Published in final edited form as:

Obstet Gynecol. 2014 February ; 123(2 0 1): 232–238. doi:10.1097/AOG.0000000000000081.

Bowel Preparation Before Vaginal Prolapse Surgery: A Randomized Controlled Trial

Alicia C. Ballard, MD¹, Candace Y. Parker-Autry, MD¹, Alayne D. Markland, DO, MSc², R. Edward Varner, MD¹, Carrie Huisinigh, MPH³, and Holly E. Richter, PhD, MD¹

¹Division of Urogynecology and Pelvic Reconstructive Surgery, Department of Obstetrics and Gynecology, University of Alabama at Birmingham, Birmingham, AL, United States

²Birmingham/Atlanta Geriatric Research, Education, and Clinical Center, Department of Veterans Affairs, Birmingham, Alabama; and the Department of Medicine, Division of Gerontology, Geriatrics, and Palliative Care, University of Alabama at Birmingham, Birmingham, Alabama, United States

³Center for Clinical and Translational Science, University of Alabama at Birmingham, Birmingham, AL, United States

Abstract

Objectives—To compare surgeons' intraoperative surgeon acceptability or assessment of the operative field regarding bowel contents. and patients' satisfaction with or without a mechanical bowel preparation prior to reconstructive vaginal prolapse surgery.

Methods—In this single-blind, randomized trial, women scheduled to undergo vaginal prolapse surgery with a planned apical suspension and posterior colporrhaphy were allocated using block-randomization to an intervention or control group. Surgeons were blinded to patient allocation. One day prior to surgery, mechanical bowel preparation instructions consisted of a clear-liquid diet and two self-administered saline enemas; the controls sustained a regular diet and nothing by mouth after midnight. The primary outcome was surgeons' intraoperative assessment of surgical field regarding bowel contents, as measured on a 4-point Likert scale (1, excellent; 4, poor). Secondary outcomes included participant satisfaction and bowel symptoms. The primary outcome was determined by intention-to-treat analysis and other analyses were per protocol.

Results—Of the 150 women randomized (75 women to intervention and control), 145 completed the study. No differences existed in the demographic, clinical, and intraoperative characteristics between groups ($p>0.05$). Surgeons' intraoperative assessment rating was 85% "excellent/good" with bowel preparation vs. 90% for controls (OR=0.59, 95% CI 0.21–1.61; $p=0.30$). The bowel preparation group was less likely to report "complete" satisfaction compared to the controls (OR=0.11, 95% CI 0.04–0.35; $p<0.001$). Abdominal fullness and cramping, fatigue, anal irritation, and hunger pains were greater in the bowel preparation group (all $p<0.01$).

Corresponding Author: Holly E. Richter, PhD, MD, Division of Urogynecology and Pelvic Reconstructive Surgery, Department of Obstetrics and Gynecology, University of Alabama at Birmingham, 619 19th Street South, 176-F, Suite 10382, Birmingham, AL, 35249, hrichter@uabmc.edu, Phone: (205) 934-1704 Fax: (205) 975-8893.

Financial Disclosure: Holly E. Richter has received research grants from Astellas, Pelvalon, and the University of California San Francisco/Pfizer. She has served as a consultant for Pelvalon and Astellas. The other authors did not report any potential conflicts of interest.

Presented at the 39th Annual Society for Gynecological Surgeon's Meeting April 8–10, 2013

Conclusion—Prior to reconstructive vaginal surgery, mechanical bowel preparation conferred no benefit regarding surgeons' intraoperative assessment of operative field, reflected decreased patient satisfaction, and had increased abdominal symptoms.

Clinical Trial Registration—ClinicalTrials.gov, www.clinicaltrials.gov, NCT01431040.

Introduction

Pelvic organ prolapse is a prevalent condition affecting 1 in every 10 women in the United States.(1)Between 1976 – 2006, 5 million prolapse procedures were performed in the United States.(2)The life-time risk of prolapse surgery is 11% for symptomatic women, with an additional 30% risk of re-operation. (3)

Mechanical bowel preparation is a common, but not a universal practice among surgeons operating in the abdominal or pelvic area. Its practice in gynecologic surgery was originally adopted from colorectal surgery where it was perceived to reduce surgical site infection, without clear evidence of its benefit.(4) A 2011 Cochrane review of the use of mechanical bowel preparation for elective colorectal surgery concluded that there is no significant evidence that patients benefit from its use or that of rectal enemas.(5) Additionally, patients may experience more side effects with bowel preparation and diet alterations, including gastrointestinal distress, dehydration, and electrolyte disturbances.(6)

Recent studies demonstrated no advantage to mechanical bowel preparation in laparoscopic gynecologic surgery and reported increased adverse side effects. (7–9) While evidence against routine use in colorectal and laparoscopic gynecologic surgery exists and is changing practice, (10–11) many pelvic reconstructive surgeons continue to use some form of pre-operative bowel preparation.

As a paucity of evidence exists for the use of bowel preparation prior to reconstructive vaginal prolapse surgery, we performed a randomized controlled trial to assess the effect of mechanical bowel preparation on intraoperative surgeon acceptability or assessment of the operative field regarding bowel contents. Secondly, we evaluated patient satisfaction, associated bowel symptoms, and complications.

Materials and Methods

This was a single-blind, randomized trial conducted in women presenting to the Urogynecology Care Clinic at the University of Alabama at Birmingham between January 2011–August 2012. Eligible participants were women older than 19 years of age, scheduled to undergo reconstructive vaginal prolapse surgery to include an apical suspension with posterior compartment repair; other surgical procedures were allowed. Women were excluded if they had a history of a total colectomy, a diagnosis of inflammatory bowel disease, colorectal cancer receiving treatment, or chronic constipation per Rome III guidelines.(12)Written informed consent was obtained from all participants in accordance with a research protocol approved by the University of Alabama at Birmingham Institutional Review Board for Human Use.

Eligible women were enrolled and randomized to treatment assignment at the time of their preoperative visit (within 30 days of surgery) by research staff. After obtaining informed consent, baseline characteristics including age, body mass index, medical history, surgical history (specific to abdominal, pelvic, or abdominal and pelvic surgery) were recorded and physical examination conducted. Participants received preoperative counseling and were randomly assigned with a 1:1 ratio to receive mechanical bowel preparation (intervention group) or not (control group). On the day prior to surgery, verbal and written instructions to

the intervention group included: 1) intake a clear-liquid diet, 2) self-administration of two separate saline enemas at 4:00 pm and at 6:00 pm, along with 3) nothing by mouth after midnight on the day of surgery. Saline enemas were chosen as the intervention as they are the institutional standard for those surgeons who use a mechanical bowel preparation. Instructions given to the control group included: 1) continuation of a regular diet and 2) nothing by mouth after midnight on the day of surgery. Participants were asked not to reveal the bowel preparation assignment to the surgeon. Both groups were given written instructions on a high fiber diet (20–25 g/day) as a guideline to follow postoperatively.

Immediately after surgery, the primary surgeon (4 faculty pelvic reconstructive surgeons) completed a self-administered questionnaire assessing the intraoperative surgical field. The surgeon's questionnaire included an overall assessment of bowel cleansing as measured on a 4-point Likert scale (1-excellent, 2-good, 3-fair, 4-poor) based on the presence of gas, fluid, particulate formed stool, or large solid stool by inspection and palpation.⁽⁶⁾ The primary outcome (surgeon acceptability) was dichotomized as "excellent/good" versus "fair/poor/missing." Other factors such as intraoperative stooling, adequacy of visualization, and difficulty with bowel handling were also evaluated. Perioperative parameters collected included operative time, estimated blood loss, use of preoperative antibiotics, surgical complications (if any), and type(s) of surgical procedures performed.

Secondary outcomes included the patient's overall satisfaction with their preoperative regimen (reflecting patient acceptability) using previously reported standardized questions. ⁽⁶⁾ The overall patients' preoperative satisfaction and experience was assessed with a self-administered questionnaire. A modified patient satisfaction question ⁽¹³⁾ assessed overall satisfaction with the following question, "How satisfied are you with the method used to prepare your bowel for your surgery?" with response options of "completely," "somewhat," or "not at all." Participants were also asked to estimate the percentage of enema completed, if they adhered to the preoperative diet regimen, if they were willing to have the identical bowel preparation in the future, and if they would be willing to try another regimen in the future. Participants used a visual analog, scored from 0 (none) to 4 (distressing), to rate severity of their perioperative bowel symptoms. The 13 bowel symptoms included: trouble taking the enema, abdominal fullness or bloating, sleep loss, fatigue, abdominal cramps, nausea, vomiting, anal irritation, weakness or faint feeling, chest pains, chills, and ease of completing their regimen.

The sample size for the primary outcome assumed a reference rate of 87% for acceptable (excellent or good) bowel preparation as reported by Oliveria et al.⁽⁶⁾ As reported by Muzii ⁽⁷⁾ the goal was to detect a 20% difference in rates of acceptable bowel preparation between groups with a two-sided 5% significance level and a power of 80%. A sample size of 70 participants were needed in each group. Assuming a 7% attrition rate, we aimed to recruit 150 patients for this study.

Block randomization was applied using blocks of 10. The allocation sequence was computer-generated and concealed in sequentially numbered, opaque, sealed and stapled envelopes. Corresponding envelopes were opened only after the enrolled participants completed all baseline assessments and it was time to allocate the intervention. Each participant was provided with the assigned preparation regimen by research staff. Participants assigned to the intervention were not blinded. However, surgeons assessing the primary outcome and data analyst were blinded to the allocation.

Chi-square (Fisher's exact as applicable) and t-tests were used to compare categorical and continuous variables, respectively, between the intervention and control groups. For data that were not normally distributed, Wilcoxon rank-sum tests were used to compare medians.

Logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (CI) for surgeon's acceptability and patient satisfaction. The analyses are based on an intention-to-treat approach. Per protocol analyses were also performed. In sensitivity analyses, missing data for surgeon's acceptability were classified as either all treatment failures and or as all treatment successes in order to compare the consistency of our findings. Adjustment of p-values for multiple comparisons was not performed. A p-value of 0.05 was considered to be significant.

Results

Over 20 months, 150 women were enrolled and randomized: 75 to the bowel preparation and 75 to the control group. A total of 145 (97%) participants completed the study. The study patient flow diagram is shown in Figure 1. Demographic, clinical, and intraoperative characteristics were similar between the two groups (Table 1). Ninety-nine percent of the intervention group and 100% of controls received concomitant vaginal apical suspension ($p>0.05$). Concurrent posterior colporrhaphy was performed in 96% and 97% of intervention and control groups respectively, ($p=0.68$). There were no significant differences between concomitant hysterectomy, conversion to laparotomy, estimated blood loss, or operative time between groups, ($p>0.05$). With regard to complications, there were no bowel injuries at the time of surgery and no surgical site infectious complications in either group post-operatively.

Eight-four percent (63/75) of women adhered to their treatment assignment (completing $>50\%$ of the enema and complying with a clear liquid diet) in the mechanical bowel preparation group compared to 93% (70/75) in the control group. No differences existed in the surgeon's intraoperative acceptability of the bowel preparation regarding bowel contents as it related to the surgical field, rated as "excellent or good," in 85% (61/72) of the intervention group compared to 90% (66/73) in the control group (OR=0.59, 95% CI 0.21–1.61; $p=0.30$) (Table 2). In a sensitivity analysis, with missing data classified as either all successes or all failures, the results were similar (Table 2). Similarly, in per protocol analysis, of those completing the study, no significant differences in the primary outcome were noted (data not shown). Surgeons' intraoperative assessment of the rectal vault revealed that there were no differences in the presence of gas or stool between the intervention and the control groups (Table 2). Adequate visualization was similar between groups and there were no differences in intraoperative stooling or difficulty of bowel handling between groups, all $p>0.05$. Of the cases noted to have fair/poor bowel preparation, surgeons' subjective evaluation largely reflected stooling on the field while performing a rectal exam during the procedure or while performing the procedure itself.

Overall, patient satisfaction with their bowel preparation was lower in women randomized to the bowel preparation (66% intervention v. 94% control group, $p<0.001$) (Table 3). The mechanical bowel preparation group was less likely to report "complete" satisfaction compared to the control group (OR=0.11, 95% CI 0.04–0.35; $p<0.001$). In addition, women who received the mechanical bowel preparation were less likely to repeat a mechanical bowel preparation again. Overall, peri-operative bowel symptom severity was low in both groups, however women in the intervention group were more symptomatic. The highest symptom severity scores were reported for hunger pains (1.09 ± 1.13 v. 0.27 ± 0.73 ($p<0.001$), abdominal cramps or pain (0.99 ± 1.35 v. 0.35 ± 0.91 , $p<0.001$) and abdominal fullness and bloating (0.81 ± 1.08 v. 0.31 ± 0.77 , $p<0.001$) for MBP versus control groups, respectively. In addition, 3 (4%) participants noted it to be "distressing" administering the saline enemas.

Discussion

Use of a mechanical bowel preparation with clear liquids and saline enemas did not significantly improve surgeons' intraoperative acceptability of the operative field regarding the presence of bowel contents compared to a control group. Importantly, women undergoing a bowel preparation prior to vaginal prolapse surgery reported decreased satisfaction and increased distressing bowel symptoms, strongly suggesting that a bowel preparation should not be performed routinely in women undergoing reconstructive vaginal prolapse surgery.

Our data is in agreement with a recent Cochrane review summarized outcomes of 5,805 patients in randomized trials evaluating mechanical bowel preparation for elective colorectal surgery, where it was concluded that its routine use did not prove beneficial. Specifically, there were no statistically significant differences with regard to leakage of the anastomotic site, mortality rates, peritonitis, need for reoperation, wound infection, and other nonabdominal complications.(14) Mechanical bowel preparation outcomes using rectal enemas was also included and there was no significant evidence of patient benefit with their use. Although bowel preparation has continued to be performed prior to vaginal reconstructive prolapse surgery despite the reported over-whelming lack of benefit demonstrated in the colorectal literature (5), and given the low risk of bowel injury (<2%) in vaginal reconstructive surgery, it stands to reason that mechanical bowel preparation would not be of benefit even for this potential complication.

Our conclusions also align with prior level I studies investigating the role of bowel preparation in laparoscopic gynecologic surgery. (7,8) Yang and colleagues randomized 145 women undergoing advanced gynecologic laparoscopy to receive either oral sodium phosphate solution or single sodium phosphate enema. No differences between groups were noted for the acceptability of the surgical field and the use of oral sodium phosphate resulted in more adverse side-effects.(8) Muzii et al (7) conducted a single-blind trial randomizing 91 patients undergoing diagnostic or operative laparoscopy for gynecologic indications, to oral sodium phosphate or no bowel preparation. Similarly, there were no significant differences noted between the control and intervention groups in terms of intraoperative and postoperative complication rates, operative times, surgical field visualization, or self-reported ease of the procedure. The intervention arm also had more perioperative gastrointestinal symptoms.

Lijol and colleagues reported findings in 83 women undergoing laparoscopy for benign gynecologic conditions comparing bowel preparation to a preoperative 7-day minimal residue diet. They found no differences in the surgeons' acceptability of surgical field and participants randomized to bowel preparation reported more bowel symptoms. (15) Won et al (9) reported the results of a trial of 308 women scheduled for laparoscopic gynecologic surgery. Participants were randomized to 1 of 3 arms: fasting only, minimal residue diet the day prior to surgery plus fasting after midnight, or minimal residue diet with bowel preparation (oral sodium picosulfate) and fasting. Contrary to the above findings, minimal residue diet plus mechanical bowel preparation provided a better surgical view ($p<.01$) compared to the other two groups using a visual analog scale. However, when the surgical view was assessed by a verbal descriptor scale (excellent, good, medium, sufficient, poor) no difference existed among groups.

Regarding the use of bowel preparation in reconstructive vaginal prolapse surgery, Estanol et al (16) reported results of a trial of 41 women with stage II or greater posterior vaginal wall prolapse randomized to a liquid diet and sodium phosphate enema versus no intervention. The Bristol Stool Scale was used to characterize intestinal transit times. No

significant differences were seen in postoperative colonic transit times between the 2 groups. Wiebracht et al (17) reported results of a prospective trial of 40 subjects undergoing transvaginal surgery randomized to receive 2 preoperative enemas or no enemas. They concluded that preoperative enema prior to transvaginal surgery provided no benefit or improved surgical exposure.

Our study is strengthened by its robust sample size with adequate power and randomized design. This is a well characterized surgical cohort undergoing a well-defined operative approach with a minimum of a concomitant apical suspension and posterior repair providing level 1-evidence investigating the usefulness of preoperative bowel preparation for reconstructive vaginal prolapse surgery. The use of previously published standardized questions for assessment of the surgeons' and patients' experiences further strengthens this study, allowing a similar comparison to other trials in the literature. However, the lack of validation of this instrument is a limitation. Nevertheless, these questions are structured using a standardized visual analog scale or Likert scales commonly used and previously published. (6,8,15) The study is also limited by participation of a single site; however, assessments were performed by four experienced, high-volume vaginal surgeons increasing generalizability. Finally, given the multiple comparisons, it is possible that some significant associations arose due to chance and may not be clinically significant. In conclusion, routine use of mechanical bowel preparation for reconstructive vaginal prolapse surgery should be reconsidered by all pelvic floor surgeons.

Acknowledgments

Financial Support:

Supported in part by the UAB Center for Clinical and Translational Science Grant Number UL1TR000165 from the National Center for Advancing Translational Sciences (NCATS) and National Center for Research Resources (NCRR) component of the National Institutes of Health (NIH). Also partially funded by 2K24-DK068389 to Holly E. Richter from the National Institute of Diabetes and Digestive and Kidney Disease, National Institute of Health.

The contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

The authors thank W. Jerod Greer, MD¹, Robert L. Holley, MD¹ and Kathy Carter, RN¹ for their help in recruitment of participants, as well as Gerald McGwin Jr, PhD³ for his statistical support.

References

1. DeLancey JO. The hidden epidemic of pelvic floor dysfunction: achievable goals for improved prevention and treatment. *Am J Obstet Gynecol.* 2005; 192:1488–95. [PubMed: 15902147]
2. Jones KA, Shepherd JP, Oliphant SS, Wang L, Bunker CH, Lowder JL. Trends in inpatient prolapse procedures in the United States, 1979–2006. *Am J Obstet Gynecol.* 2010; 202:501, e1–7. [PubMed: 20223444]
3. Boyles SH, Weber AM, Meyn L. Procedures for pelvic organ prolapse in the United States, 1979–1997. *Am J Obstet Gynecol.* 2003; 188:108–15. [PubMed: 12548203]
4. Cohen SL, Einarsson JJ. The role of mechanical bowel preparation in gynecologic laparoscopy. *Rev Obstet Gynecol.* 2011; 4:28–31. [PubMed: 21629496]
5. Guenaga KF, Matos D, Wille-Jorgensen P. Mechanical bowel preparation for elective colorectal surgery. *Cochrane Database of Systemic Reviews.* 2011; (9)
6. Oliveira L, Wexner SD, Daniel N, DeMarta D, Weiss EG, Nogueras JJ, et al. Mechanical bowel preparation for elective colorectal surgery. A prospective, randomized, surgeon-blinded trial comparing sodium phosphate and polyethylene glycol-based oral lavage solutions. *Dis Colon Rectum.* 1997; 40:585–91. [PubMed: 9152189]

7. Muzii L, Bellati F, Zullo MA, Mancini N, Angioli R, Panici PB. Mechanical bowel preparation before gynecologic laparoscopy: a randomized, single-blind, controlled trial. *Fertil Steril*. 2006; 85:689–93. [PubMed: 16500339]
8. Yang LC, Arden D, Lee TT, Mansuria SM, Broach AN, D'Ambrosio L, et al. Mechanical bowel preparation for gynecologic laparoscopy: a prospective randomized trial of oral sodium phosphate solution vs single sodium phosphate enema. *J Minim Invasive Gynecol*. 2011; 18:149–56. [PubMed: 21167795]
9. Won H, Peta M, Salim S, Rao A, Campbell N, Abbott J. Surgical and Patient Outcomes Using Mechanical Bowel Preparation Before Laparoscopic Gynecologic Surgery: A Randomized Controlled Trial. *Obstet Gynecol*. 2013 Mar; 121(3):538–46. [PubMed: 23635616]
10. Bucher P, Gervaz P, Egger JF, Soravia C, Morel P. Morphologic alterations associated with mechanical bowel preparation before elective colorectal surgery: a randomized trial. *Dis Colon Rectum*. 2006; 49:109–12. [PubMed: 16273330]
11. Contant CM, Hop WC, van't Sant HP, Oostvogel HJ, Smeets HJ, Stassen LP, et al. Mechanical bowel preparation for elective colorectal surgery: a multicentre randomised trial. *Lancet*. 2007; 370:2112–7. [PubMed: 18156032]
12. The Rome Foundation. Rome III disorders and Criteria. Available at: <http://www.romecriteria.org/>
13. Burgio KL, Goode PS, Richter HE, et al. Global ratings of patient satisfaction and perception of improvement with treatment for urinary incontinence: validation of three global patient ratings. *Neurourol Urodyn*. 2006; 25:411–417. [PubMed: 16652380]
14. Guenaga KF, Matos D, Wille-Jørgensen P. Mechanical bowel preparation for elective colorectal surgery. *Cochrane Database Syst Rev*. 2011:CD001544. [PubMed: 21901677]
15. Lijoi D, Ferrero S, Mistrangelo E, Casa ID, Crosa M, Remorgida V, et al. Bowel preparation before laparoscopic gynaecological surgery in benign conditions using a 1-week low fibre diet: a surgeon blind, randomized and controlled trial. *Arch Gynecol Obstet*. 2009; 280:713–8. [PubMed: 19229545]
16. Estanol MC, Pancholy AB, Crisp CC, Fellner AN, Kleeman SD, Pauls RN. Preoperative bowel preparation in paritne undergoing vaginal reconstructive surgery and its relationship with intestinal transit using the Bristol Stool Chart: A randomized controlled trial. *Female Pelvic Medicine & Reconstructive Surgery*. 2011; 17:S132.
17. Wiebracht E, Maxwell R, South M. Preoperative bowel preparation prior to vaginal surgery: a randomized trial. *Abstract Female Pelvic Medicine & Reconstructive Surgery*. 2011; 17:S132.

Figure 1.
Patient flow.

Table 1

Participant Demographic, Procedural, and Intraoperative Data

Characteristic	Mechanical Bowel Preparation (n=75)	Control (n=75)	Missing n	P
Age (years)			10	
Mean $\pm$ SD	62 $\pm$ 10	60 $\pm$ 10		0.24
Range	25 – 78	39 – 78		
Parity, median (IQR)	2 (2 – 3)	2 (2 – 3)	15	0.71
Previous hysterectomy, yes	47 (63)	50 (67)		0.61
Prior prolapse surgery, yes	24 (32)	18 (24)		0.28
Prior placement of transvaginal mesh, yes	4 (5)	1 (1)		0.37
Vaginal surgery, yes	71 (99)	73 (100)	5	0.50
Conversion to laparotomy, yes	1 (1)	4 (5)	6	0.37
Concurrent hysterectomy, yes	24 (33)	24 (33)	5	0.95
Classify hysterectomy subtypes				
Vaginal	24 (100)	22 (92)		0.49
Laparoscopic-assisted	0 (0.0)	2 (8)		
Other	0 (0)	0 (0)		
Concurrent apical suspension			5*	
Uterosacral suspension	53 (76)	50 (68)		0.61
Sacrospinous suspension	15 (21)	20 (27)		
Sacrocolpopexy	2 (3)	3 (4)		
Concurrent posterior repair, yes	69 (96)	71 (97)	5	0.68
Concurrent anterior repair, yes	55 (76)	54 (74)	5	0.74
Concurrent enterocele repair, yes	25 (35)	25 (34)	6	0.90
Concurrent placement of transvaginal mesh, yes	3 (4)	5 (7)	5	0.72
Proctotomy or enterotomy, yes =6	0 (0)	0(0)	6	----
Surgical site infections, yes	0 (0)	0 (0)	5	----
Estimated blood loss, median (IQR), in mL	100 (75–150)	100 (75–150)	12	0.42
Operative time, median (IQR), in minutes	110 (90–130)	115.5 (99–133)	9	0.12

SD, standard deviation; IQR, interquartile range.

Data are n (%) unless otherwise specified.

* Two didn't receive apical.

Table 2

Surgeon Assessment of Surgical Field

Variable	Mechanical Bowel Preparation(n=75)	Control (n=75)	Missing n	P
Overall assessment of surgical field			5	
Excellent or good	61 (85)	66 (90)		0.30
Fair or poor	11 (15)	7 (10)		
Set all missing to successes				
Excellent or good	64 (85)	68 (91)		0.31
Fair or poor	11 (15)	7 (9)		
Set all missing to failures				
Excellent or good	61 (81)	66 (88)		0.26
Fair or poor	14 (19)	9 (12)		
Evaluation of prep			5	
Rectum empty	58 (81)	51 (70)		0.14
Gas	1 (1)	0 (0)		0.50
Fluid	3 (4)	2 (3)		0.68
Particulate formed stool	9 (13)	17 (23)		0.09
Large solid stool	1 (1)	3 (4)		0.62
Adequate visualization			5	
Yes	71 (99)	73 (100)		0.50
No	1 (1)	0 (0)		
Stooling on the field			5	
Yes	10 (14)	5 (7)		0.16
No	62 (86)	68 (93)		
Difficulty handling bowel			6	
Yes	2 (3)	0 (0)		0.50
No	70 (97)	72 (100)		

Data are n (%) unless otherwise specified.

Table 3

Patient Experience Outcomes

	Mechanical Bowel Preparation (n=75)	Control (n=75)	Missing n	P
Patient satisfaction (PSQ)			9	
Completely	46 (66)	67 (94)		<0.001
Somewhat	20 (29)	3 (4)		
Not at all	4 (6)	1 (1)		
Willing to have the same prep in future			7	
Yes	63 (90)	71 (97)		0.09
No	7 (10)	2 (3)		
Willing to try another one			7	
Yes	59 (84)	47 (64)		0.007
No	11 (16)	26 (36)		
Patient symptoms, self-reported, 5-point VAS [0–4], mean ± SD				
Trouble taking enema	0.84 ± 1.11	0.10 ± 0.41	7	<0.001
Abdominal fullness or bloating	0.81 ± 1.08	0.31 ± 0.77	9	0.004
Sleep loss	0.81 ± 1.28	0.32 ± 0.68	8	0.023
Fatigue	0.73 ± 1.18	0.29 ± 0.74	7	0.007
Abdominal cramps or pain	0.99 ± 1.35	0.35 ± 0.91	8	<0.001
Nausea	0.19 ± 0.60	0.06 ± 0.23	8	0.09
Vomiting	0.10 ± 0.51	0.04 ± 0.26	7	0.39
Anal irritation	0.74 ± 1.02	0.25 ± 0.76	8	<0.001
Weakness or faint feeling	0.30 ± 0.75	0.11 ± 0.46	7	0.07
Chest pains	0.10 ± 0.52	0.01 ± 0.12	10	0.17
Hunger pains	1.09 ± 1.13	0.27 ± 0.73	8	<0.001
Chills	0.18 ± 0.49	0.03 ± 0.16	9	0.02
Ease of completion	1.10 ± 1.18	0.12 ± 0.55	7	<0.001

PSQ, Patient Satisfaction Questionnaire; VAS, visual analog scale; SD, standard deviation.

Data are n (%) unless otherwise specified.