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Perioperative Complications and Short-Term Outcomes in Abdominal Laparoscopic Versus Vaginal Vault Prolapse Surgeries: A Comparative Analysis

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ABSTRACT
Aim of this study was to perform comparative analysis of perioperative complications and short-term outcomes in abdominal laparoscopic versus vaginal vault prolapse surgeries. A total of 35 female patients were selected through convenient sampling, all of whom were diagnosed with symptomatic stage 2 or greater apical prolapse according to the Pelvic Organ Prolapse Quantification (POP-Q) system and subsequently underwent reconstructive surgery. The duration of hospital stay was also significantly longer for patients who underwent vaginal vault prolapse surgery (5.28±1.23 days) compared to those who had abdominal laparoscopic surgery (3.59±0.51 days), with a p-value of <0.0001. At the 6-month follow-up, the vaginal vault prolapse group reported complications, such as dyspareunia, blood transfusion, urinary tract infections, postvoid urinary retention and stress urinary incontinence, compared to the abdominal laparoscopic group, where 76.5% of patients had no complications. The study highlights the differences in perioperative complications and short-term outcomes between abdominal laparoscopic and vaginal vault prolapse surgeries. While both approaches have their merits, the choice of surgery should be individualized, taking into account the patient's overall health, prolapse severity and specific anatomical considerations.

INTRODUCTION

Vault prolapse is a condition characterized by the descent of the vaginal apex following a hysterectomy, significantly impacting a woman's quality of life, often leading to issues such as urinary problems, anorectal dysfunction and sexual difficulties. These complications can severely affect daily living and overall well-being [1-2]. Recent data suggest that the incidence is 11.6%. The management of vault prolapse presents a complex challenge, with surgical intervention often necessary to restore pelvic anatomy and function. Two prominent surgical approaches-abdominal laparoscopic vault prolapse surgery and vaginal vault prolapse surgery-are widely employed in clinical practice[3].

The choice of surgery is influenced by various factors, including the severity of prolapse, patient age and comorbidities, presence/absence of bowel or urinary symptoms, level of physical and sexual activity, previous surgery, total vaginal lengthand surgeon expertise. Both surgeries differ significantly in their techniques, risks and outcomes[4]. Abdominal laparoscopic vault prolapse surgery is a minimally invasive technique that has gained popularity due to its advantages, such as reduced postoperative pain, shorter hospital stays, and quicker recovery times. Laparoscopic methods include Sacrocolpopexy (suspension of the apex from the sacral promontory using a mesh) or Pectopexy (suspending the vault by a mesh by fixing the bilateral mesh ends to the pectineal ligaments)[5-6].

On the other hand, vaginalvault prolapse surgery by sacrospinous fixation has been used since generations for the correction of a prolapsed vault. It involves attaching the top of vagina/ cervix to the sacrospinous ligament by a stitch. The vaginal approach offers direct access to the prolapsed structures, potentially reducing the operative time and avoiding abdominal incisions[7-8]. However, despite the varying benefits of both surgeries, perioperative complications are concerns that can affect patient outcomes. This study seeks to fill this gap by conducting an analysis of perioperative complications and short-term clinical outcomes associated with abdominal laparoscopic vault prolapse surgery compared to vaginal vault prolapse surgery providing a comprehensive understanding of the efficacy and safety profiles of the two techniques.

MATERIALS AND METHODS

The present prospective, observational study was conducted in the Department of Obstetrics and Gynaecology at SAMC and PGI, Indore, over a one-year period, following approval from the Institutional Ethics Committee. A total of 35 female patients were selected through convenient sampling, all of whom were diagnosed with symptomatic stage 2 or greater apical prolapse according to the Pelvic Organ Prolapse Quantification (POP-Q) system and subsequently underwent reconstructive surgery. Patients who were medically unfit for surgery, had contraindications for surgical intervention, or were lost to follow-up during the 6-month postoperative period were excluded from the study. Demographic data, including age at the time of surgery, parity, menopausal status, previous pelvic surgeries (e.g., hysterectomy, pelvic floor repair) and comorbidities, were collected through interpersonal interviews and general examinations.

Preoperative assessments included a detailed urogynaecology history, a comprehensive physical examination, urine analysis, and a cough stress test. To evaluate the influence of pressure and the potential for over- or under-correction, patients were examined in both lying and sitting positions. Women presenting with vaginal erosion were prescribed vaginal oestrogen therapy for 2-3 weeks prior to surgery. Patients underwent either abdominal laparoscopic vault prolapse surgery or vaginal vault prolapse surgery, as determined by clinical indications.

Perioperative complications were defined as any complications occurring during surgery or within 6–10 weeks postoperatively. Short-term outcomes were assessed over a 6-month period following surgery. Patients identified as being at risk for thromboembolic events received antithrombotic prophylaxis with low-molecular-weight heparin, while all patients were administered antibiotic prophylaxis preoperatively. Estimated blood loss was calculated by comparing preoperative and postoperative haemoglobin levels. The duration of hospital stay was recorded from the time of admission until discharge. The urethral catheter was routinely removed on the second postoperative day.

All patients attended at least two follow-up examinations within the 6-month postoperative period, during which they were assessed for subjective outcomes related to pelvic floor dysfunction symptoms and for anatomical outcomes using POP-Q vaginal examination.

Statistical analysis was performed using SPSS version 25.0 (trial version). Continuous data were expressed as means with standard deviations, while categorical data were represented as frequencies and percentages. Appropriate statistical tests were applied to evaluate associations, with a p-value of <0.05 considered statistically significant at a 95% confidence interval.

RESULTS AND DISCUSSIONS

The baseline characteristics of the study participants (n=35) have been depicted in Figure 1.

Majority (77.1%) were between 51-70 years old. Most of the study participants (31.4%) had a parity of 3. Comorbidities were present in 60% of the study population; hypertension being the most common (34.3%) followed by type-2 diabetes mellitus (17.1%), hypothyroidism (14.3%), hyperthyroidism (5.7%), VP

shunt in situ (2.9%), coronary artery disease (2.9%) and pancytopenia (2.9%). Third degree prolapse was seen in majority (62.9%) and a pre-op POP-Q score of 3 was observed in 65.7% of the study population.

A total of 18 patients (51.4%) underwent sacrospinous fixation (vaginal vault prolapse repair), out which 9 patients had associated surgeries [cystocele repair (n=6); posterior perineorrhaphy or pelvic floor repair (n=4); while 2 patients underwent all the three procedures] in the same sitting. 17 patients were treated for vault prolapse by abdominal laparoscopic procedures (sacrocolpopexy/ pectopexy). Out of these, 3 patients underwent associated surgeries in the same sitting [bilateral salpingectomy (n=1), anterior colporrhaphy (n=1) and pelvic floor repair (n=1)]. (Table 1)

(Table 2) compares the baseline characteristics of patients who underwent abdominal laparoscopic vault prolapse surgery versus those who had vaginal vault prolapse surgery. The mean age of patients in the abdominal laparoscopic group was slightly higher (58.88±6.76 years) compared to the vaginal vault prolapse group (55.89±7.50 years), although this difference was not statistically significant (p=0.225). Parity distribution showed a significant difference (p=0.0065), with a higher number of patients having higher parity in the vaginal surgery group. Comorbidities were slightly more prevalent in the abdominal laparoscopic group (64.7%) compared to the vaginal group (55.6%), but this difference was not statistically significant (p=0.581).

(Table 3) details the perioperative complications and short-term outcomes among the two groups. The mean difference between preoperative and postoperative hemoglobin levels was significantly greater in the vaginal group (1.71±0.71) than in the abdominal laparoscopic group (0.59±0.51), indicating higher blood loss in the former (p<0.0001). The duration of hospital stay was also significantly longer for patients who underwent vaginal vault prolapse surgery (5.28±1.23 days) compared to those who had abdominal laparoscopic surgery (3.59±0.51 days), with a p-value of < 0.0001. At the 6-month follow-up, the vaginal vault prolapse group reported complications, such as dyspareunia, blood transfusion, urinary tract infections, postvoid urinary retention and stress urinary incontinence, compared to the abdominal laparoscopic group, where 76.5% of patients had no complications. The difference in POP-Q scores post-surgery was also significantly greater in the vaginal group (2.39±0.70) than in the abdominal group (0.18±0.64), suggesting better anatomical correction in the former (p<0.0001).

The present study aimed to compare perioperative complications and short-term clinical outcomes in patients undergoing abdominal laparoscopic vault prolapse surgery versus vaginal vault prolapse surgery. Vault prolapse is a significant postoperative complication following hysterectomy, with an incidence varying widely across different studies. The management of this condition is complex, necessitating surgical interventions that restore pelvic anatomy and function.

The study included 35 patients diagnosed with symptomatic stage 2 or greater apical prolapse, who underwent either abdominal laparoscopic or vaginal vault prolapse surgery. The demographic data showed that the majority of patients were between 51-70 years old, with a mean age slightly higher in the abdominal laparoscopic surgery group (58.88±6.76 years) compared to vaginal surgery group (55.89±7.50 years). Demirci[4] compared abdominal sacrocolpopexy and sacrospinous ligament fixation and reported a higher mean age in the latter group (58.2±15.60 years), similar to our finding. Marcickiewicz[9] also reported higher mean age (66 years) among patients of vaginal sacrospinousfixation compared to laparoscopic sacrocolpopexy (58 years). Similarly, van Oudheusden[10], reported a mean age of 66 years in the vaginal sacrospinous fixation group vs 61.7 years in the laparoscopic sacrocolpopexy group. Parity distribution, in the present study, was significantly different between the two groups, with a higher number of patients having greater parity in the vaginal surgery group. Similar finding was observed by Demirci[4] with mean parity of 4.3±2.5 in the sacrospinous ligament fixation group compared to the abdominal sacrocolpopexy group (3.9±2.7). Marcickiewicz[9] and van Oudheusden[10] reported no such difference.

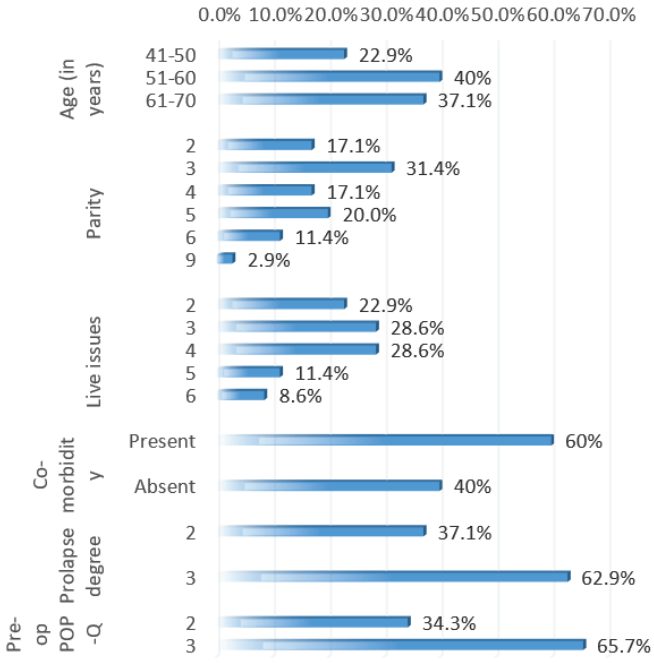

Fig. 1: Baseline Characteristics of Study Participants

Table 1: Distribution of patients based on the type of surgery undergone

Surgery	Frequency (n)	Percentage (%)
Abdominal laparoscopic vault prolapse surgery	17	48.6
Vaginal vault prolapse surgery	18	51.4

Table 2: Baseline characteristics of the two groups compared

Baseline data		Abdominal laparoscopic vault prolapse surgery	Vaginal vault prolapse surgery	p-value
Age (in years) Mean±S.D		58.88±6.76	55.89±7.50	0.225
Parity	2	5 (29.4%)	1 (5.5%)	0.0065*
	3	4 (23.5%)	7 (38.9%)	
	4	4 (23.5%)	2 (11.1%)	
	5	2 (11.8%)	5 (27.8%)	
	6	1 (5.9%)	3 (16.7%)	
	9	1 (5.9%)	0 (0.0%)	
Live	2	5 (29.4%)	3 (16.7%)	0.027
	3	4 (23.5%)	6 (33.3%)	
	4	5 (29.4%)	5 (27.8%)	
	5	2 (11.8%)	2 (11.1%)	
	6	1 (5.9%)	2 (11.1%)	
Preop POP-Q	2	7 (41.2%)	5 (27.8%)	0.401
	3	10 (58.8%)	13 (72.2%)	
Comorbidities n (%)	Present	11 (64.7%)	10 (55.6%)	0.581
	Absent	6 (35.3%)	8 (44.4%)	

Table-3: Perioperative complications and short-term outcomes among the two groups

Parameter		Abdominal laparoscopic vault prolapse surgery (Mean±S.D)	Vaginal vault prolapse surgery (Mean±S.D)	p-value
Difference between pre-operative and post-operative Hemoglobin (Mean±S.D)		0.59±0.51	1.71±0.71	<0.0001*
Duration of Hospital stay Mean±S.D		3.59±0.51	5.28±1.23	<0.0001*
Complications at 6-month follow-up	Dyspareunia	4 (23.5%)	2 (11.1%)	
	Blood transfusion	0	3 (16.7%)	
	UTI	0	2 (11.1%)	
	Postvoid urinary retention	0	2 (11.1%)	0.0017*
	Stress urinary incontinence	0	1 (5.6%)	
	None	13 (76.5%)	8 (44.4%)	
Difference between pre-operative and post-operative POP-Q (Mean±S.D)		0.18±0.64	2.39±0.70	<0.0001*

The perioperative outcomes, in the present study, revealed notable differences between the two surgical approaches. Patients undergoing vaginal vault prolapse surgery experienced significantly greater blood loss compared to those undergoing abdominal laparoscopic surgery. This was evident from the mean difference in preoperative and postoperative haemoglobin levels, which was higher in the vaginal group (p-value<0.0001). Since laparoscopic procedures required lesser dissection and all the dissection that did occur through the procedure was under visualization sparing major blood vessels on the way, this significant difference was observed. Also, no patients undergoing laparoscopic procedures required blood transfusion in the postoperative period. Similar finding was reported by van Oudheusden[10] with an estimated blood loss of 141.3±48.5 ml in vaginal sacrospinous fixation group compared to 35.2±5.7 ml loss in laparoscopic sacrocolpopexy group. However, in contrast to our study, Marcickiewicz[9] observed a comparable blood loss in both the surgeries. Zhang[11] also found no difference in haemorrhage between both groups.

Hospital stay duration was also significantly longer in the vaginal surgery group, which could be linked to the greater perioperative complications and the need for more intensive postoperative care. Patients in the abdominal laparoscopic group benefited from the minimally invasive nature of the surgery, which typically involves smaller incisions, less tissue disruption, and faster recovery times. van Oudheusden[10] reported a comparable mean hospital stay duration of 2.2±0.1 days in laparoscopic group and 2.1±0.1 days in vaginal sacrospinous fixation group.

At the 6-month follow-up, in the present study, the vaginal vault prolapse surgery group reported a higher incidence of complications such as dyspareunia, urinary tract infections, postvoid urinary retention and stress urinary incontinence. These complications could be associated with the anatomical and functional changes induced by the vaginal approach, which might impact pelvic floor dynamics and urinary function. In contrast, the majority of patients in the abdominal laparoscopic group reported no complications, underscoring the safety and efficacy of this approach in the short term. Only dyspareunia was noted among these patients. A similar finding was reported by Marcickiewicz[9] with 28.1% patients experiencing dyspareunia in laparoscopic sacral colpopexy group compared to 25% patients who had vaginal sacrospinouscolpopexy. van Oudheusden[10] reported de novo dyspareunia in 11.8% patients of laparoscopic

sacrocolpopexy while it was reported in only 7.1% patients of vaginal sacrospinous fixation. Ramanah[12] reported that laparoscopic sacrocolpopexy was more effective in treating voiding difficulty (p=0.01) which could be observed in our study from the fact that none of the patients had any such complication post abdominal laparoscopic repair. However, a meta-analysis by Zhang[11] reported no difference in the occurrence of dyspareunia among the two groups. But, they did report a lower febrile rate in the laparoscopic sacrocolpopexy group compared to vaginal sacrospinous fixation group.

The better anatomical correction observed in the laparoscopic vault prolapse surgery group, as indicated by the greater change in POP-Q scores, suggests that this approach might offer superior anatomical outcomes in most cases. However, the trade-off between achieving better anatomical correction with lesser perioperative outcomes but practicing a more costly approach specially in limited resource settings needs to be carefully considered when selecting the surgical approach. van Oudheusden[10] found that both laparoscopic sacrocolpopexy and vaginal sacrospinous fixation effectively improved anatomical outcomes as measured by POP-Q, with some differences in specific compartments, such as a lower recurrence rate in the anterior compartment with laparoscopic sacrocolpopexy.

CONCLUSION

The study highlights the differences in perioperative complications and short-term outcomes between abdominal laparoscopic and vaginal vault prolapse surgeries. While both approaches have their merits, the choice of surgery should be individualized, taking into account the patient's overall health, prolapse severity and specific anatomical considerations. Future research with larger sample sizes and longer follow-up periods is warranted to further elucidate the long-term outcomes and optimal management strategies for vault prolapse.

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