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Significant gastrointestinal morbidity after sacrocolpopexy: The incidence and risk factors

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Objective
This study aimed to quantify the risk of significant gastrointestinal (GI) morbidity after sacrocolpopexy (SCP), and to identify related risk factors.

Methods
A retrospective study was performed of 258 patients who underwent laparotomic SCP for symptomatic pelvic organ prolapse (POP) from November 2008 to August 2013. By the review of medical records, the frequency of significant GI morbidity that resulted in a prolonged initial hospitalization, readmission, or reoperation was assessed. Thereafter, risk factors for significant GI morbidity were assessed using univariate and multivariate analyses.

Results
Ten patients (3.9%) were identified as having significant GI morbidity; nine (3.5%) had a prolonged initial hospital stay or were readmitted for the medical treatment of postoperative ileus and 1 (0.4%) underwent reoperation for small bowel obstruction. The occurrence of significant GI morbidity was significantly associated with patient's age and prior laparotomy. By multivariable logistic regression analysis, age (odds ratio [OR], 1.14; 95% confidence interval [CI], 1.01–1.27; *P*=0.03) and prior laparotomy (OR, 6.82; 95% CI, 1.37–34.07; *P*=0.02) were found as independent risk factors for significant GI morbidity.

Conclusion
One in 25 (3.9%) women after SCP experiences significant GI morbidity. Particularly, women with older age and prior laparotomy have a higher risk for significant GI morbidity. This data will aid preoperative counseling for Korean POP patients undergoing SCP.

Keywords: Gastrointestinal morbidity; Pelvic organ prolapse; Prior laparotomy; Risk factors; Sacrocolpopexy

Introduction

Pelvic organ prolapse (POP) is a common gynecologic disorder that affects almost half of all women over 50 years of age, with lifetime prevalence of 30% to 50% [1]. Women with average life expectancy have 11% to 12% chance of undergoing surgery for POP or urinary incontinence [2]. Because of the aging population across the world and current trend toward maintaining active lifestyle to older age than ever, increasing number of women will need treatment of POP. In the United States the demand for POP care is estimated to double over the next 40 years [3]. Considering the accelerated aging phenomenon, POP will also become one of the major socioeconomic problems in Korea.

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Sacrocolpopexy (SCP) is an effective procedure commonly performed to correct advanced POP. According to the Cochrane review, SCP was associated with lower rates of recurrent prolapse than the vaginal procedures including sacrospinous colpopexy, uterosacral colpopexy and transvaginal mesh [4]. On the other hand, it requires longer operating time and duration to recover daily life, and is more expensive. Moreover, as a major operation, SCP carries the risk for significant gastrointestinal (GI) morbidity including ileus, bowel obstruction, and bowel injury. Because significant GI morbidity is one of the major causes of reoperation and unplanned hospitalization, identification of its incidence and related risk factors may be important.

A recent review of the literatures on SCP found that significant GI morbidity is not rare [5]. The median rates of intraoperative bowel perforation and postoperative ileus were 1.6% (range, 0.4%–2.5%) and 3.6% (range, 1.1%–9.3%), respectively. And a median 1.1% (range, 0.6%–8.6%) of patients required reoperation for small bowel obstruction. However, most of the studies included in this review were small case-series and did not report complications or assess them completely. Therefore, the rates of significant GI complications are likely to be much higher. A recent study for patients included in the Colpopexy and Urinary Reduction Efforts (CARE) trial, a randomized, multicenter trial to evaluate the utility of Burch colposuspesion at the time of SCP in stress-continent women, found that 1 in 20 women experienced significant GI morbidity requiring a prolonged hospitalization, readmission, or reoperation for 12 months after laparotomic SCP. The sole risk factor for ileus or small bowel obstruction was older age [6]. Another study that also included largest study population reported that significant GI morbidity after laparoscopic SCP were relatively low (about 1%) and associated with prior laparotomy [7]. Most of women included in these two studies are Caucasian, therefore the results cannot be applied to different ethnic backgrounds of women. Indeed, several studies have shown that race and ethnicity may influence surgical outcomes [8-11].

Until now, there has been no report evaluating significant GI morbidity after SCP in Korean patients. The aims of the present study were to quantify the risk of significant GI morbidity that required a prolonged hospitalization, readmission, or reoperation after SCP, and to identify related risk factors.

Materials and methods

This retrospective study included women who underwent laparotomic SCP for symptomatic POP at Seoul National University Hospital from November 2008 to August 2013. All surgeries were done by one skilled surgeon. A detailed surgical procedure was described in a previous report [12]. The study protocol was approved by the institutional review board (H-1310-113-530).

Baseline demographic and clinical data on age, parity, body mass index, menopausal status, medical co-morbidities (hypertension and diabetes), prior laparotomy or prolapse surgery, and preoperative pelvic organ prolapse quantification (POP-Q) stage were collected from the medical chart records. The operative and anesthesia reports were reviewed for intraoperative complications, American Society of Anes-

Table 1. Patient and operative characteristics of the study population

Variables	Values (n=258)
Age (yr)	64.0 (11.0)
Parity	3 (2)
Vaginal parity	3 (2)
Body mass index (kg/m^2)	24.3 (3.5)
Menopause	231 (89.5)
Smoking	0
Hypertension	115 (44.6)
Diabetes	35 (13.6)
Prior laparotomy	80 (31.0)
Prior prolapse surgery	29 (11.2)
Preoperative POP-Q stage	
II	23 (8.9)
III	196 (76.0)
IV	39 (15.1)
ASA class	
1	97 (37.6)
2	153 (59.3)
3	8 (3.1)
Concomitant hysterectomy	198 (76.7)
Operative time (min)	190 (50)
Estimated blood loss (mL)	160 (160)
Transfusion	10 (3.9)

Data are presented median (interquartile range) or number (%).
POP-Q, pelvic organ prolapse quantification; ASA, American Society of Anesthesiologists.

thesiologists (ASA) class, estimated blood loss, and operation time. Data on postoperative complications, length of hospital stay, and occurrence of readmission or reoperation were also obtained from the medical chart records.

Significant GI morbidity was defined as GI complications that required a prolonged initial hospitalization (defined as hospitalization for more than a week), readmission, or reoperation. Then, we divided the patients into two groups, according to the occurrence of significant GI morbidity after SCP, to find out related risk factors.

Statistical analyses were performed using SPSS ver. 19.0 (SPSS, Chicago, IL, USA). The normality of the data was assessed using the Shapiro-Wilk test, which indicated that the data did not follow a normal distribution. Therefore, comparisons between the groups for the continuous variables were performed using the Mann-Whitney *U*-test. To compare the categorical variables between the groups, the Fisher's exact test or chi-square test was performed. To identify risk factors that are associated with significant GI morbidity, we performed univariate analyses of the potential risk factors that included baseline demographic and clinical data, ASA class, a concomitant hysterectomy, operation time, estimated blood loss, and transfusion. Then, logistic regression analyses were performed including variables with statistical significance in univariate analyses. All statistical tests were two-tailed, and statistical significance was defined as $P<0.05$.

Results

During the study period, 258 women underwent SCP. Medical records were available for all patients. Baseline patient and operative characteristics are presented in Table 1. The median follow-up time was 18 months (range, 1–52).

Of 258 patients, ten (3.9%) were identified as having significant GI morbidity. Nine patients (3.5%) had a prolonged initial hospital stay or were readmitted for the treatment of postoperative ileus. They improved with medical treatment and discharged without further problems. One patient (0.4%) with small bowel obstruction underwent reoperation during initial hospitalization. This case was associated with panperitonitis due to microperforation unrecognized during the operation (Table 2). This patient undergoing small bowel segmental resection, end-to-end anastomosis, and ileostomy (case 10 in Table 2) received ileostomy repair at postoperative 5 months and incisional herniorrhaphy with small bowel adhesiolysis at postoperative 2 years.

Table 2. Reports of severe adverse events

Case	POD to onset	Final diagnosis	Management
1	4	Ileus (⟶ prolonged initial hospitalization)	No oral intake, nasogastric tube drainage, parenteral nutrition
2	5	Ileus (⟶ prolonged initial hospitalization)	No oral intake, nasogastric tube drainage, parenteral nutrition
3	6	Ileus (⟶ prolonged initial hospitalization)	No oral intake, nasogastric tube drainage, parenteral nutrition
4	9	Ileus (⟶ prolonged initial hospitalization)	No oral intake, nasogastric tube drainage
5	8	Ileus (⟶ readmission)	No oral intake, nasogastric tube drainage, parenteral nutrition
6	9	Ileus (⟶ readmission)	No oral intake, nasogastric tube drainage, parenteral nutrition
7	17	Ileus (⟶ readmission)	No oral intake, nasogastric tube drainage, parenteral nutrition
8	25	Ileus (⟶ readmission)	No oral intake, nasogastric tube drainage, parenteral nutrition
9	26	Ileus (⟶ readmission)	No oral intake
10	5	SBO related with panperitonitis due to SB microperforation (⟶ reoperation)	Laparotomic SB segmental resection, end-to-end anastomosis, and ileostomy on POD 5

POD, postoperative day; SBO, small bowel obstruction; SB, small bowel.

Table 3. Results of univariate analysis for significant gastro-intestinal morbidity

Variable	Significant gastrointestinal morbidity		*P*-value
	Yes (n=10)	No (n=248)	
Age (yr)	71 (6)	64 (11)	<0.01
Parity	3 (2)	3 (2)	0.39
Vaginal parity	3 (2)	3 (2)	0.39
Body mass index (kg/m^2)	25.0 (6.5)	24.2 (3.0)	0.52
Menopause	9 (90.0)	222 (89.5)	0.96
Hypertension	5 (50.0)	110 (44.4)	0.73
Diabetes	0	35 (14.1)	0.20
Prior laparotomy	8 (80.0)	72 (29.0)	<0.01
Prior prolapse surgery	1 (10.0)	28 (11.3)	0.90
Preoperative POP-Q stage			0.06
II	0	23 (9.3)	
III	6 (60.0)	190 (76.6)	
IV	4 (40.0)	35 (14.1)	
ASA class			0.38
1	2 (20.0)	95 (38.3)	
2	8 (80.0)	145 (58.5)	
3	0	8 (3.2)	
Concomitant hysterectomy	7 (70.0)	191 (77.0)	0.61
Operative time (min)	228 (65)	190 (50)	0.06
Estimated blood loss (mL)	155 (210)	160 (160)	0.57
Transfusion	0	10 (4.0)	0.52

Data are presented median (interquartile range) or number (%).
POP-Q, pelvic organ prolapse quantification; ASA, American Society of Anesthesiologists.

Then, we performed additional analyses to find out risk factors for significant GI morbidity. Among variables considered as the potential risk factors, patient's age and prior laparotomy was significantly associated with the occurrence of significant GI morbidity (Table 3). By multivariable logistic regression analysis, age (odds ratio [OR], 1.14; 95% confidence interval [CI], 1.01–1.27; *P*=0.03) and prior laparotomy (OR, 6.82; 95% CI, 1.37–34.07; *P*=0.02) were found as independent risk factors for significant GI morbidity.

Discussion

The objective of this study was to assess the incidence and risk factors of significant GI morbidity that required a prolonged initial hospitalization, readmission, or reoperation after laparotomic SCP. We observed significant GI morbidity in 4% of our study cohort. In addition, we identified patient's age and prior laparotomy as significant risk factors associated with the occurrence of significant GI morbidity.

Most of significant GI morbidity identified in our study was postoperative ileus, which accounts for 90%. Postoperative ileus is defined as transient impairment of bowel mobility after abdominal or other surgery and is characterized by abdominal distension, lack of bowel sounds, and lack of passage of flatus and stool [13]. Postoperative ileus is accepted as an inevitable response to surgical trauma, however may contribute to delayed recovery and increase risk for the development of pulmonary complications and nosocomial infections because of a prolonged hospitalization [13-15]. Although patients with postoperative ileus in our study had a prolonged initial hospital stay or were readmitted for the treatment, they all improved with medical treatment and discharged without further problems. The rest of significant GI morbidity was small

bowel obstruction. There was one case with SBO, which was associated with panperitonitis due to microperforation unrecognized during laparotomic SCP with adhesiolysis. This case underwent reoperation at postoperative 5 days and improved after surgery. The overall incidence of significant GI morbidity in our study was similar to the result of the CARE trial. Our study indicates that the risk for significant GI morbidity in Korean patients undergoing SCP is not different from the risk in Caucasian.

A limited number of studies have sought to identify the risk factors with the development of GI complications in patients undergoing SCP. We found patient's age and prior laparotomy were significantly associated with the occurrence of significant GI morbidity, which is consistent with the results of previous studies [6,7]. The association of age and postoperative ileus has been also found in other abdominal surgeries [16,17]. The possible reasons for this association include decreased GI motility, decreased mobility and decreased tolerance to narcotics. On the other hand, the role of age as a risk factor predisposing to small bowel obstruction is not well defined. The Surgical and Clinical Adhesions Research-3 study found that patients younger than 60 years old undergoing a colorectal surgery has a higher risk for readmission directly related to adhesions compared with older counterparts [18]. On the contrary, the other investigators found that of all patients undergoing appendectomy, patients older than 70 years had a twofold higher risk for small bowel obstruction requiring surgery, compared with patients younger than 20 years old. Given the results of previous studies and the incidence, older age appears to increase the risk for significant postoperative ileus, rather than small bowel obstruction, in patients undergoing SCP. The reason why prior laparotomy is associated with significant GI morbidity remains unclear, but it may be due to a concomitant adhesiolysis during surgery. Adhesiolysis may produce an iatrogenic bowel injury and inflammatory response, and therefore contribute to prolonged postoperative ileus and small bowel obstruction [13,19].

Our study included patients who underwent laparotomic SCP, and therefore the results cannot be applied to those undergoing laparoscopic SCP. Favorable outcomes of laparoscopic procedures were observed in surgeries for different indications with regard to postoperative GI morbidity [20,21]. Compared with open procedures, laparoscopic procedures have the theoretical advantage of decreased tissue trauma. And it has been found that patients undergoing laparoscopic colon resection have lower levels of systemic cytokines after surgery compared with those who had open procedures [22]. Although it is unknown that the same benefit of laparoscopic approach can be applied to SCP, a recent paper evaluating GI complications after laparoscopic SCP showed low rates of postoperative ileus or small bowel obstruction [7]. A prospective, randomized trial evaluating whether laparoscopic SCP may reduce the risk of significant GI morbidity compared with laparotomic SCP is warranted.

The strength of our study is that it included the large number of cases. And a skilled, high volume surgeon operated every patient, which limited a potential confounding effect by the surgeon's skill. Limitations of our study include its retrospective nature. Because events may have occurred that were not documented in the medical records. Also, our study is based on relatively short-term follow-up and may underestimate the incidence of significant GI morbidity. In a large series of patients with small bowel obstruction, the median time interval between initial operation and small bowel obstruction was 5.3 years (range, 1 month to more than 20 years) [23]. A long-term, prospective study with large population will be needed to obtain better information.

In conclusion, our study shows that one in 25 women after SCP experienced significant GI morbidity. Particularly, women with older age and prior laparotomy have a higher risk for significant GI morbidity. This data will aid preoperative counseling for Korean POP patients undergoing SCP.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

References

1. Subak LL, Waetjen LE, van den Eeden S, Thom DH, Vittinghoff E, Brown JS. Cost of pelvic organ prolapse surgery in the United States. Obstet Gynecol 2001;98:646-51.
2. Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstet Gynecol 1997;89:501-6.

3. Wu JM, Hundley AF, Fulton RG, Myers ER. Forecasting the prevalence of pelvic floor disorders in U.S. Women: 2010 to 2050. Obstet Gynecol 2009;114:1278-83.
4. Maher C, Feiner B, Baessler K, Schmid C. Surgical management of pelvic organ prolapse in women. Cochrane Database Syst Rev 2013;4:CD004014.
5. Nygaard IE, McCreery R, Brubaker L, Connolly A, Cundiff G, Weber AM, et al. Abdominal sacrocolpopexy: a comprehensive review. Obstet Gynecol 2004;104:805-23.
6. Whitehead WE, Bradley CS, Brown MB, Brubaker L, Gutman RE, Varner RE, et al. Gastrointestinal complications following abdominal sacrocolpopexy for advanced pelvic organ prolapse. Am J Obstet Gynecol 2007;197:78.e1-7.
7. Warner WB, Vora S, Alonge A, Welgoss JA, Hurtado EA, von Pechmann WS. Intraoperative and postoperative gastrointestinal complications associated with laparoscopic sacrocolpopexy. Female Pelvic Med Reconstr Surg 2012;18:321-4.
8. Curry WT Jr, Carter BS, Barker FG 2nd. Racial, ethnic, and socioeconomic disparities in patient outcomes after craniotomy for tumor in adult patients in the United States, 1988-2004. Neurosurgery 2010;66:427-37.
9. Mayberry RM, Mili F, Ofili E. Racial and ethnic differences in access to medical care. Med Care Res Rev 2000;57 Suppl 1:108-45.
10. Oh-Park M, McGinn A, Lipsitz E, Thomas M, Zonszein J. Racial disparity in amputation-free survival after infrainguinal bypass procedure: contribution of socioeconomic status. Am J Phys Med Rehabil 2009;88:986-94.
11. Kirby JB, Taliaferro G, Zuvekas SH. Explaining racial and ethnic disparities in health care. Med Care 2006;44(5 Suppl):I64-72.
12. Jeon MJ, Moon YJ, Jung HJ, Lim KJ, Yang HI, Kim SK, et al. A long-term treatment outcome of abdominal sacrocolpopexy. Yonsei Med J 2009;50:807-13.
13. Holte K, Kehlet H. Postoperative ileus: a preventable event. Br J Surg 2000;87:1480-93.
14. Ferraz AA, Cowles VE, Condon RE, Carilli S, Ezberci F, Frantzides CT, et al. Nonopioid analgesics shorten the duration of postoperative ileus. Am Surg 1995;61:1079-83.
15. Ogilvy AJ, Smith G. The gastrointestinal tract after anaesthesia. Eur J Anaesthesiol Suppl 1995;10:35-42.
16. Svatek RS, Fisher MB, Williams MB, Matin SF, Kamat AM, Grossman HB, et al. Age and body mass index are independent risk factors for the development of postoperative paralytic ileus after radical cystectomy. Urology 2010;76:1419-24.
17. Grosso G, Biondi A, Marventano S, Mistretta A, Calabrese G, Basile F. Major postoperative complications and survival for colon cancer elderly patients. BMC Surg 2012;12 Suppl 1:S20.
18. Parker MC, Wilson MS, Menzies D, Sunderland G, Clark DN, Knight AD, et al. The SCAR-3 study: 5-year adhesion-related readmission risk following lower abdominal surgical procedures. Colorectal Dis 2005;7:551-8.
19. Dite P, Lata J, Novotny I. Intestinal obstruction and perforation: the role of the gastroenterologist. Dig Dis 2003;21:63-7.
20. Schwenk W, Bohm B, Haase O, Junghans T, Muller JM. Laparoscopic versus conventional colorectal resection: a prospective randomised study of postoperative ileus and early postoperative feeding. Langenbecks Arch Surg 1998;383:49-55.
21. Barmparas G, Branco BC, Schnuriger B, Lam L, Inaba K, Demetriades D. The incidence and risk factors of post-laparotomy adhesive small bowel obstruction. J Gastrointest Surg 2010;14:1619-28.
22. Leung KL, Lai PB, Ho RL, Meng WC, Yiu RY, Lee JF, et al. Systemic cytokine response after laparoscopic-assisted resection of rectosigmoid carcinoma: a prospective randomized trial. Ann Surg 2000;231:506-11.
23. Al-Took S, Platt R, Tulandi T. Adhesion-related small-bowel obstruction after gynecologic operations. Am J Obstet Gynecol 1999;180(2 Pt 1):313-5.