Prospective Cohort Study of Bowel Function After Robotic Sacrocolpopexy

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Objective: This study aimed to determine bowel function changes 12 months after robotic sacrocolpopexy.

Methods: We performed a single-center prospective cohort study evaluating bowel function 12 months after robotic sacrocolpopexy between 2007 and 2011. Bowel function symptoms were measured by the Colorectal-Anal Distress Inventory, Short Form 8 (CRADI-8). Specific impacts on quality of life with regard to bowel function were evaluated using the Colorectal-Anal Impact Questionnaire, Short Form 7 (CRAIQ-7). "Splinting to defecate" was defined as any positive response to question 4 of the Pelvic Floor Distress Inventory-20 which reads, "do you ever have to push on the vagina or around the rectum to have or complete a bowel movement?." Lastly, patients were grouped according to perineorrhaphy versus no perineorrhaphy and bowel function scores were examined.

Results: Of 423 consecutive patients who underwent robotic sacrocolpopexy at our institution, 393 (93%) completed a 12-month follow-up. Mean CRADI-8 scores at baseline and 12 months were 21.1 (20) and 7.3 (11), respectively ($P < 0.0001$). Mean CRAIQ-7 scores at baseline and 12 months were 11.1 (20) and 2.4 (9), respectively ($P < 0.0001$). Preoperatively, 152 patients reported a need to splint the vagina or perineum to complete a bowel movement. At 12 months, 70% reported complete resolution of "splinting." Concomitant perineorrhaphy was performed on 87 patients and there were no differences in 12-month CRADI-8 or CRAIQ-7 scores between groups.

Conclusions: Robotic sacrocolpopexy was associated with significant improvements in bowel function as measured by CRADI-8 as well as improvements in impact on quality of life as measured by CRAIQ-7.

Key Words: bowel function, prolapse, robotic sacrocolpopexy

(*Female Pelvic Med Reconstr Surg* 2014;20: 87–89)

Specific bowel symptoms of constipation, splinting to defecate, excessive straining, and feelings of incomplete bowel emptying are common complaints in patients with pelvic organ prolapse.[1] Historically, successful prolapse repair was defined by anatomic outcomes using the Baden-Walker halfway system, the pelvic organ prolapse quantification system (POP-Q), or other clinician-determined parameters.[2–4] More recently, improvements in bowel symptoms after surgical repair have been assessed using validated assessment tools.[1,5,6] Abdominal sacrocolpopexy has become the gold standard apical prolapse repair with excellent long-term objective outcomes and has shown improvements in bowel function 12 months postoperatively.[7–11] However, prior studies addressing bowel function after laparoscopic or robotic sacrocolpopexy are limited given the use of nonvalidated questionnaires, small patient numbers, retrospective nature, and suboptimal follow-up rates.[12–14]

Our objective was to study bowel function in patients before and 12 months after robotic sacrocolpopexy.

MATERIALS AND METHODS

We performed a single-center prospective cohort study between January 2007 and August 2011. This study was approved through the Atlantic Health Institutional Review Board and listed on clinical trials.gov (NCT01618292). All 423 patients who underwent robotic sacrocolpopexy during the study period were included. Outcome measures were collected at baseline and 12 months postoperatively. Validated questionnaires addressing bowel symptoms and impact measures were collected using the Colorectal-Anal Distress Inventory, Short Form 8 (CRADI-8) and the Colorectal-Anal Impact Questionnaire, Short Form 7 (CRAIQ-7).[6] "Splinting to defecate" was defined as any "Positive" response to question 4 of the Pelvic Floor Distress Inventory-20 which reads, "do you ever have to push on the vagina or around the rectum to have or complete a bowel movement?."[6]

Baseline demographic information was collected including age, body mass index, menopausal status, and prior hysterectomy. Baseline prolapse stage and POP-Q measurements were collected. All study subjects underwent robotic sacrocolpopexy with a type I polypropylene mesh using our previously described techniques.[15] The posterior graft measured approximately 8 to 10 cm in length and every attempt was made to place the posterior graft within 1 to 2 cm of the perineal body. Procedural details including operative time, estimated blood loss, readmissions, and complications were obtained. A concomitant perineorrhaphy was performed at the discretion of the attending surgeon when there was concern for a gaping introitus. No posterior repairs were performed. Patients were grouped according to concomitant perineorrhaphy versus no perineorrhaphy and CRADI-8 and CRAIQ-7 scores were examined.

The CRADI-8 addresses specific bowel symptoms of obstructive defecation, fecal incontinence, pain/irritation with bowel movements, and rectal prolapse. The CRADI-8 scores range from 0 to 100 with higher scores indicative of worsening bowel symptom bother. The CRAIQ-7 addresses the impact bowel symptoms have on activities of daily living or impact on function. The CRAIQ-7 scores range from 0 to 100 with higher scores indicative of worsening ability to function.

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Dr Culligan is a paid consultant for CR Bard, Boston Scientific, and Intuitive Surgical. He receives research support from CR Bard, Boston Scientific, American Medical Systems, Coloplast, and Intuitive Surgical. Dr Salamon is a paid consultant for American Medical Systems and Intuitive Surgical. Dr Lewis, Dr Gurshumov, and Dr Priestley have declared they have no conflicts of interest.

Presented at the AAGL 41st Global Congress, November 5–9, 2012, Las Vegas, NV.

DOI: 10.1097/SPV.0000000000000049

TABLE 1. Anatomic Measurements

POP-Q Point*	Baseline*	12 mo Postoperatively*
Prolapse stage	3 (2 to 3)	1 (0 to 1)
Anterior wall		
Aa	1 (0 to 3)	−2.5 (−3 to −2)
Ba	1 (0 to 3)	−2.5 (−3 to −2)
Apical		
C	−1 (−3 to 1)	−8.5 (−9 to −8)
D	−4 (−5 to −1)	−9 (−10 to −9)
Introitus		
GH	4 (3 to 5)	2.5 (2 to 3)
PB	2.5 (2 to 3)	2.5 (2 to 3)
TVL	10 (9 to 10)	9.5 (9 to 10)
Posterior wall		
Ap	−1 (−2 to 0)	−3 (−3 to −2)
BP	−1 (−2 to 0)	−3 (−3 to −2)

*Median (IQR), measurements in centimeters.
TVL indicates total vaginal length.

Statistical analysis was performed with SAS 9.2 (SAS Institute Inc, Cary, NC). Demographics were assessed with descriptive statistics using standard methods for mean and median. The CRADI-8 and CRAIQ-7 scores at baseline and 12 months were evaluated with Student *t* tests for parametric variables using a Bonferroni correction. Additionally, longitudinal data analysis was performed to examine changes in bowel symptoms over time. Proportion of "splinters" was determined using descriptive statistics.

RESULTS

Of the 423 patients who underwent robotic sacrocolpopexy at our institution during the study period, complete 12-month follow-up data were available for 393 (93%) patients. Average patient age was 57 (9.1) years. Average body mass index was 26.0 (4) and average vaginal parity was 2.5 (1). Most patients were postmenopausal 319 (75%). The POP-Q measurements at baseline and 12 months postoperatively are listed in Table 1. Specific procedural details including operative time, estimated blood loss, and concomitant procedures are listed in Table 2.

TABLE 2. Procedural Details (n = 423)

Variable	Mean (SD)
Operative room time, min	155 (38)
Estimated blood loss, mL	54 (42)
Concomitant supracervical hysterectomy, n (%)	324 (77)*
Concomitant perineorrhaphy, n (%)	87 (21)*
Concomitant posterior repair, n	0
Concomitant suburethral sling, n (%)	312 (74)*
Inpatient stay > 24 h, n (%)	2 (0.5)*
Intraoperative complications	
Cystotomy, n (%)	1 (0.2)*
Blood transfusion, n (%)	2 (0.5)*
Bowel injury, n	0
Ureteral injury, n	0
Postoperative complications, n (%)	
Postoperative fever	3 (0.7)*
Postoperative ileus	1 (0.2)*
Postoperative bowel obstruction	1 (0.2)*
Readmission	3 (0.7)*

*Proportion.

TABLE 3. Bowel Function Scores at Baseline and 12 Months Postoperatively

	Baseline (SD)	12 mo Postoperatively (SD)	*P* (95% CI)*
CRADI-8	21.1 (20)	7.3 (11)	<0.0001 (10.8–14.5)
CRAIQ-7	11 (20)	2.4 (9)	<0.0001 (5.7–9.4)

**P* values calculated Student *t* test.

Bowel function as measured by CRADI-8 and CRAIQ-7 scores significantly improved at 12 months postoperatively (Table 3). Preoperatively, 152 patients complained of splinting using their finger on the vagina or perineum to complete a bowel movement. Mean baseline CRADI-8 scores for patients requiring to "splint" to complete a bowel movement [33.2 (21)] were significantly worse than those who did not "splint" [13.6 (15)] [$P < 0.0001$; 95% confidence interval (CI), 15.7–23.5]. Similarly, mean baseline CRAIQ-7 scores for patients requiring to "splint" to complete a bowel movement [17.0 (24)] were significantly worse than those who did not "splint" [7.4 (15)] ($P < 0.0001$; 95% CI, 5.3–13.9). At 12 months, 106/152 (70%) patients who complained of splinting preoperatively reported complete resolution. De novo splinting was seen in 22 patients. These patients with de novo splinting still reported relatively low degree of bother [CRADI-8 score, 13.8 (9)].

Concomitant perineorrhaphy was performed on 87/423 (21%) patients. At 12 months postoperatively, CRADI-8 and CRAIQ-7 scores for both the perineorrhaphy group and the non–perineorrhaphy group did not differ (Table 4). Baseline median GH measurements were worse in the perineorrhaphy group versus the non–perineorrhaphy group (5 vs 3.5, respectively, $P < 0.0001$).

DISCUSSION

Overall bowel symptoms as measured by the CRADI-8 were improved at 12 months postoperatively. Similarly, the impact bowel symptoms have on quality of life as measured by

TABLE 4. Comparison of Bowel Symptoms After Robotic Sacrocolpopexy (RSC) With and Without Perineorrhaphy

	RSC With Perineorrhaphy	RSC Without Perineorrhaphy	*P* (95% CI)*
Baseline CRADI-8, mean (SD)	25.0 (21.2)	20.1 (20.0)	0.049 (0.02–9.6)
12 mo postoperative CRADI-8, mean (SD)	7.5 (9.4)	7.4 (11.7)	0.92 (−2.3 to 2.6)
Baseline CRAIQ-7, mean (SD)	15.0 (24.7)	10.1 (18.4)	0.09 (−0.8 to 10.6)
12 mo postoperative CRAIQ-7, mean (SD)	2.7 (10.1)	2.4 (9.7)	0.86 (−2.2 to 2.6)

*CRADI-8 and CRAIQ-7 scores compared with Student *t* test.

CRAIQ-7 improved at 12 months as well. "Splinting to defecate" resolved in 70% of patients at 12 months. Additionally, bowel symptoms improved regardless of concomitant perineorrhaphy and there were no differences in bowel function improvements between groups.

Strengths of our study include the large sample size, high follow-up rate (93%), prospective study design, and use of validated questionnaires to assess bowel function. All POP-Q examinations and validated questionnaires were collected by our clinical research nurse. Our study was limited by the lack of baseline constipation severity scores. Additionally, we did not collect dietary fiber intake, the use of laxatives, or physical activity, all of which could contribute to bowel function.[16] The lack of a control group is a limitation, however, less of a factor in this cohort where patients act as their own control, especially because our objective was to assess a single intervention.

Although it is well established that posterior repair improves bowel function, there are no studies that show similar effects with isolated perineorrhaphy. Our study confirms that finding because we did not find any difference between those patients who underwent perineorrhaphy and those who did not with respect to 12-month CRADI-8 and CRAIQ-7 scores.

Overall, robotic sacrocolpopexy was associated with significant improvements in bowel function as measured by CRADI-8 as well as improvements in impact on quality of life as measured by CRAIQ-7, and we now incorporate these findings into our preoperative counseling sessions for robotic sacrocolpopexy.

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