

# Evaluation of laparoscopic versus open sacrocolpopexy for vaginal vault prolapse – A study from a tertiary care center



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## ABSTRACT

**Background:** Post hysterectomy vault prolapse is a progressive herniation of the vaginal vault through the urogenital diaphragm and commonly leads to per vaginal bulge. Surgically, vault prolapse is corrected by sacrocolpopexy which can be done both as an open abdominal surgery and as a laparoscopic repair. **Aims and Objectives:** This study was performed to compare the therapeutic efficacies of laparoscopic and abdominal sacrocolpopexy. **Materials and Methods:** This study includes 50 cases of vault prolapsed who underwent hysterectomy previously, admitted in our institution and operated during January 2021–June 2022 for a period of 18 months with both open abdominal and laparoscopic sacrocolpopexy. We compared the basic characteristics, duration of surgery, post-operative stay, post-operative complications, and patient satisfaction between open and laparoscopic groups. **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 (187.8 vs. 90.3 mL,  $P < 0.001$ ) and a shorter operative time (148.0 vs. 115.3 min,  $P < 0.001$ ) than the abdominal-approach group. The complication rates of the two groups were not significantly different. **Conclusion:** Our Study is favorable for the use of laparoscopic approach over open abdominal surgery for treating cases of vault prolapse for sacrocolpopexy. The less invasive method leads to less blood loss and a shorter operative time than an open approach.

**Key words:** Sacrocolpopexy; Laparoscopy; Pelvic organ prolapse; Sacral colpopexy; Vault prolapse

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## INTRODUCTION

Pelvic organ prolapse (POP) is the descent of pelvic structures into the vagina due to ligament or muscular weakness. POP is subcategorized according to the compartment of descent. Cystocele characterizes anterior wall herniation, rectocele refers to the posterior vaginal wall descent, and vaginal vault prolapse (VVP) characterizes descent of the uterus, cervix, or apex of the vagina. They can occur either singly or in combination. Although the etiology of POP is multifactorial, there is a high correlation with pregnancy and vaginal delivery, which can lead to direct pelvic floor muscle and connective tissue injury.<sup>1</sup>

Vault prolapse is a progressive herniation of the vaginal vault through the urogenital diaphragm and commonly leads to vaginal bulge.<sup>2</sup> More than 40% of women aged 40 and older have POP.<sup>2</sup> The incidence of vault prolapses requiring surgery has benefits estimated to be 36/10,000 women years.<sup>3</sup> The risk of prolapse following hysterectomy is 5.5 times higher in women whose initial indication for hysterectomy was POP as opposed to other indications.<sup>4</sup> The number of women with a symptomatic POP who seek medical help is increasing.<sup>5</sup> VVP is often associated with other compartment defects (cystocele, rectocele, or enterocele), which makes it a challenging condition to treat.<sup>5</sup> There is a growing recognition that adequate

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support for the vaginal apex is an essential component of a durable surgical repair for women with advanced prolapse.<sup>4</sup> Due to the significant contribution of the apex to vaginal support, anterior and posterior vaginal repairs may fail unless the apex is adequately supported. Various surgeries that are now being performed for vault prolapse are posterior intravaginal sling plasty sacrospinous fixation, sacrocolpopexy with mesh (Laparoscopic or open) Mesh kit or inlay mesh, colpocleisis, and uterosacral plication (Vaginal or laparoscopic). Sacrocolpopexy is a procedure that surgically corrects POP through 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, due to the development of laparoscopic surgery, laparoscopic sacrocolpopexy has become a popular alternative to the open abdominal approach.<sup>4</sup> Furthermore, the laparoscopic approach is considered superior to the open abdominal approach in terms intraoperative and post-operative complications such as blood loss, length of hospital stay, and risk of post-operative ileus. The therapeutic effect of the laparoscopic approach is better than that of the abdominal approach.<sup>4</sup> 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.<sup>5-8</sup> Two of the RCTs and the retrospective study focused on patients with vault prolapse who had previously undergone a hysterectomy.<sup>5,6,8</sup> The other RCT studied heterogeneous experimental groups that included patients with vault prolapse or POP<sup>7</sup> and compared abdominal approach with laparoscopic approach sacrocolpopexy with or without hysterectomy. In this study, we tried to compare the therapeutic effects of laparoscopic and open abdominal sacrocolpopexy on patients who already underwent a hysterectomy.

## Aims and objectives

This study was performed to compare the therapeutic efficacies of laparoscopic and abdominal sacrocolpopexy.

## MATERIALS AND METHODS

We conducted a prospective study comparing open abdominal sacrocolpopexy with laparoscopic sacrocolpopexy by collecting the medical records of all patients who had undergone sacrocolpopexy at Department of Obstetrics and Gynecology, Government Mohan Kumaramangalam Medical College and Hospital, from January 2021 to June 2022. Of the 79 sacrocolpopexy operations performed, we selected the 50 cases of one urologic surgeon. Patient characteristics are shown in Table 1. Twenty-four patients underwent an open abdominal sacrocolpopexy and 26 underwent a laparoscopic sacrocolpopexy. We compared the clinical data of the patients, including age, body weight, height, menopausal status, obstetric history, operative time, estimated blood loss during surgery, pre-operative hemoglobin level, pre-operative POP Quantification System rating (POP-Q, and post-operative complications (such as fever, mesh complications, hernia, hematoma formation, wound dehiscence, recurrence of vault prolapse, and wound infection). Post-operative fever is considered a complication when it starts 24 h or later after surgery. Because the same surgeon operated on all the patients, perioperative treatment is almost the same throughout. All patients underwent an abdominal or a laparoscopic sacrocolpopexy. An ETHICON polypropylene mesh (15×7 cm) was cut and made into a Y shaped mesh and used for all cases. Moreover, a standard surgical procedure was followed. Central limb of the Y-shaped mesh was fixed to sacral promontory and other two limbs are fixed to anterior and posterior vaginal walls, respectively. 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

**Table 1: Patient characteristics**

Characteristics	Abdominal sacrocolpopexy (n=24)	Laparoscopic sacrocolpopexy (n=26)	P-value	OR (95% CI)
Age	66.7 (45–86)	67.8 (49–88)	0.126	
Parity	4.2 (2–10)	4.1 (1–8)	0.129	
Underlying diseases	11 (45.8)	9 (34.6)	0.515	1.342 (0.556–3.018)
BMI (kg/m <sup>2</sup> )	26.1 (21.7–31.5)	25.8 (18.8–34.7)	0.124	
Pre-operative Hb (g/dL)	12.4 (11–14.9)	12.6 (10.8–15.0)	0.512	
Pre-operative POP-Q				
Stage II	5 (20.8)	7 (29.1)		
Stage III	4 (16.6)	4 (15.3)		
Stage IV	15 (62.5)	17 (65.5)		

for the scope (10 mm) and three side trocars (one 10 mm and two 5 mm). For all the cases, general anesthesia with epidural analgesia was given for good muscle relaxation and for post-operative pain management. To examine the differences between the groups, we used an unpaired t-test or the Mann–Whitney U-test for continuous variables and a  $\chi^2$  test for dichotomous variables. Statistical significance was set at  $P < 0.05$ .

## RESULTS

The overall characteristics of the patients in both groups were similar. Of the 25 patients in abdominal approach group, 6 (12%) had a low midline incision and 19 (38%) had a Pfannenstiel incision. The basic characteristics of the patients are shown in Table 1. The clinical outcomes of the two groups are presented in Sections I and II of Table 2. The intraoperative estimated blood loss was significantly lower in the laparoscopic – approach group than in the abdominal – approach group (187.8 ml vs. 90.3 mL,  $P < 0.001$ ). Operative time was lesser for the laparoscopic approach group than for the open abdominal surgery group (140.0 min vs. 115.7 min,  $P < 0.001$ ). However, the complication rates of both groups are comparable (32% vs. 20%). Eight patients in the abdominal group had complications which are more severe. Five patients had complications in the laparoscopic group which is mostly minor (Table 2).

## DISCUSSION

We conducted a prospective study to compare the therapeutic efficacies of laparoscopic and abdominal sacrocolpopexy for patients with vault prolapse with previous history of hysterectomy. We recorded all the data of patients from the time of admission in our center until discharge. The basic characteristics of the abdominal approach group and the laparoscopic approach group were not significantly different from each other. The laparoscopic group had less intraoperative blood loss and a shorter operative time than the abdominal group. Number of complications such as

increased operative time, increased requirement of post-operative analgesia, and delayed post-operative recovery are seen in abdominal group. All surgical procedures are performed by the same surgeon under the same conditions, with proper perioperative care. The impact of other potential factors was minimized. The previous studies have shown that laparoscopic sacrocolpopexy is more effective for fixing vault prolapse than abdominal sacrocolpopexy. In one study that did compare laparoscopic and abdominal sacrocolpopexy, Costantini et al.,<sup>7</sup> included patients who underwent sacrocolpopexy with hysterectomy. A subset analysis of patients who are managed with hysterectomy alone showed no difference in the complication rates of the two groups. Intraoperative median blood loss was high 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.,<sup>6</sup> 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 the abdominal sacrocolpopexy group. Freeman et al.,<sup>5</sup> tested the clinical equivalence of open and laparoscopic sacrocolpopexy for treating vault prolapse using objective and outcomes. Subjective outcomes at 1 month showed that 90% of both the groups felt “much better after surgery.” 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 POP.<sup>9</sup> 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.<sup>10</sup> In our study, the pre-operative POP-Q stages of both groups were statistically equivalent. A laparoscopic hysterectomy is widely known to be better than an abdominal hysterectomy with respect to estimated blood loss, perioperative complications, and length of

**Table 2: Comparison of outcomes of open abdominal and laparoscopic sacrocolpopexy**

I. Characteristics	Open abdominal Sacrocolpopexy n=24	Laparoscopic sacrocolpopexy n=26	P-value	OR (95% confidence interval)
Operative time	141 min (90–215)	115.3 min (78–174)	<0.001	
Estimated blood loss	187.8 ml (79–401)	90.3 ml (81–176)	<0.001	
II. Post-operative complications	8 (32)	5 (20)	0.975	(0.417–2.493)
Wound complications	3 (12)	0		
Stump inflammation	1 (4)	2 (7.6)		
Post-operative fever	2 (8)	3 (11.5)		
Micturition disorders	2 (8)	0		
Others	0	0		

hospital stay.<sup>11</sup> Historically, it has been thought that a laparoscopic hysterectomy takes longer to perform than an open hysterectomy.<sup>12</sup> 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.<sup>13</sup> A recent study by Campagna et al.,<sup>14</sup> shows the efficacy of laparoscopic sacrocolpopexy in managing POP recurrence in patients with the previous history of trans vaginal polypropylene mesh surgery and another study by the latter shows the effectiveness of laparoscopic sacrocolpopexy with or without supracervical hysterectomy in previously non-hysterectomized patients with vault prolapse.<sup>15</sup> Morciano et al.,<sup>16</sup> in another recent study, concluded that continuous suturing is advantageous and better than multiple interrupted sutures for anterior and posterior vaginal mesh fixation during sacrocolpopexy. 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, eight patients in the abdominal approach group had multiple complications: Three had wound complications two which had micturition disorder and stump inflammation and the one had post-operative fever. In the laparoscopic approach group, most complications were stump inflammation and post-operative fever, which were mostly minor problems. Although the complication rates were similar, the complications of the abdominal approach group were more severe.

### Limitations of the study

However, our study is not without limitations First, as a prospective study sample size was not sufficient, and patients were not randomized which meant that the choice of surgery might have been biased by the surgeon's preference based on the pre-operative condition of the patient. However, we showed that the cohorts were well balanced before surgery. Second, information about pre-operative POP-Q staging, including details about the POP-Q sites and total vaginal length and details 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 must be tracked.

### CONCLUSION

With this study, we conclude that laparoscopic sacrocolpopexy is more efficient than open abdominal

approach in terms of less blood loss, shorter hospital stay, early recovery after surgery, and less post-operative complications. The complications in open abdominal group are more severe than in laparoscopic group. Hence, laparoscopic approach for sacrocolpopexy can be considered as a safer and better approach. However, more definitive studies such as RCT's and meta-analysis with larger sample sizes are still needed for concrete evidence.

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**SP**- Concept and design of the study, prepared first draft of manuscript; **RR**- Interpreted the results; reviewed the literature and manuscript preparation, Publication work; **RS and SG**- Concept, coordination, statistical analysis and interpretation, preparation of manuscript and revision of the manuscript.

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