheduled postoperative visits and perioperative outcomes between outpatients and admitted patients undergoing robot-assisted sacrocolpopexy. Women in the outpatient group were older than those admitted (61.3 years vs 58.5 years, p <.05) and also had shorter operative times (237 minutes vs 256 minutes, p <.01). Readmission rates, emergency department visits, and clinic visits were similar between the 2 groups [22]. Lloyd et al [20] retrospectively compared 10 patients who underwent outpatient robot-assisted pelvic floor reconstruction using a newly instituted same-day discharge protocol with 30 admitted patients in the preceding 9 months. Perioperative outcomes were similar between both groups. In addition, same-day discharge patients were not more likely to have emergency department or early clinic visits. Romanova et al [21] performed a retrospective analysis to assess the impact of same-day discharge on 30-day unanticipated healthcare encounters after a variety of prolapse surgery, of which minimally invasive sacrocolpopexy made up 40.2%. Unanticipated healthcare encounters within 30 days of surgery were similar between outpatients and admitted patients as were 30-day readmissions.

The body of evidence supporting outpatient minimally invasive prolapse surgery continues to grow, catching up with other gynecologic procedures. Available evidence suggests that same-day delivery has similar perioperative and postoperative outcomes when compared with patients admitted to the hospital. The key to instituting an outpatient program successfully is patient buy-in, and a significant part of this is sufficient preoperative patient education. The safety and rationale are discussed, reassuring the patient that admission remains a possibility depending on intraoperative or postoperative courses. This starts from the consult visit and continues to the preoperative visit, conversation on the day of surgery, and discussion with the

Table 4

Multivariable logistic regression predicting admission

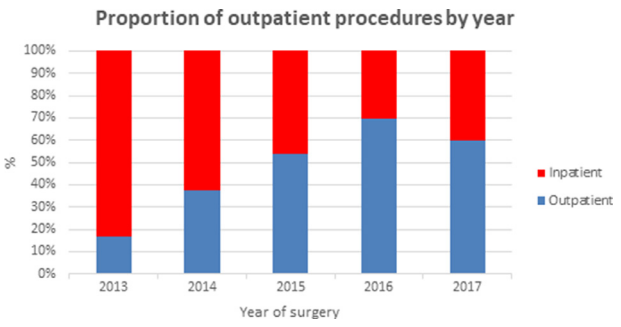
Variable	OR (95% CI) unadjusted	OR (95% CI) multivariate*
Age, yr		
<65	Reference	
≥65	0.98 (0.67−1.42)	0.86 (0.53−1.41)
Race		
White	Reference	
Nonwhite	0.69 (0.37−1.32)	0.75 (0.38−1.51)
BMI, kg/m^2		
<30	Reference	
≥30	0.86 (0.5−1.48)	0.9 (0.47−1.71)
ASA class		
1	Reference	
2	0.76 (0.36−1.64)	0.8 (0.34−1.88)
3	1.33 (0.49−3.61)	1.36 (0.43−4.32)
POP-Q stage		
1	No observation	
2	Reference	
3 and 4	1.18 (0.79−1.76)	1.14 (0.69−1.86)
Previous abdominal surgery		
No	Reference	
Yes	1.05 (0.72−1.53)	0.97 (0.61−1.52)
Previous prolapse surgery		
No	Reference	
Yes	0.86 (0.58−1.27)	1.04 (0.61−1.76)
Type of apical support		
Sacrocervicopexy	Reference	
Sacrocolpopexy	0.83 (0.56−1.24)	1.12 (0.55−2.26)
Type of hysterectomy		
Previous hysterectomy	Reference	
Total hysterectomy	0.25 (0.03−2.52)	0.39 (0.03−4.92)
Supracervical hysterectomy	2.5 (0.75−8.32)	2.22 (0.48−10.34)
Anterior/Posterior repair		
No	Reference	
Yes	0.4 (0.16−1)	0.46 (0.07−3.09)
Midurethral sling		
No	Reference	
Yes	1.07 (0.71−1.6)	1.06 (0.67−1.69)

ASA = American Society of Anesthesiologists; BMI = body mass index; CI = confidence interval; OR = odds ratio; POP-Q = pelvic organ prolapse quantification.

* Adjusted for other factors in table.

Fig. 1

Proportion of outpatient procedures by year.



patient's support team before and after surgery. This study adds to the growing evidence base supporting the feasibility of outpatient minimally invasive sacrocolpopexy. The only difference noted between the 2 groups in this study was the shorter procedure time for outpatients compared with admitted patients (103.9 minutes vs 115.5 minutes). Although statistically significant, this additional 12 minutes is likely of no clinical significance. Nevertheless, the procedure time is quite short, compared with comparable procedure times in literature: Paraiso et al [9] 269 minutes laparoscopic; Paraiso et al [11] sacrocolpopexy for posthysterectomy vault prolapse, 199 minutes laparoscopic and 265 minutes robotic; Coolen et al [5] sacrocolpopexy for posthysterectomy vault prolapse, 125 minutes laparoscopic; Anger et al [10] 225 minutes laparoscopic and 246 minutes robotic. The traditionally prolonged duration of the procedures may be a reason as to why surgeons opt to admit patients overnight.

The study was limited by the retrospective, single-center design and the relatively small number of subjects. The results reported are however consistent with the developing data in this subject matter. Aside from perioperative outcomes suggesting that the procedure can be carried out safely in an outpatient manner, there are additional benefits gained with implementing same-day discharge. A safely instituted same-day discharge may offer up bed availability for the hospital system, decreasing critical census status and freeing up beds for other patients. Some patients may prefer same-day discharge if criteria are met as this allows them to begin their recuperation in their own surroundings. Although a cost analysis was not an outcome or intent of this study, there is potential for cost savings with widespread adoption of safe early discharge. Future studies can include a patient satisfaction survey, change in hospital bed use over a period of outpatient procedure adoption, and a cost analysis.

The unique combined procedure performed by both urogynecology and MIGS in this study resulted in a quick and efficient procedure. Undoubtedly, many surgeons are already instituting same-day or outpatient discharge for patients undergoing minimally invasive sacrocolpopexy, but it remains under-reported. Increased reporting will supplement the developing evidence and lend to wider adoption of outpatient minimally invasive sacrocolpopexy, which has proven to be a safe undertaking.

Conclusion

Perioperative outcomes are similar for outpatients and admitted patients after laparoscopic apical prolapse repair, making outpatient surgery a feasible option. A unique team approach may foster a shorter, more efficient procedure without compromising short-term outcomes.

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