



Cohort Study

Laparoscopic sacrocolpopexy versus open abdominal sacrocolpopexy for pelvic organ prolapse repair: A retrospective cohort study

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ARTICLE INFO

Keywords:

Pelvic organ prolapse
Sacrocolpopexy
Sacral colpopexy
Hysterectomy

ABSTRACT

Introduction: Pelvic organ prolapse (POP) is a progressive herniation of the pelvic organs through the urogenital diaphragm and commonly leads to vaginal bulge. Sacrocolpopexy is a procedure that surgically corrects POP and can be performed as open abdominal surgery or laparoscopic surgery. This study was performed to compare the therapeutic efficacies of laparoscopic and abdominal sacrocolpopexy with hysterectomy.

Methods: The medical records of 105 patients who had undergone laparoscopic or open abdominal sacrocolpopexy with hysterectomy at Jeju National University Hospital were retrospectively reviewed. We compared the basic characteristics and clinical outcomes of these two groups of patients.

Results: No significant difference was observed between the characteristics of the patients in the abdominal-approach group and the laparoscopic-approach group. The laparoscopic-approach group had a lower intraoperative estimated blood loss (177.8 vs. 89.3 mL, $P < 0.001$) and a shorter operative time (132.0 vs. 112.3 min, $P < 0.001$) than the abdominal-approach group. The complication rates of the two groups were not significantly different.

Conclusion: The results of our study favor the use of a laparoscopic approach for sacrocolpopexy with hysterectomy. The less invasive method leads to less blood loss and a shorter operative time than an open approach, while maintaining a comparable rate of complications.

1. Introduction

Pelvic organ prolapse (POP) is a progressive herniation of the pelvic organs through the urogenital diaphragm and commonly leads to vaginal bulge [1]. POP is a common phenomenon such that the lifetime risk of a woman undergoing POP-related surgery is as high as 11% [2]. Sacrocolpopexy is a procedure that surgically corrects POP via the use of mesh bands to hold the vagina in the correct anatomical position. This procedure can be performed after a hysterectomy to treat uterine prolapse and provide long-term support to the vagina.

Sacrocolpopexy has traditionally been performed as open abdominal surgery. Abdominal sacrocolpopexy has been widely known as the gold standard procedure for treating apical vaginal prolapse. However, because of the development of laparoscopic surgery, laparoscopic sacrocolpopexy has become a popular alternative to the open abdominal approach [3]. Furthermore, the laparoscopic approach is considered

superior to the open abdominal approach in terms of blood loss, length of hospital stay, and risk of postoperative ileus. The therapeutic effect of the laparoscopic approach is better than that of the abdominal approach [4].

Several studies have compared the laparoscopic approach with the abdominal approach to treating apical vaginal prolapse. Three randomized controlled trials (RCTs) and one retrospective study compared laparoscopic and abdominal sacrocolpopexy [5–8]. Two of the RCTs and the retrospective study focused on patients with vault prolapse who had previously undergone a hysterectomy [5,6,8]. The other RCT studied heterogeneous experimental groups that included patients with vault prolapse or pelvic organ prolapse [7] and compared abdominal-approach with laparoscopic-approach sacrocolpopexy with or without hysterectomy. In this study, we aimed to compare the therapeutic effects of laparoscopic and open abdominal sacrocolpopexy on patients who underwent a hysterectomy.

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<https://doi.org/10.1016/j.amsu.2022.103852>

Received 20 March 2022; Received in revised form 19 May 2022; Accepted 22 May 2022

Available online 24 May 2022

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2. Materials and methods

We conducted a retrospective study comparing open abdominal sacrocolpopexy with laparoscopic sacrocolpopexy by collecting the medical records of all patients who had undergone sacrocolpopexy at Jeju National University Hospital from July 2008 to December 2017. Of the 183 sacrocolpopexy operations performed, we selected the 120 cases of one gynecologic surgeon. Patients who had undergone sacrocolpopexy for vault prolapse were excluded, leaving 105 patients for inclusion. Forty-one patients underwent an open abdominal sacrocolpopexy with hysterectomy and 64 underwent a laparoscopic sacrocolpopexy with hysterectomy. We collected and compared the clinical data of the patients, including age, body weight, height, menopausal status, obstetric history, operative time, estimated blood loss during surgery, preoperative hemoglobin level, preoperative Pelvic Organ Prolapse Quantification System rating (POP-Q), and postoperative complications (such as fever, mesh complications, hernia, hematoma formation, wound dehiscence, recurrence of vault prolapse, and wound infection). Postoperative fever is considered a complication when it starts 24 h or later after surgery. The Institutional Review Board of the Jeju National University Hospital approved this retrospective study (IRB File No. 2019-01-005). Patient consent was waived by the Institutional Review Board because we used a retrospective chart review to collect patient data.

Because the same surgeon operated on all the patients, perioperative treatment was almost the same throughout. All patients underwent an abdominal or a laparoscopic hysterectomy concurrently with sacrocolpopexy. A homemade polypropylene mesh graft was used and a standard surgical procedure was followed.

There were several notable differences between the abdominal-approach and laparoscopic-approach groups. Abdominal surgery was performed through a low midline or Pfannenstiel incision with the patient in the supine position. Laparoscopic surgery was performed with the patient in the lithotomy position and four trocars: one for the scope (11 mm) and three side trocars (one 11 mm and two 5 mm). One important difference between the laparoscopic-approach group and the abdominal-approach group was the day on which stitching was performed. Patients in the laparoscopic-approach group were stitched on the sixth postoperative day while those in the abdominal-approach group received half stitches on the sixth postoperative day and full stitches on the seventh postoperative day. All patients remained in the hospital until full stitching was completed. The mean follow-up period was 5 years with the shortest follow-up period of 6 months.

We analyzed the collected data using SPSS ver. 20 (IBM Corp., Armonk, NY, USA). To examine the differences between the groups, we used an unpaired *t*-test or the Mann–Whitney *U* test for continuous variables and a χ^2 test for dichotomous variables. Statistical significance was set at $P < 0.05$. For dichotomous outcomes, we calculated the odds ratios and 95% confidence intervals. Our study has been reported in line with the STROCSS criteria [9].

3. Results

The overall characteristics of the patients in the two groups were similar, except for parity (Table 1). The mean parity of the abdominal-approach group was significantly higher than that of the laparoscopic-approach group (4.3 vs. 3.5, $P = 0.022$).

Of the 41 patients in the abdominal-approach group, 3 (7.3%) had a low midline incision and 38 (92.7%) had a Pfannenstiel incision.

The clinical outcomes of the two groups are presented in Table 2. The intraoperative estimated blood loss was significantly lower in the laparoscopic-approach group than in the abdominal-approach group (177.8 vs. 89.3 mL, $P < 0.001$). Operative time was shorter for the laparoscopic-approach group than for the abdominal-approach group (132.0 vs. 112.3 min, $P < 0.001$). However, the complication rates of the two groups were comparable (26.8% vs. 26.6%, $P = 0.976$). The

Table 1
Patient characteristics.

Characteristics	Abdominal sacrocolpopexy with hysterectomy (n = 41)	Laparoscopic sacrocolpopexy with hysterectomy (n = 64)	<i>P</i> value	OR (95% CI)
Age (years)	65.9 (48–87)	68.8 (50–88)	0.127	
Parity	4.3 (2–10)	3.5 (0–7)	0.022	
Underlying diseases	29 (71)	49 (76.6)	0.505	1.352 (0.557–3.282)
BMI (kg/m ²)	25.7 (21.6–31.1) (n = 38)	24.8 (17.8–33.7)	0.124	
Preoperative Hb (g/dL)	12.9 (10–15.2)	12.8 (11.0–15.0)	0.5	
Preoperative POP-Q			0.467	
Stage II	16 (39)	19 (29.7)		
Stage III	10 (24.4)	14 (21.9)		
Stage IV	15 (36.6)	31 (48.4)		
Postmenopause	38 (92.7)	61 (95.3)	0.676	0.623 (0.120–3.246)

OR, odds ratio; CI, confidence interval; Hb, hemoglobin; BMI, body mass index; POP-Q, Pelvic Organ Prolapse Quantification System.

Data are presented as mean (range) or number (%).

abdominal sacrocolpopexy with hysterectomy group had 11 patients with complications.

4. Discussion

We performed a retrospective study to compare the therapeutic efficacies of laparoscopic and abdominal sacrocolpopexy with hysterectomy for patients with POP. The basal characteristics of the abdominal-approach group and the laparoscopic-approach group were not significantly different. The laparoscopic-approach group had less intraoperative blood loss and a shorter operative time than did the abdominal-approach group. The complication rates were equivalent, but two patients in the abdominal-approach group had multiple complications.

Because all surgical procedures and perioperative care were performed by the same surgeon under the same conditions, the impact of other potential factors was minimized. In addition, we selected patients who had undergone sacrocolpopexy concurrently with a hysterectomy. Previous studies have shown that laparoscopic sacrocolpopexy is more effective for fixing vault prolapse than abdominal sacrocolpopexy. However, few studies have compared abdominal and laparoscopic sacrocolpopexy performed concurrently with hysterectomy.

In one study that did compare laparoscopic and abdominal sacrocolpopexy, Costantini et al. [7] included patients who underwent sacrocolpopexy with hysterectomy. A subset analysis of patients who underwent hysterectomy alone revealed no difference in the complication rates of the two groups. Intraoperative median blood loss was heavier and hospital stay was longer for the abdominal group than for the laparoscopic group, but the median operative time was longer for the laparoscopic group than for the abdominal group.

Coolen et al. [6] conducted an RCT that compared laparoscopic and abdominal sacrocolpopexy for vault prolapse. All patients had had a hysterectomy. There were no significant differences between the abdominal and laparoscopic groups with respect to the functional and anatomical outcomes. Furthermore, the laparoscopic sacrocolpopexy group had less blood loss and a shorter hospital stay than did the abdominal sacrocolpopexy group.

Freeman et al. [5] tested the clinical equivalence of open and laparoscopic sacrocolpopexy for treating vault prolapse using objective and subjective outcomes. Subjective outcomes at 1 year showed that 90% of the open group and 80% of the laparoscopic group were “much better.”

Table 2
Comparison of clinical outcomes.

Characteristics	Abdominal sacrocolpopexy with hysterectomy (n = 41)	Laparoscopic sacrocolpopexy with hysterectomy (n = 64)	P-value	OR (95% CI)
Estimated blood loss (mL)	177.8 (80–400)	89.3 (10–350)	<0.001	
Operative time (min)	132.0 (87–217)	112.3 (76–173)	<0.001	
Complications	11 (26.8)	17 (26.6)	0.976	0.986 (0.407–2.393)
Stump inflammation	6 (42.8)	4 (23.5)		
Postoperative fever	5 (35.7)	10 (58.8)		
Wound problem	1 (7.1)	0 (0)		
Recurrence	1 (7.1)	0 (0)		
Micturition disorder	1 (7.1)	1 (5.8)		
Others	0 (0)	2 (11.7)		

OR, odds ratio; CI, confidence interval.

Data are presented as mean (range) or number (%).

Blood loss, hemoglobin, and length of hospital stay were better for the laparoscopic group than for the open group.

The only parameter that was different between the abdominal-approach group and the laparoscopic-approach group in this study was parity, a risk factor that contributes to the development of pelvic organ prolapse [10]. One study showed that there was a strong, almost linear association between parity and the risk of surgery for prolapse in women who had only vaginal deliveries [11]. In our study, most patients had only vaginal deliveries, and the parity of the abdominal group was greater than that of the laparoscopic group. However, the preoperative POP-Q stages of both groups were statistically equivalent. Therefore, we believe that the difference in parity between the two groups had a minimal effect on our conclusions.

A laparoscopic hysterectomy is widely known to be better than an abdominal hysterectomy with respect to estimated blood loss, perioperative complications, and length of hospital stay [12]. Historically, it has been thought that a laparoscopic hysterectomy takes longer to perform than an open hysterectomy [13]. However, a recent study showed that laparoscopic hysterectomy had a significantly lower mean operative time, but surgeon experience and learning curve should be taken into account [14]. In our study, the laparoscopic-approach group had a lower amount of blood loss and shorter operative time than the abdominal-approach group.

The complication rates of the two groups were not significantly different. However, two patients in the abdominal-approach group had multiple complications: one had micturition disorder and stump inflammation and the other had postoperative fever, stump inflammation, and recurrence. In the laparoscopic-approach group, most complications were stump inflammation and postoperative fever, which were mostly minor problems. Although the complication rates were similar, the complications of the abdominal-approach group were more severe.

Several limitations have merited consideration. First, as a retrospective study, patients were not randomly assigned to a surgical procedure, which meant that the choice of surgery might have been biased by the surgeon's preference based on the preoperative condition of the patient. However, we showed that the cohorts were well balanced before surgery. Second, information about preoperative POP-Q staging, including details about the POP-Q sites Aa, Ap, Ba, Bp, C, D, and TVL and about the prolapsed compartment, was lacking. Third, specific questionnaire was not used to assess subjective bulging symptoms or other disturbances related to prolapse and the level of patient satisfaction after surgery. Fourth, long term follow-up was not included in this study. Quality indicators of life, including urogenital symptoms, defecatory distress and sexual activity, and long term surgical complications can be tracked, and the two surgical methods can be compared in more diverse aspects.

5. Conclusion

In conclusion, when performed with hysterectomy, laparoscopic sacrocolpopexy has a lower estimated blood loss and shorter operative time than an abdominal sacrocolpopexy. No significant difference between the complication rates of the two groups was observed. However, the complications in the abdominal-approach group were more severe than those in the laparoscopic-approach group. Laparoscopic surgery is considered to be a safer surgical method for vaginal prolapse than open surgery. However, because of the limitations of our study, our findings should be interpreted with caution. For more definite answers on comparison, future prospective randomized controlled trials are needed.

Ethical approval

This retrospective study was approved by Institutional Review Board of Jeju National University Hospital (IRB File No. 2019-01-005).

Sources of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contributions

Eun Hye Cho: physician of patient, written the paper, correction of the paper.

Eun Seo Shin: written the paper, correction of the paper.

Sung Yob Kim: corresponding author. Written the paper, correction of the paper.

Registration of research studies

IRB file No. 2019-01-005.

Guarantor

Sung Yob Kim. Sung Yob Kim will be the guarantor and accepts full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish at this given time of submission.

Consent

All patients provided their written informed consent.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

The authors have no conflicts of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.103852>.

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