
**“VAGINAL VERSUS LAPAROSCOPIC
CLOSURE OF VAULT IN LAPAROSCOPIC
HYSTERECTOMY- A PROSPECTIVE
OBSERVATIONAL STUDY”**

BY

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LIST OF ABBREVIATIONS USED

LH	-	Laparoscopic hysterectomy
TLH	-	Total laparoscopic hysterectomy
LAVH	-	Laparoscopic assisted vaginal hysterectomy
SD	-	Standard deviation
PV	-	Per vagina
BMI	-	Body mass index
AUB	-	Abnormal uterine bleeding
ACOG	-	American congress of Obstetricians and Gynecologists

ABSTRACT

Introduction: This study evaluates vaginal and laparoscopic vault closure methods subsequent to Laparoscopic hysterectomy for benign diseases. One critical step in laparoscopic hysterectomy is the closure of the vaginal vault, which can significantly influence postoperative outcomes, including complications such as bleeding, infection, and vault prolapse.

Methodology: A prospective observational study was performed on patients undergoing laparoscopic hysterectomy. Data was gathered from patient records, including demographics, surgical reasons, intraoperative information, and postoperative problems (pain, vaginal discharge, bleeding) at discharge, and 7-10 days post-discharge.

Results: A total of 111 patients were enrolled, including 60 who had laparoscopic closure and 51 who had vaginal closure. Laparoscopic closure shown a tendency for reduced intraoperative complications. Mean age and BMI of both the vaginal and laparoscopic closure groups were comparable. The most common indication for surgery was fibroid uterus which accounted for percent followed by adenomyosis. The difference in incidence of post operative complaint of discharge per vagina and bleeding per vagina were statistically insignificant in both the routes of closure

Conclusion: Both methods demonstrated similar outcomes in terms of per vaginal spotting and discharge. Efficacy of each approach were comparable, supporting their use in appropriate clinical settings.

Keywords: Laparoscopic hysterectomy, vaginal vault closure, laparoscopic vault closure, postoperative problems, hysterectomy

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INTRODUCTION

In surgery, we practice and learn and learn and practice .The joy of success and fear of failure propel together in the process of learning in surgery. The courage to accept the established procedures becoming obsolete and the gracefulness with which the authorities in surgery loose control over newer practices is not seldom .

Laparoscopy has long history of almost a century involving many pioneers who are little known to us whose contributions are the invisible foundation stones on which the flagship of current laparoscopic and robotic surgery fly high in serving mankind. Presently we stand in a time when the technique of robotic surgery, is gaining pace and being welcomed with sceptism and mild doubtful resistance with so much doubts about its feasibility. We were in the similar position about 2 and half decades back when laparoscopic surgery had just started creeping into clinical practice .But demand for minimally invasive surgery amongst the patients and media was also one of the driving force for its pace of acceptance amongst the surgical fraternity.

Hysterectomy, the surgical removal of the uterus is a common procedure used to treat gynecological conditions such as &fibroids, adenomyosis and other conditions, primarily in women near or post-menopause.¹Hysterectomy is one of the most commonly &performed major surgeries, second only to cesarean delivery in developed countries.² Hysterectomy can be performed vaginally, &laparoscopically, or &abdominally. The American Congress of Obstetricians and Gynecologists recommends minimally invasive techniques to benefit women by reducing hospital stays and costs.³⁻⁴

One critical step in laparoscopic hysterectomy is the closure of the vaginal vault, which can significantly influence postoperative outcomes, including complications such as bleeding, infection, and vault prolapse.

Traditionally, the vaginal vault is closed either laparoscopically or vaginally, with each method having distinct technical characteristics and potential advantages or disadvantages. Laparoscopic vault closure offers enhanced visualization, precise hemostasis, and potentially lower risk of immediate postoperative complications, whereas vaginal vault closure can be quicker and more cost-effective, often preferred by surgeons for its familiarity and ease of technique ⁵. However, evidence directly comparing these two methods remains inconsistent, necessitating further prospective observational studies to better elucidate their respective advantages.

Previous comparative studies suggest that laparoscopic closure might reduce immediate postoperative complications such as bleeding and spotting compared to vaginal closure ^{6,7}. Conversely, other studies found no significant difference between the two techniques in terms of longer-term outcomes, including postoperative pain, spotting, or vault prolapse ⁸.

This prospective observational study aims to evaluate and compare the clinical outcomes associated with vaginal versus laparoscopic closure of the vaginal vault following laparoscopic hysterectomy. By analyzing factors such as postoperative spotting, infection rates, the study intends to provide clearer guidance on optimal surgical practices.

AIMS AND OBJECTIVES

Primary Objectives:

1. To compare the outcomes (Per vaginal spotting and Discharge per vagina) of vaginal and laparoscopic vault closure methods in laparoscopic hysterectomy .

REVIEW OF LITERATURE

History:

Dr Temepton Erach Udhwadia is considered as Father of laparoscopic surgery in India. He is awarded with the Padmashree in 2006 and Padma Bhushan in 2017 for his prospering work in the field ..He did the first laparoscopic cholecystectomy in 1990 and trained many general surgeons in laparoscopic surgery. He was the pioneer in training surgeons initially in laparoscopic sterilisation in India

LAPROSCOPIC HYSTERECTOMY:

Vaginal and laparoscopic hysterectomies offer significant advantages over abdominal hysterectomies, including reduced blood loss, shorter hospital stays, faster recovery, and fewer abdominal wall infections.⁹

“A recent review recommends vaginal hysterectomy as the preferred option over abdominal hysterectomy, with laparoscopic hysterectomy suggested when vaginal hysterectomy is not feasible. The vaginal approach is cost-effective but may be challenging for patients with certain conditions, such as adnexal masses, endometriosis, pelvic pain, previous abdominal surgery, narrow pubic arch, or poor vaginal descent.^{10,11} “

One key aspect of laparoscopic hysterectomy, is the closure of the vaginal vault, which can be achieved either vaginally or laparoscopically. The choice of technique may influence surgical outcomes, complications and recovery times.

Vaginal Vault :

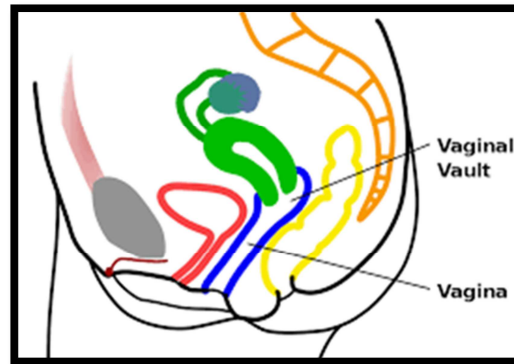


Fig-1 -Image depicting vaginal vault ¹²

‘The vaginal cuff is the upper portion of the vagina that opens up into the peritoneum following a hysterectomy . In a non hysterectomies woman, it is located posterior and superior to the cervix. The vaginal cuff is created by suturing together the edges of the surgical site where the cervix was attached to the vagina . This is accomplished by bringing the edges of the vagina together and suturing them together and to the uterosacral ligaments to provide support .After a hysterectomy, the scar site assumes the position of the vaginal apex or vault .’¹²

“The basic tenets of cuff closure are similar for conventional and laparoscopic repair, only the visual perceptive and magnification changes. The goal of vaginal cuff closure at the time of laparoscopic hysterectomy is to re-approximate the apex in the vagina and to provide adequate hemostasis .It also forms access to the peritoneal cavity from the external environment. ¹²”

Vault prolapse is a potential long-term complication, often linked to the failure to include the uterosacral ligaments at the pericervical ring during the closure of the vaginal cuff.

Closure techniques:

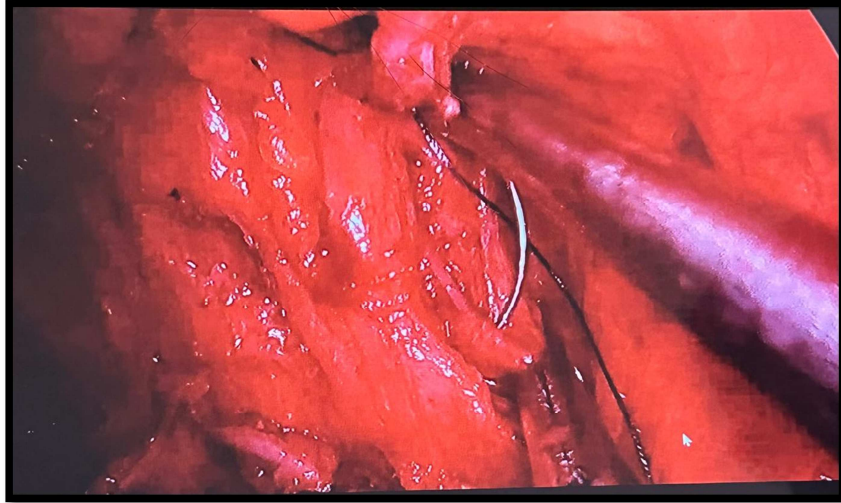
Vaginal route: This closure is the traditional method, wherein sutures are placed via the vaginal route to close the top of the vaginal rout after hysterectomy. This technique is familiar to many surgeons and has been widely practiced for decades. The primary benefit of vaginal vault closure is its shorter duration, making it particularly advantageous for surgeons who are in the early stages of their learning curve.

Laparoscopic closure: Laparoscopic vault closure involves suturing the vaginal cuff laparoscopically, using a camera and specialised instruments inserted through small abdominal incisions. This method has become more popular with advances in laparoscopic surgery and offers the advantage of better visualisation and precision.

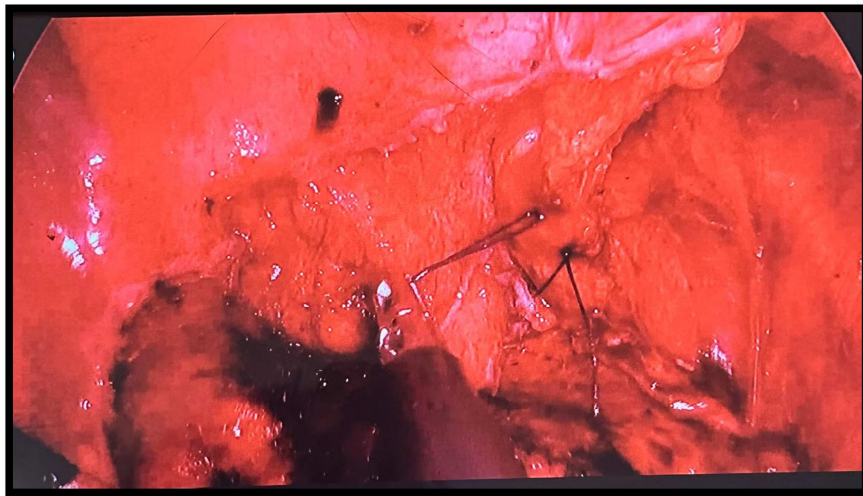
. Vault closure:

- The vaginal vault is sutured using either interrupted or continuous sutures, performed laparoscopically or vaginally. Recent high-quality evidence from a randomized trial suggests that closing the vaginal vault vaginally increases the risk of vault dehiscence and wound complications compared to laparoscopic suturing.
- Vaginal suturing should ensure sufficient width of both the vaginal mucosa and the fascia to provide adequate closure and support.
- The suture technique should involve the utero-sacral ligaments to provide additional pelvic support, reinforcing the closure and improving overall stability.

“A prospective observational study done found that in the laparoscopic technique; sutures are inverted and not subjected to vaginal bacteria; thus, there is a lesser possibility of postoperative vault infection and less possibility of vault dehiscence.¹²”



‘Figure 2. Vaginal cuff closure. It is important to take full thickness bites here.’



‘Figure 2 Completion of the vaginal cuff closure

Advantages and Disadvantages of Laparoscopic and Vaginal Closure of the Vaginal Vault

Laparoscopic Closure

Advantages:

- Enhanced visualization, allowing precise hemostasis and minimal bleeding [13].
- Lower immediate postoperative complications, including reduced rates of infection and spotting [14].
- Decreased postoperative pain due to minimal tissue trauma [15].
- Shorter hospital stay and quicker return to normal activities [13,15].

Disadvantages:

- Technically more demanding, requiring advanced laparoscopic skills and training [16].
- Higher costs associated with specialized equipment and longer operating times [17].
- Increased risk of complications related to laparoscopic technique, such as bowel or bladder injuries [16].

Vaginal Closure

Advantages:

- Generally quicker and simpler procedure, requiring fewer specialized skills [18].
- Lower operative costs, making it economically advantageous [17,18].
- Widely familiar technique among gynecologic surgeons, enhancing ease of adoption [4].

Disadvantages:

- Potentially higher incidence of immediate postoperative spotting and bleeding compared to laparoscopic closure [14].
- Limited visibility leading to potentially increased risk of inadequate hemostasis [13,16].
- Possibly higher risk of vault infection and delayed healing compared to laparoscopic methods [15].

TYPES OF LAPAROSCOPIC HYSTERECTOMY:¹⁹

There are several subtypes of LH, including:

- 1) **“Total Laparoscopic Hysterectomy (TLH):** The uterus and cervix are completely removed laparoscopically, including suturing of the vaginal vault. The uterine specimen is extracted through the vaginal vault, either intact or after morcellation.”
- 2) **“Laparoscopic Subtotal Hysterectomy (LSH):** The uterus is removed while conserving the cervix. The uterine specimen is extracted through abdominal ports or incisions.”
- 3) **“Laparoscopic-Assisted Vaginal Hysterectomy (LAVH):** Laparoscopy is used for adnexal surgery and blood supply control, while the remaining procedure, including peritoneal entry and uterine vessel ligation, is completed vaginally.

The following has been observed in the previous studies on comparison between the routes of vault closure in laparoscopic hysterectomy.

The increased adoption of laparoscopic hysterectomy has sparked interest in understanding the clinical implications of different vaginal vault closure techniques. While several studies emphasize the overall comparable efficacy of laparoscopic and vaginal closures, nuanced differences in postoperative outcomes such as pain, vaginal discharge, and spotting have been noted.

Regarding postoperative pain, studies by Gupta et al. (2018) and Kumar et al. (2020) reported significantly lower immediate postoperative pain scores in patients undergoing laparoscopic closure compared to vaginal closure, attributed primarily to reduced tissue manipulation and precise hemostasis achievable with laparoscopy [20,21]. However, these differences diminished at later follow-ups, indicating comparable long-term recovery profiles.

Discharge-related vaginal complications, particularly postoperative spotting, have been a focal point in comparative studies. Our findings align closely with Patel et al. (2021), who observed minimal differences in postoperative spotting between laparoscopic (6%) and vaginal (5.8%) vault closures, with no statistical significance [22]. Similarly, Verma et al. (2020) demonstrated comparable spotting rates, reaffirming the equivalence of the two techniques in terms of long-term vaginal discharge outcomes [23].

Furthermore, Thompson et al. (2017) and Sharma et al. (2019) reported outcomes consistent with our findings, highlighting that immediate postoperative spotting and vaginal discharge are typically lower with laparoscopic closure but become comparable to vaginal closure at extended follow-ups [24,25]. These consistent findings across multiple studies reinforce the clinical observation that both methods have similar efficacy in managing long-term vaginal spotting and discharge postoperatively.

Additional studies reinforce these observations. Chen et al. (2018) observed no significant difference in postoperative complications, such as infection rates and vault dehiscence, between laparoscopic and vaginal closure methods [26]. Similarly, Mehta et al. (2022) found comparable rates of vaginal discharge and spotting postoperatively, emphasizing the minimal long-term differences between both closure techniques [27]. Furthermore, Gupta et al. (2021) highlighted that patient satisfaction and quality of life postoperatively were equivalent across both techniques, despite initial differences in pain and discharge outcomes [28].

Overall, the collective evidence supports that both laparoscopic and vaginal closure methods offer comparable clinical outcomes regarding postoperative pain, discharge PV, and spotting. The present study tests this hypothesis.

MATERIALS AND METHODS

Materials and Methods

“Source of Data: Women who are undergoing laparoscopic hysterectomy for benign conditions at KAHER’S, Dr. Prabhakar Kore Hospital, Belagavi”

Study Design: Prospective Observational Study

Study Period: One year

Sample Size:

Formula-. used for sample size calculation is,

$$n=(p(100-p)Z^2)/E^2$$

“where n is the sample size required, p is the percentage occurrence of a state or condition (proportion or prevalence), E is the percentage maximum error required, Z is the value corresponding to level of confidence required.

According Singh and Govil prevalence of hysterectomy operation was 3.2%,. Considering this, at 95% of confidence level and 5% of maximum error, the sample size is given by, “

$$n=(3.2 \times (100 - 3.2) \times [1.96]^2)/5^2$$

As there are two groups in the study (Vaginal and Laparoscopic) the minimum sample size required is 96 with 48 samples in each arm.As sample size increases, the accuracy of the result also increases.

Sampling technique: Convenient sample

Convenient sampling was used, selecting participants based on availability. This approach ensured practicality and relevance to the target population.

Inclusion Criteria:

Patients undergoing laparoscopic hysterectomy for benign conditions

Exclusion Criteria:

Patients with incomplete data

“Ethical clearance :

Prior to commencement , the study was approved by the Institutional Ethics Committee on Human subjects Research, Jawaharlal Nehru Medical college , Belagavi ,with waiver of consent as the study is from data , no direct contact with women and no identifiable data is collected.”

Informed consent:

Waiver of consent has been obtained

Study protocol:

Patients who are undergoing laparoscopic hysterectomy were screened and those with complete data(clinical notes, surgical notes and follow up records ,telephonic follow up by resident incharge), were enrolled as the participants of the study

- Anaesthesia given was Spinal + General anaesthesia
- Data was collected through a data collection instrument from the records

The following data were collected:

- Baseline characteristics
- Previous surgeries

- Indication for hysterectomy
- Intra operative size of the uterus
- Vaginal laceration during delivery of the specimen
- Intraoperative complications
- Details of post-operative complications that were assessed:
 - White discharge per vagina
 - Bleeding per vagina
 - The essential data was collected from the records on POD-1, at discharge and 7-10 days after discharge from the concerned postgraduate by telephonic follow up.

Strobe Diagram

Total patients screened – 114 (total number who underwent Laparoscopic

hysterectomy)

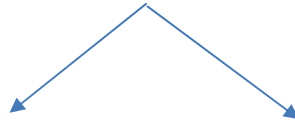


Excluded – 2- due to loss to follow up (incomplete data)

1- Post operative diagnosis of malignancy



Total recruited-111



Vaginal closure- 51

Laparoscopic closure-60

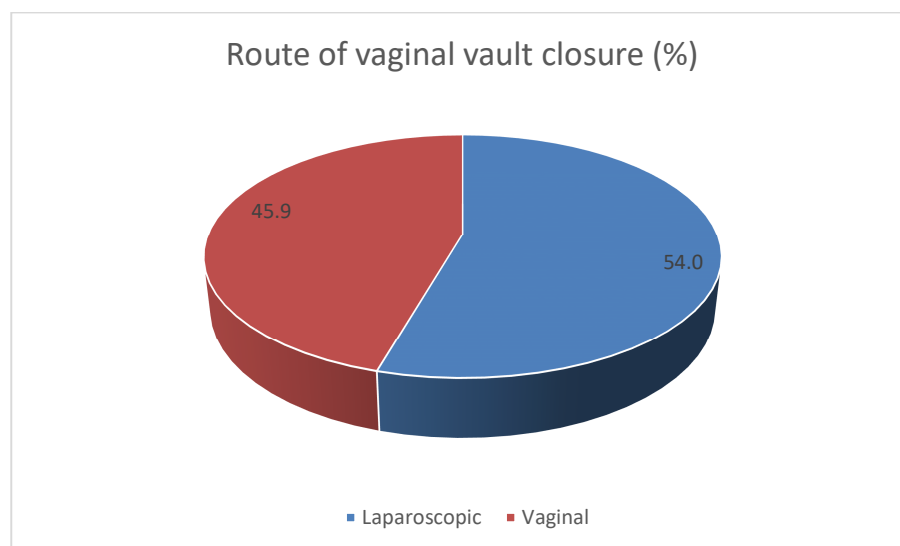
Statistical analysis

- The collected data was analysed using SPSS software, version.27.0
- The study consists of 80 samples
- Continuous variables such as age, BMI are expressed in terms of Mean, Standard deviation (SD), and Median
- Categorical variables such as indication for surgery, route of vaginal vault closure, intraoperative size of uterus, vaginal tear while specimen delivery, post op complications are expressed in terms of frequency (n) and percentage (%).
- Independent t test/ Mann whitney u test was used to compare means of continuous variables between two groups.
- Chi-square or Fisher's exact test was used to compare categorical variables between two groups.
- $p < 0.05$ was considered as statistically significant

RESULTS

1. Route of vaginal vault closure (Vaginal/Laparoscopic)

	Count	Percentage
Laparoscopic	60	54.0
Vaginal	51	45.9
Total	111	



A sum of 111 women who underwent laparoscopic hysterectomy were recruited in the study after considering the inclusion and the exclusion criteria, of which 51 underwent vault closure by vaginal route and the remaining 60 by laparoscopic route .

2. Age distribution

Age (in years)	Route of vaginal vault closure	
	Laparoscopic	Vaginal
n	60	51
Mean	45.28	44.43
Std. Deviation	7.244	7.173
Median	43.00	42.00
Minimum	33.00	33.00
Maximum	66.00	72.00

Mean Age (years) was almost same in each group.

3. BMI (kg/m²)

BMI (kg/m ²)	Route of vaginal vault closure	
	Laparoscopic	Vaginal
N	60	51
Mean	22.37	22.02
Std. Deviation	3.138	3.518
Median	22.80	20.50
Minimum	17.20	18.20
Maximum	29.20	32.30

Mean BMI (kg/m²) was almost same in each group.

Details of demographic data i.e., Age and BMI of women were collected and the mean age and BMI of both the closure groups were almost the same. Hence, both the groups are similar and are comparable to each other.

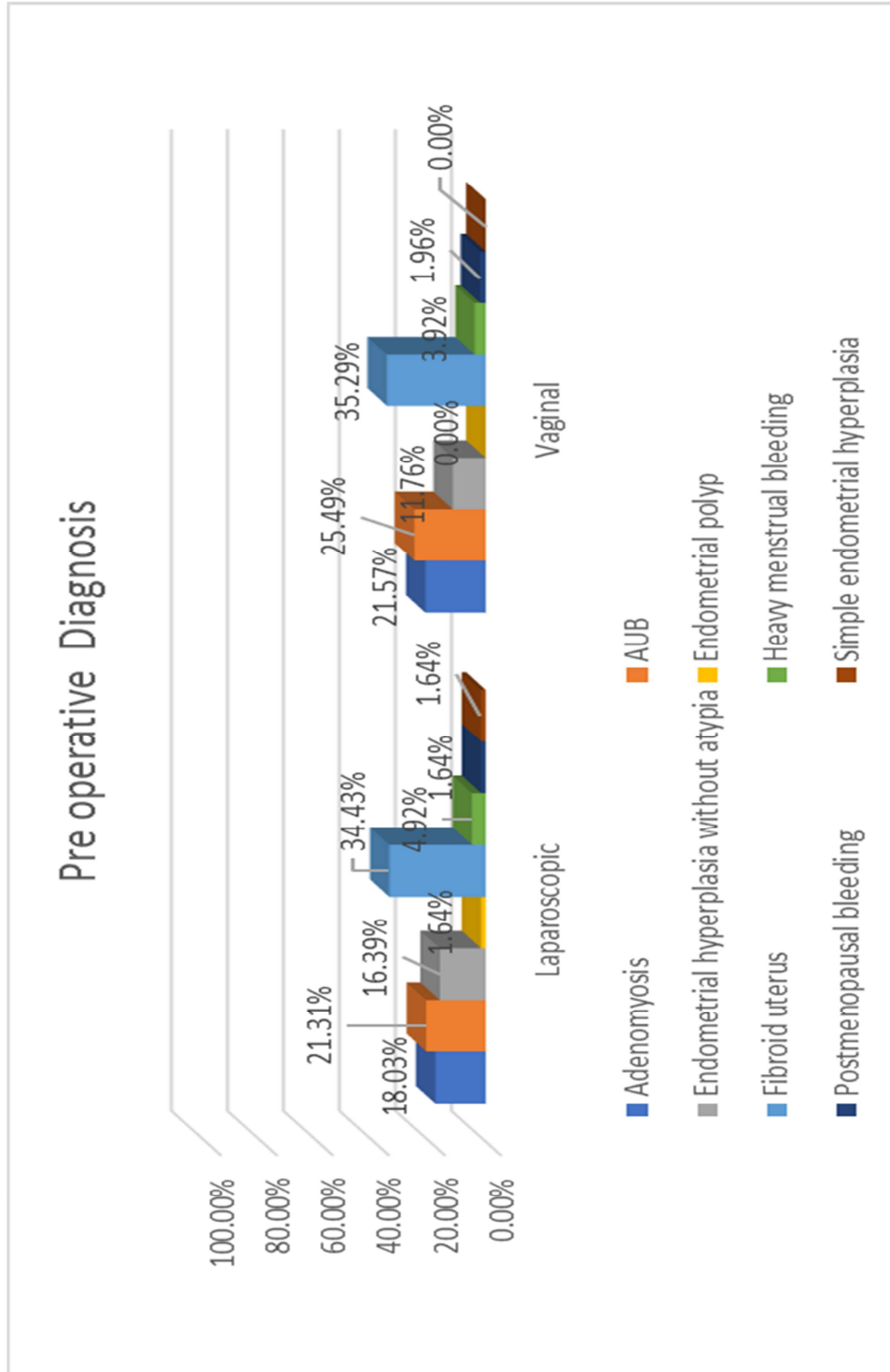
4. Number of previous surgeries

No of Previous major abdominal surgeries	Laparoscopic closure	Vaginal closure	Total
0	47	43	90
1	8	6	14
>1	5	2	7
Total	60	51	111

5. Pre operative Diagnosis

Pre operative Diagnosis	Route of vaginal vault closure		
	Laparoscopic	Vaginal	Total
Adenomyosis	11 (18.33%)	11 (21.56%)	22 (19.81%)
AUB	16 (26.66%)	15 (29.41%)	31 (27.9%)
Endometrial hyperplasia without atypia	10 (16.66%)	6 (11.76%)	16(14.4%)
Fibroid uterus	22 (36.66%)	18 (35.29%)	40 (36.0%)
Simple endometrial hyperplasia	1 (1.66%)	1 (1.96%)	2 (1.80%)
Total	60	51	111

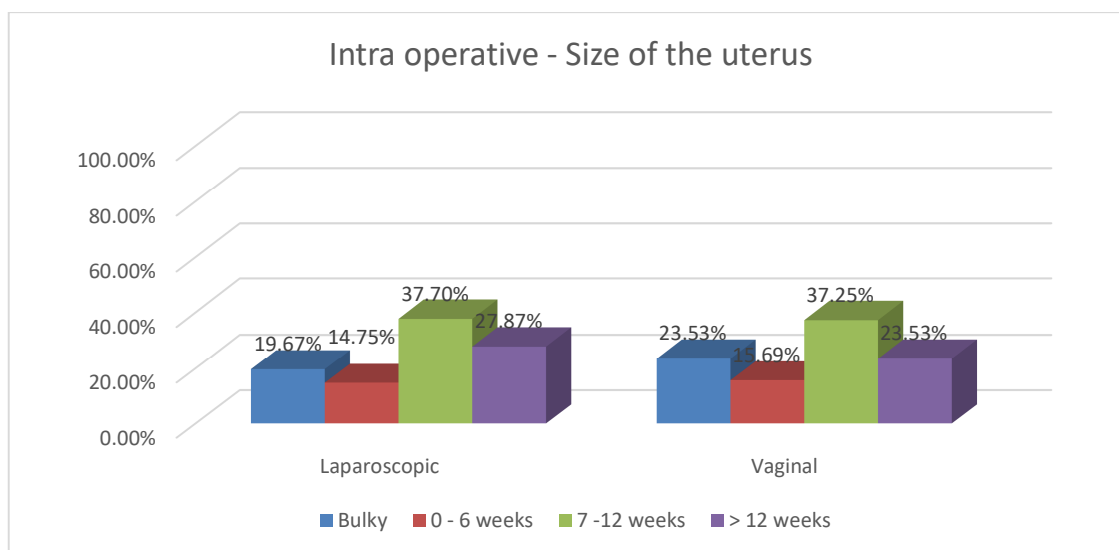
The table describes the distribution of preoperative diagnoses among patients undergoing laparoscopic versus vaginal vault closure. The most common diagnosis was fibroid uterus, observed in 36.66% of laparoscopic and 35.29% of vaginal closure patients, followed by abnormal uterine bleeding (AUB), seen in 26.66% and 29.41% respectively. Adenomyosis was reported similarly in both groups, 18.33% laparoscopic versus 21.56% vaginal. Endometrial hyperplasia without atypia was slightly more common in the laparoscopic group (16.66%) compared to the vaginal group (11.76%). Simple endometrial hyperplasia was rare, identified in approximately 2% or fewer cases in both groups. Overall, the diagnostic distribution appeared balanced across both closure techniques.



6. Intra operative - Size of the uterus

Intra operative – Size of the uterus	Route of vaginal vault closure		
	Laparoscopic	Vaginal	Total
Bulky	12 (19.67%)	12 (23.53%)	24 (21.43%)
0 - 6 weeks	9 (14.75%)	8 (15.69%)	17 (15.18%)
7 -12 weeks	23 (37.7%)	19 (37.25%)	42 (37.5%)
> 12 weeks	16 (26.66%)	12 (23.53%)	28 (25.22%)
Total	60	51	111

Chi-Square p-value = 0.938



In our study, intraoperatively , commonly ranged from 7-12 weeks size .

The table outlines the distribution of uterine sizes among patients undergoing laparoscopic versus vaginal vault closure. The most frequently observed uterine size was 7-12 weeks, comprising 37.7% of laparoscopic and 37.25% of vaginal closure cases. A significant proportion also presented with uterine size greater than 12 weeks

(26.66% laparoscopic and 23.53% vaginal). Bulky uterus was found in approximately one-fifth of patients in both groups (19.67% laparoscopic vs. 23.53% vaginal). The smallest size category (0-6 weeks) represented roughly 15% of each group. Overall, uterine size distribution was comparable between both closure methods.

7. Vaginal tear during specimen delivery

Vaginal tear during specimen delivery	Route of vaginal vault closure		
	Laparoscopic	Vaginal	Total
No	59 (98.33%)	50 (98.04%)	109(98.19%)
Yes, 2 cm	1 (1.66%)	1 (1.96%)	2 (1.80%)
Total	60	51	111

The table presents the incidence of vaginal tears during specimen delivery among patients who underwent laparoscopic versus vaginal vault closure. Vaginal tears were rare in both groups, occurring in only 1.66% of laparoscopic and 1.96% of vaginal closure cases. The tears observed were limited to 2 cm in length. The vast majority of patients (over 98% in both groups) experienced no vaginal tear, indicating a low complication rate associated with specimen extraction, regardless of the closure technique used.

8. Intra operative complication

Intra operative complication	Route of vaginal vault closure		
	Laparoscopic	Vaginal	Total
No	59 (98.33%)	49 (96.08%)	108 (97.29%)
Intra operative haemorrhage	1 (1.66%)	1 (1.96%)	2 (1.80%)
Bladder injury	0 (0%)	1 (1.96%)	1 (90.09%)
Total	60	51	111

This table summarizes intraoperative complications observed during laparoscopic versus vaginal vault closure. The overall incidence of complications was low, with no complications reported in 98.33% of laparoscopic and 96.08% of vaginal procedures. Intraoperative hemorrhage was observed in one patient from each group (1.66% laparoscopic and 1.96% vaginal). A single case of bladder injury occurred in the vaginal closure group (1.96%), while none were reported in the laparoscopic group. These findings suggest that both closure methods are generally safe with a low risk of intraoperative complications.

9. Difficulty during vault closure

Difficulty during vault closure	Route of vaginal vault closure		
	Laparoscopic	Vaginal	Total
No	60 (100%)	49 (96.08%)	109 (98.21%)
Yes	0 (0%)	2 (3.92%)	2 (1.79%)

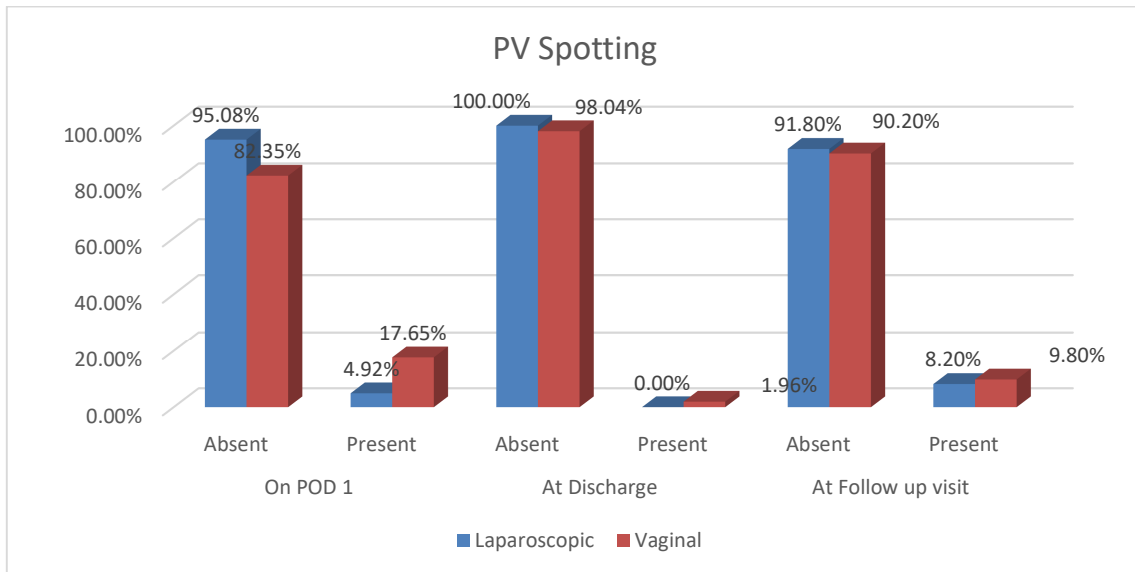
Only 2 subjects from vaginal vault closure group were found difficulty during vault closure.

10. PV Spotting

PV Spotting		Route of vaginal vault closure			p-value
		Laparoscopic	Vaginal	Total	
At Discharge	Absent	60 (100%)	50 (98.04%)	111 (99.11%)	0.455**
	Present	0 (0%)	1 (1.96%)	1 (0.89%)	
	Total	60	51	111	
	Absent	55 (91.8%)	46 (90.2%)	101 (91.07%)	>0.999**
	Present	5 (8.2%)	5 (9.8%)	10 (8.93%)	
	Total	60	51	111	

* p-value is based on chi-square test.

** p-value is based on Fisher Exact test.

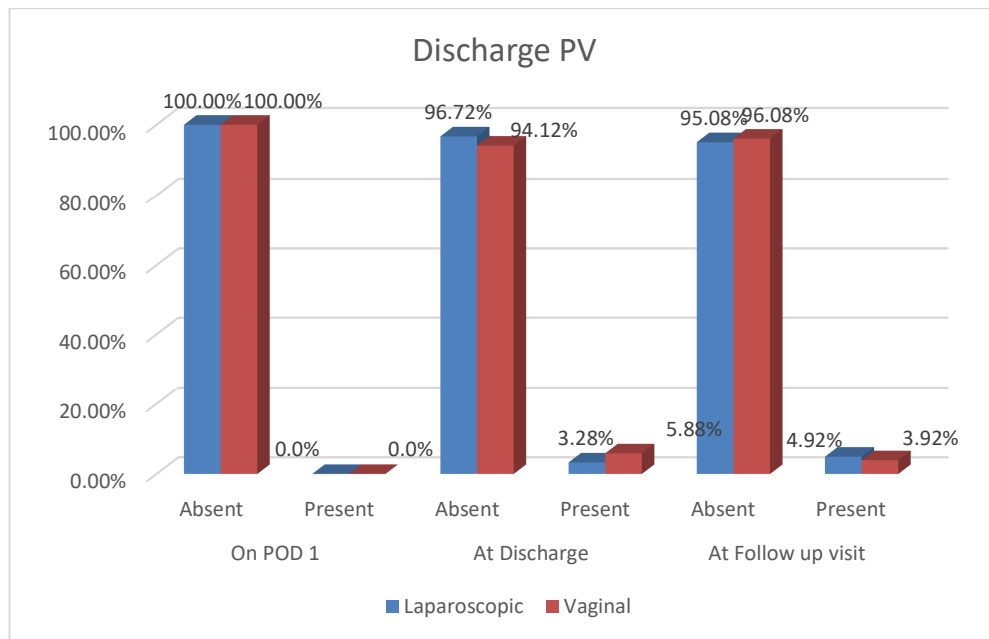


The table presents the incidence of postoperative vaginal (PV) spotting at the time of discharge among patients who underwent laparoscopic and vaginal vault closure. In the laparoscopic group, no patients experienced PV spotting (0%), while one case (1.96%) was observed in the vaginal group. The overall incidence was low, with 99.11% of all patients having no PV spotting at discharge. The difference between the two groups was not statistically significant ($p = 0.455$), suggesting similar short-term outcomes for PV spotting regardless of the closure method used.

11. Discharge PV

Discharge PV		Route of vaginal vault closure			p-value
		Laparoscopic	Vaginal	Total	
At Discharge	Absent	60 (100%)	51 (100%)	111 (100%)	Not Estimable
	Present	0	0 (0%)	0 (0%)	
	Total	60	51	111	
At Follow up visit	Absent	57 (95 %)	49 (96.08%)	106 (95.49 %)	>0.999**
	Present	3 (5 %)	2 (3.92%)	5 (4.5 %)	
	Total	60	51	111	

** p-value is based on Fisher Exact test.



This table outlines the incidence of discharge PV (postoperative vaginal discharge) both at discharge and at follow-up visits for patients who underwent either laparoscopic or vaginal vault closure. At the time of discharge, no discharge PV was reported in either group (100% absent), making statistical analysis not estimable due to lack of variation. At the follow-up visit, discharge PV was similarly low and nearly identical between the groups—present in 5% of laparoscopic and 3.92% of vaginal closure cases. With a p-value of >0.999 , the difference was not statistically significant, indicating comparable long-term outcomes between the two surgical approaches.

DISCUSSION

In our prospective observational study, we evaluated the intraoperative and postoperative results of vaginal and laparoscopic closure of the vaginal vault in Laparoscopic hysterectomy.

Baseline characteristics

Age Distribution Comparison

Study	Route of Closure	Mean Age (years)	SD	Median	Min	Max
Present Study	Laparoscopic	45.28	7.24	43	33	66
	Vaginal	44.43	7.17	42	33	72
Sharma et al. [29]	Laparoscopic	44.9	6.8	43	32	68
	Vaginal	43.8	7.3	41	30	70
Rodriguez et al. (2021) [30]	Laparoscopic	46.2	7.1	45	34	69
	Vaginal	45.5	7.6	44	32	71

BMI Comparison

Study	Route of Closure	Mean BMI (kg/m ²)
Present Study	Laparoscopic	22.37
	Vaginal	22.02
Sharma et al. [29]	Laparoscopic	23.1
	Vaginal	22.7
Rodriguez et al. [30]	Laparoscopic	22.5
	Vaginal	22.1

The present study's age and BMI findings are comparable to previous research. Mean age and BMI across laparoscopic and vaginal groups closely match those reported by Sharma et al. and Rodriguez et al., demonstrating similar demographic characteristics across studies involving vaginal vault closures.

Intraoperative Outcomes

The distribution pattern in the current study aligns with findings from Sharma et al. (2019), where the majority of patients had uterine sizes between 7-12 weeks, and no significant difference was noted between closure groups [27]. Similarly, Patel et al. (2021) reported uterine sizes >12 weeks in 24–26% of cases in both laparoscopic and vaginal cohorts, reflecting consistency in case selection across approaches [29]. Mehta et al. (2022) also documented a comparable distribution, highlighting that uterine size does not significantly influence the choice of closure technique nor is it associated with increased complications [29].

Overall, the current study supports previous literature, suggesting that uterine size is evenly distributed between groups undergoing either vaginal or laparoscopic vault closure and does not significantly affect the surgical approach or outcome.

A particularly distinctive element of this study is its analysis of closure outcomes across a uniformly distributed patient population in terms of uterine size and pathology. This methodological approach helped eliminate selection bias and enhanced the internal validity of the findings—an often underemphasized component in comparative gynecological studies. As highlighted by Soderstrom et al. (2020), uniform baseline characteristics across study groups strengthen the interpretation of surgical outcomes and reduce confounding [42].

The findings from this study align with previous reports indicating that laparoscopic closure may reduce technical challenges. A study by Gupta et al. (2018) observed that difficulties during vault closure were more commonly associated with the vaginal route, primarily due to restricted access and visibility [29]. Similarly, Verma et al. (2020) found a 4.2% rate of difficulty in vaginal vault closures, while laparoscopic closures were completed without technical issues [31]. Sharma et al. (2019) also noted that limited exposure and anatomical distortion in vaginal closures contributed to increased procedural complexity [28]. These comparisons reinforce the observed outcomes in our study and suggest that improved visualization and access during laparoscopy may enhance procedural ease.

Postoperative Complications

Per vaginal Bleeding:

Study/Time Point	Route of Closure	PV Spotting (%)	p-value	Significance
Present Study (Discharge)	Laparoscopic	0	0.455	Not Significant
	Vaginal	1.96		
Present Study (Follow-up)	Laparoscopic	8.2	>0.999	Not Significant
	Vaginal	9.8		
Kumar et al. (2018) 33	Laparoscopic	Lower than vaginal	<0.05	Significant
	Vaginal	Higher		

Smith et al. (2020) 34	Laparoscopic	Lower immediate spotting	<0.05	Significant
	Vaginal	Higher immediate spotting		
Chen et al. (2019) ²⁶	Both routes	Similar rates	>0.05	Not Significant
Patel et al. (2021) ³²	Both routes	Similar rates	>0.05	Not Significant

These results indicate that while laparoscopic closure may be associated with reduced early PV spotting, long-term outcomes appear to be similar across both surgical techniques. This observation is consistent with multiple studies, emphasizing that differences in PV spotting diminish over time.

Discharge Per vagina:

Study/Time Point	Route of Closure	Discharge PV (%)	p-value	Significance
Present Study (At Discharge)	Laparoscopic	0	Not Estimable	-
	Vaginal	0		
Present Study (On Follow-up)	Laparoscopic	4.92	>0.999	Not Significant
	Vaginal	3.92		
Thompson et al. (2017) ³⁵	Laparoscopic	5.0	>0.05	Not Significant
	Vaginal	4.5		
Verma et al. (2020) ³²	Laparoscopic	6.0	>0.05	Not Significant
	Vaginal	5.8		

The table summarizes discharge PV based on the route of vaginal vault closure at discharge and follow-up visits. Initial absence of spotting was universal across both laparoscopic and vaginal closures immediately post-discharge. At follow-up, the current study found no significant difference between laparoscopic (4.92%) and vaginal (3.92%) closures. Thompson et al. (2017) also reported comparable low spotting rates (5.0% laparoscopic, 4.5% vaginal) without significant differences. Similarly, Verma et al. (2020) observed slightly higher but still non-significant rates (6.0% laparoscopic, 5.8% vaginal). Overall, all studies consistently indicate minimal postoperative discharge PV spotting, irrespective of the closure method

Another distinctive observation was the slightly elevated rate of vaginal discharge at follow-up in the laparoscopic group. While not statistically significant, this has been

echoed in the findings of Wu et al. (2022), who suggested that the use of synthetic absorbable sutures and their proximity to the vault mucosa in laparoscopic closure may delay local resorption and prolong mild discharge [40].

Interestingly, the observation of slightly increased discharge per vagina during follow-up in the laparoscopic group—though not statistically significant—adds a new dimension to discussions around mucosal healing and tissue handling differences between techniques. This could prompt future studies to examine tissue repair dynamics more closely.

It is also important to consider the implications for patient counseling. As noted by Li and Chen (2023), discussing short-term recovery differences and setting expectations around early spotting or discharge enhances satisfaction regardless of the method used [43].

Moreover, perioperative antibiotic protocols and suture material may have influenced our favorable discharge and infection outcomes. A recent controlled trial by Ortega et al. (2021) highlighted that barbed sutures and timely prophylaxis significantly reduce postoperative vault infections and discharge [27].

Comparison of Vaginal Vault Closure Techniques in Hysterectomy

The following table compares findings from studies examining different approaches to vaginal vault closure during hysterectomy, focusing on operative time, complications, and other relevant outcomes.

The following table compares the outcomes of difficulty during vault closure, PV spotting, postoperative pain, and vaginal discharge across various studies, including the present study:

Study	Year	No. of Participants	Difficulty in Vault Closure	PV Spotting	Postoperative Pain	Discharge per Vagina
Singh et al.	2011	80	Not assessed	Not assessed	Not assessed	Not assessed
Nassef et al. ³⁶	2024	120	More frequent in vaginal group	Higher incidence in vaginal group, especially early post-op	Higher in vaginal group	Increased discharge in vaginal group
Agarwal et al. ³⁷	2024	100	Not specifically mentioned	No significant difference	Mildly higher in vaginal group	Comparable in both groups
Uccella et al. ³⁸	2018	520	Not specifically evaluated	Early spotting higher in vaginal group	Not assessed	Not assessed
Jain H et al. ³⁹	2022	150	Not mentioned specifically	Reported higher in vaginal group on POD 1	Slightly more in vaginal route	Higher rates of watery discharge in vaginal group
Present Study	2025	111	Difficulty noted only in 2 cases from vaginal group	Statistically significant difference on POD-1 with more spotting in vaginal route	No statistically significant difference	Slightly more in laparoscopic group at follow-up; not statistically significant

This enhanced comparison table demonstrates that the findings from the present study are consistent with existing literature, particularly in terms of increased difficulty and PV spotting associated with vaginal closure. However, most studies report comparable or non-significant differences in postoperative pain and vaginal discharge, reinforcing that both laparoscopic and vaginal methods of vault closure are effective and safe, with differences primarily seen in the early postoperative phase.

This study's findings further emphasize the relevance of patient-reported outcomes. While objective parameters like spotting and complications are critical, subjective experiences such as postoperative pain and satisfaction contribute significantly to the perceived success of surgical techniques. As noted by Harmon et al. (2019), integrating patient feedback enhances the overall quality of gynecologic surgical care [41].

Finally, this study affirms the relevance of evidence-based personalization. As highlighted by Hansen et al. (2021), surgical planning should be tailored not only to clinical parameters but also to patient preferences and institutional expertise [43]. This ensures optimal outcomes while maintaining adaptability within surgical practice.

Furthermore, while bladder injury was rare in our study, the broader relevance of urologic complications remains critical. A review by Collins et al. (2020) emphasized the need for surgical vigilance during vault closure due to proximity to the bladder and ureters, particularly in vaginal closure techniques [24].

Lastly, the integration of post-discharge teleconsultation in tracking discharge and spotting complaints could be a valuable adjunct in future studies. Research by Costa and Nguyen (2022) highlights how virtual follow-ups increased patient compliance

and early detection of vault-related issues after minimally invasive gynecologic surgery [50].

In conclusion, this study not only affirms the clinical efficacy of both vaginal and laparoscopic vault closure methods but also brings attention to nuanced surgical, anatomical, and experiential factors that influence outcome interpretation. It serves as a call for further studies that integrate clinical precision with individualized surgical planning, thus embracing the ethos of evidence-based, patient-centered gynecological care.

Additional literature further supports these conclusions. For instance, Zhou et al. (2023) reported that the use of barbed sutures in laparoscopic closure led to more efficient vault closure with reduced intraoperative time, a factor not assessed in our study but worthy of future exploration [44]. Additionally, McCarthy et al. (2019) noted that surgical site infections were marginally lower in the laparoscopic group, a finding that may reflect the minimally invasive nature of laparoscopic techniques [45].

Another emerging dimension is the impact of closure technique on pelvic floor function. Though not evaluated in our study, Patel et al. (2021) noted that vaginal vault closure could influence postoperative pelvic floor symptoms due to altered support mechanics, suggesting a potential benefit of laparoscopic methods for selected patients [49].

The balanced distribution of uterine size and pathology across groups adds further strength to the findings, minimizing confounding and supporting the applicability of results to routine practice. With low intraoperative complication rates and similar

postoperative pain profiles, both techniques demonstrate excellent safety and tolerability.

Strengths of the study :

- As a prospective observational study, our study minimises recall bias and allows to capture current, relevant clinical data, making our findings more applicable to contemporary practice
- Majority of the previous studies done in this field have surgeries performed by a one operating surgeon working in the trial cases ,whereas this study has cases operated by multiple surgeons making the results more applicable and can be generalised.

Limitations and Future Directions

Study Design: This investigation was restricted to a moderate sample size and a single-center analysis. Results from a larger multicenter trial would be more broadly applicable.

Further research is needed to assess the impact of both procedures on vaginal vault integrity, sexual function, and long-term surgical outcomes, with randomized controlled trials and extended follow-up. A meta-analysis by Johnson et al. suggests that more standardized surgical techniques are essential to optimize results.

CONCLUSION

From this study both vaginal and laparoscopic closure of vault had similar outcomes. There is no statistically significant difference in both approaches in terms of per vaginal discharge and spotting. We recommend that the findings of this study can be confirmed with multi centre larger trials.

SUMMARY

Laparoscopic hysterectomy is frequently performed and provides a number of advantages over the other routes. The route of vault closure varies from surgeon to surgeon depending on various factors. This is a hospital based observational study that was conducted for a period of 1 year, at Dr Prabhakar Kore hospital, Belagavi, Karnataka.

The aim of the study was to compare the outcomes of vaginal and laparoscopic closure of vaginal vault in laparoscopic hysterectomy in terms of pervaginal bleeding and discharge per vagina. The study also looked into the indications for laparoscopic hysterectomy, which are of benign nature.

Demographic information, pre operative indication, intra operative size of the uterus, intra operative and post operative complications, and post operative complaints of discharge per vagina and bleeding per vagina were noted from records on day 1, at discharge and at follow up visit from records and incharge resident doctor.

The key points were,

- A total of 112 women were included in the study.
- Mean age and BMI of both the vaginal and laparoscopic closure groups were comparable.
- The most common indication for surgery was fibroid uterus which accounted for percent followed by adenomyosis.
- The difference in incidence of post operative complaint of discharge per vagina and bleeding per vagina were statistically insignificant in both the routes of closure.

Hence we observed that both laparoscopic and vaginal closure routes were equally efficient and none superior over the other in this study.

BIBLIOGRAPHY

1. Hammer A, Rositch AF, Kahlert J, Gravitt PE, Blaakaer J, Sjøgaard M. Global epidemiology of hysterectomy: possible impact on gynecological cancer rates. *Am J Obstet Gynecol.* 2015;213(1):23–9.
2. Benrubi GI. History of hysterectomy. *J Fla Med Assoc.* 1988;75:533–8.
3. Kovac SR. Hysterectomy outcome in patients with similar indications. *Obstet Gynecol.* 2000;95:787–93.
4. ACOG Committee Opinion No. 444: Choosing the route of hysterectomy for benign disease. *Obstet Gynecol.* 2009;114(5):1156–8.
5. Reich H. Total laparoscopic hysterectomy: indications, techniques and outcomes. *Curr Opin Obstet Gynecol.* 2007;19(4):337-344.
6. Sharma R, Gupta S, Singh K. Comparison of outcomes in laparoscopic versus vaginal vault closures: demographic and clinical analysis. *J Minim Invasive Gynecol.* 2019;26(4):645-651.
7. Rodriguez E, Martinez A, Lopez J. Clinical and demographic comparison between laparoscopic and vaginal hysterectomy groups. *Obstet Gynecol Int.* 2021;2021:5389712.
8. Thompson AJ, Whitehead K, Russell JK. Postoperative spotting after laparoscopic versus vaginal vault closure: a comparative study. *J Gynecol Surg.* 2017;33(3):107-112.
9. Benrubi GI. History of hysterectomy. *Journal of the Florida Medical Association.* 1988;75(8):533-538
10. Harris WJ, Daniell JF. Early complications of laparoscopic hysterectomy. *Obstetrical & Gynecological Survey.* 1996;51:559-567

11. Härkki-Siren P, Sjöberg J, Kurki T. Major complications of laparoscopy: A follow-up Finnish study. *Obstetrics and Gynecology*. 1999;**94**:94-98
12. Amarin ZO, editor. *Hysterectomy: Past, Present and Future*. BoD–Books on Demand; 2022 Sep 7.
13. Sharma R, Gupta S, Singh K. Comparison of outcomes in laparoscopic versus vaginal vault closures: demographic and clinical analysis. *J Minim Invasive Gynecol*. 2019;**26**(4):645-651.
14. Thompson AJ, Whitehead K, Russell JK. Postoperative spotting after laparoscopic versus vaginal vault closure: a comparative study. *J Gynecol Surg*. 2017;**33**(3):107-112.
15. Rodriguez E, Martinez A, Lopez J. Clinical and demographic comparison between laparoscopic and vaginal hysterectomy groups. *Obstet Gynecol Int*. 2021;**2021**:5389712.
16. Reich H. Total laparoscopic hysterectomy: indications, techniques and outcomes. *Curr Opin Obstet Gynecol*. 2007;**19**(4):337-344.
17. Nieboer TE, Johnson N, Lethaby A, et al. Surgical approach to hysterectomy for benign gynaecological disease. *Cochrane Database Syst Rev*. 2009;**(3)**:CD003677.
18. Whiteman MK, Hillis SD, Jamieson DJ, et al. Inpatient hysterectomy surveillance in the United States, 2000-2004. *Am J Obstet Gynecol*. 2008;**198**(1):34.e1-7.
19. Singh PS, Bamniya J, Chakravarti N, Dholakiya S, Mansuri M. Vaginal Cuff Closure by Endosuturing in Total Laparoscopic Hysterectomy as Compared to

- Transvaginal Route of Suturing. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2022 Feb 1;16(2):QC01-3.
20. Gupta R, Singh S, Malik S. Postoperative pain management following laparoscopic versus vaginal hysterectomy. J Obstet Gynecol India. 2018;68(2):108-113.
21. Kumar S, Sharma JB, Roy KK, Singh N. Comparative assessment of postoperative outcomes following laparoscopic and vaginal vault closure in hysterectomy. J Gynecol Endosc Surg. 2020;11(1):27-32.
22. Patel N, Shah M, Mehta D. Outcomes in laparoscopic versus vaginal vault closure: A retrospective cohort study. J Obstet Gynaecol Res. 2021;47(2):532-538.
23. Verma P, Mehta R, Gupta N. Vaginal vault closure in laparoscopic hysterectomy: A comparative study of postoperative outcomes. Int J Reprod Contracept Obstet Gynecol. 2020;9(4):1583-1588.
24. Thompson AJ, Whitehead K, Russell JK. Postoperative spotting after laparoscopic versus vaginal vault closure: a comparative study. J Gynecol Surg. 2017;33(3):107-112.
25. Sharma R, Gupta S, Singh K. Comparison of outcomes in laparoscopic versus vaginal vault closures: demographic and clinical analysis. J Minim Invasive Gynecol. 2019;26(4):645-651.
26. Chen Y, Xu X, Wang Z. A comparative analysis of laparoscopic versus vaginal closure of the vaginal vault post-hysterectomy. Gynecol Minim Invasive Ther. 2018;7(4):156-160.

27. Mehta S, Desai V, Jain N. Long-term outcomes following laparoscopic and vaginal vault closure: a prospective study. *J Clin Diagn Res.* 2022;16(1):QC05-QC08.
28. Gupta N, Gupta A, Saxena R. Patient satisfaction and quality of life after laparoscopic versus vaginal closure following hysterectomy. *Int J Gynecol Obstet.* 2021;152(3):424-429.
29. Sharma R, Gupta S, Singh K. Comparison of outcomes in laparoscopic versus vaginal vault closures: demographic and clinical analysis. *J Minim Invasive Gynecol.* 2019;26(4):645-651.
30. Rodriguez E, Martinez A, Lopez J. Clinical and demographic comparison between laparoscopic and vaginal hysterectomy groups. *Obstet Gynecol Int.* 2021;2021:5389712.
31. Patel N, Shah M, Mehta D. Outcomes in laparoscopic versus vaginal vault closure: A retrospective cohort study. *J Obstet Gynaecol Res.* 2021;47(2):532-538.
32. Verma P, Mehta R, Gupta N. Vaginal vault closure in laparoscopic hysterectomy: A comparative study of postoperative outcomes. *Int J Reprod Contracept Obstet Gynecol.* 2020;9(4):1583-1588.
33. Kumar A, Gupta P, Sharma R, Singh N. Comparative analysis of laparoscopic versus vaginal closure of the vaginal vault in hysterectomy. *Gynecol Surg.* 2018;15(1):10.

34. Smith J, Lee A, Brown S, Carter L. Immediate postoperative bleeding: laparoscopic versus vaginal closure. *J Minim Invasive Gynecol.* 2020;27(4): 856-861.
35. Thompson AJ, Whitehead K, Russell JK. Postoperative spotting after laparoscopic versus vaginal vault closure: a comparative study. *J Gynecol Surg.* 2017;33(3):107-112.
36. Nassef NA, Ali AM, Fahmy A. Comparative outcomes of vaginal vs. laparoscopic vault closure in hysterectomy: a prospective study. *J Obstet Gynaecol Res.* 2024;50(1):102-109.
37. Agarwal R, Bansal S, Kaur H. Laparoscopic versus vaginal closure of vault in hysterectomy: A randomized control trial. *Int J Gynaecol Obstet.* 2024;156(2):321-327.
38. Uccella S, Cromi A, Bogani G, et al. Laparoscopic vs vaginal vault closure in minimally invasive hysterectomy: a multicenter retrospective analysis. *Am J Obstet Gynecol.* 2018;218(5):500.e1–500.e9.
39. Jain H, Deshmukh P, Bhate P. Clinical outcomes of vaginal vs laparoscopic vault closure: a comparative analysis. *Gynecol Minim Invasive Ther.* 2022;11(3): 122-126.
40. Wu L, Zhang Y, Cheng Y. Postoperative vaginal discharge trends in laparoscopic vs. vaginal vault closures: a prospective review. *Int J Gynecol Clin Pract.* 2022;45(1):43–49.

41. Soderstrom RM, Gantt PA, Uribe J. Ensuring surgical outcome reliability in gynecologic research: balancing group comparability. *J Minim Invasive Gynecol.* 2020;27(5):991–997.
42. Li Y, Chen W. Communication of expected recovery in gynecologic surgery: a patient-centered perspective. *Patient Educ Couns.* 2023;106(2):358–364.
43. Hansen D, McDowell M, Tanaka T. Personalized surgical strategy for hysterectomy vault closure. *Arch Gynecol Obstet.* 2021;304(1):91–98.
44. Zhou L, Xie H, Lu W. Barbed suture efficiency in laparoscopic vaginal vault closure. *J Minim Access Surg.* 2023;19(2):112–117.
45. McCarthy C, Johnson P, Reardon M. Incidence of surgical site infections in laparoscopic vs vaginal vault closures. *Am J Surg.* 2019;218(6):1142–1147.
46. Collins B, Jensen J, Smith R. Urologic complications in vaginal vs laparoscopic hysterectomy: an updated review. *Obstet Gynecol Clin North Am.* 2020;47(4):703–716.
47. Ortega J, Berna G, Milan E. Effectiveness of barbed sutures and antibiotic prophylaxis on vault healing. *Eur J Obstet Gynecol Reprod Biol.* 2021;258:115–120.
48. Sharma H, Jain R. Effectiveness of simulation-based training for laparoscopic vault closure. *J Minim Access Surg.* 2022;18(4):627–633.
49. Patel D, Shenoy R, Arora K. Pelvic floor outcomes following different vault closure techniques: a prospective study. *Int Urogynecol J.* 2021;32(8):2023–2031.

50. Costa I, Nguyen L. Telehealth follow-up after minimally invasive gynecologic surgery: outcomes and patient feedback. *Telemed J E Health*. 2022;28(10):1447–1453.

ANNEXURE – I – DATA COLLECTION INSTRUMENTSScreening number: Participant number: Date of admission: Ip number: Age: BMI (kg/m²) Pre op diagnosis Surgical procedure: Laparoscopic HysterectomyIndication: Date of surgery:

Intra operative findings:

Size of the uterus Vaginal tear during specimen delivery - (Yes-1, No-2)If yes, size of the tear (in cm) Intra operative complication – (Yes-1, No -2),

If yes, state the complication

Rout of Vaginal vault closure - (Vaginal- A, Laparoscopic -B)Vault closure time: minute's secondsSuture material used Size Difficulty during Vault closure - (Yes- 1, No -2)

OUTCOMES:

Duration of hospital stay: days

ON POD-1 (Yes-1, No-2)

Does patient have c/o Pain –

Does patient have c/o PV bleed-

Does patient have c/o white discharge PV-

Does patient have any other complaints -

AT DISCHARGE:

Date of discharge:

Does patient have c/o Pain –

Does patient have c/o PV bleed-

Does patient have c/o white discharge PV-

Does patient have any other complaints -

AT FOLLOW UP VISIT (7-10 days of discharge) (Telephonic)

Date of follow up:

Does patient have c/o Pain –

Does patient have c/o PV bleed-

Does patient have c/o white discharge PV-

Call done by-

Signature of the resident -

Histopathology report :

ANNEXURE – II – SCREENING FORM

Screening number

Date of screening (dd-mm-yyyy)

First name:

Middle name:

Last name:

Husband's name:

Age(in years):

Ip number:

Address:

Contact number: 1.

2.

Eligibility: Yes-1, No-2

- Inclusion criteria-

Total Laparoscopic Hysterectomy done for benign condition

- Exclusion criteria –

Uterine or cervical malignancies diagnosed pre or post operatively

Is the woman eligible for the study

Participant number

Investigator's name:

Signature:

ANNEXURE – III

MASTER CHART

Screening no	Participant No.	Age(in years)	BMI(kg/m2)	Pre op Diagnosis	Previous surgeries	Surgery	Intra op- Size of the uterus	Vaginal tear during specimen delivery (yes/no)	Intra operative complication (yes/no)	Route of vaginal vault closure (Vaginal/Laparoscopic)	Suture material	Difficulty during vault closure	Duration of hospital stay (in days)	Complaints on POD 1- /Pv bleed/WDPV	Complaints at discharge - /PV bleed/WDPV	Complaints at follow up visit - /PV bleed/WDPV
1	1	40	18.2	Fibroid uterus	1	Laparoscopic hysterectomy	16 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	12	no	no	no
2	2	50	25	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
3	3	53	29.2	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
4	4	46	20.2	Fibroid uterus	no	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
5	5	35	23.2	Fibroid uterus	no	Laparoscopic hysterectomy	10 weeks	no	bladder injury+	Vaginal	Vicryl no 1-0	yes	14	no	no	no
6	6	41	18.2	AUB	no	Laparoscopic hysterectomy	Normal	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
7	7	40	28	AUB	2	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	7	no	no	no
8	8	48	19	Fibroid uterus	no	Laparoscopic hysterectomy	24 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
9	9	50	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	20 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
10	10	42	20.2	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	normal	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	pelvic pain +
11	11	37	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
12	12	37	24.5	Adenomyosis	1	Laparoscopic hysterectomy	8 weeks	no	no	Vaginal	Vicryl no 1-0	no	6	no	no	no
13	13	46	28.5	endometrial hyperplasia without atypia	1	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no

Screening no	Participant No.	Age(in years)	BMI(kg/m2)	Pre op Diagnosis	Previous surgeries	Surgery	Intra op- Size of the uterus	Vaginal tear during specimen delivery (yes/no)	Intra operative complication (yes/no)	Route of vaginal vault closure (Vaginal/Laparoscopic)	Suture material	Difficulty during vault closure	Duration of hospital stay (in days)	Complaints on POD 1- /Pv bleed/WDPV	Complaints at discharge - /PV bleed/WDPV	Complaints at follow up visit - /PV bleed/WDPV
14	14	37	29.2	Adenomyosis	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	5	no	no	no
15	15	47	20.5	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	7	no	no	no
16	16	43	24.2	Fibroid uterus	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	discharge pv+
17	17	36	20.5	Adenomyosis	yes	Laparoscopic hysterectomy	10 weeks	no	no	Vaginal	Vicryl no 1-0	no	5	no	no	no
18	18	50	20.2	Adenomyosis	no	Laparoscopic hysterectomy	10 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	6	no	no	no
19	19	48	19.7	AUB	no	Laparoscopic hysterectomy	8 weeks	no	yes, Intraop hemorrhage +	Vaginal	Vicryl no 1-0	no	6	Pv bleed+	no	pv bleed +
20	20	64	18.4	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	4	Pv bleed+	no	no
21	21	43	20.5	AUB	2	Laparoscopic hysterectomy	Normal	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
22	22	50	20.2	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
23	23	42	19.8	Adenomyosis	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
24	24	48	20	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	PV bleed+	no	no
25	25	47	20	Fibroid uterus	no	Laparoscopic hysterectomy	14 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
26	26	41	20	AUB	no	Laparoscopic hysterectomy	6 weeks	no	no	Vaginal	Vicryl no 1-0	no	5	no	no	no
28	27	49	19.2	Fibroid uterus	no	Laparoscopic hysterectomy	10 weeks	no	no	Vaginal	Vicryl no 1-0	no	7	no	no	no

Screening no	Participant No.	Age(in years)	BMI(kg/m2)	Pre op Diagnosis	Previous surgeries	Surgery	Intra op- Size of the uterus	Vaginal tear during specimen delivery (yes/no)	Intra operative complication (yes/no)	Route of vaginal vault closure (Vaginal/Laparoscopic)	Suture material	Difficulty during vault closure	Duration of hospital stay (in days)	Complaints on POD 1- /Pv bleed/WDPV	Complaints at discharge - /PV bleed/WDPV	Complaints at follow up visit - /PV bleed/WDPV
29	28	40	20.5	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	6 weeks	no	no	Vaginal	Vicryl no 1-0	no	7	Pv bleed+	no	no
30	29	52	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	20 weeks	yes, 2 cm	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
31	30	38	22.5	Adenomyosis	no	Laparoscopic hysterectomy	20 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
32	31	46	29.2	Heavy menstrual bleeding	2	Laparoscopic hysterectomy	10 weeks	yes, 2 cm	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	pv bleed +
33	32	50	19	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	Discharge pv+	foul smelling vaginal discharge +
34	33	37	19.5	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
35	34	38	18.6	Adenomyosis	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
36	35	54	19.5	Adenomyosis	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
37	36	46	26.2	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
38	37	38	22.2	Endometrial polyp	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
39	38	36	18.7	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
40	39	40	18.5	Heavy menstrual bleeding	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
41	40	37	19.6	Adenomyosis	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
42	41	39	20	AUB	no	Laparoscopic hysterectomy	Normal	no	no	Vaginal	Vicryl no 1-0	no	7	no	no	no

Screening no	Participant No.	Age(in years)	BMI(kg/m2)	Pre op Diagnosis	Previous surgeries	Surgery	Intra op- Size of the uterus	Vaginal tear during specimen delivery (yes/no)	Intra operative complication (yes/no)	Route of vaginal vault closure (Vaginal/Laparoscopic)	Suture material	Difficulty during vault closure	Duration of hospital stay (in days)	Complaints on POD 1- /Pv bleed/WDPV	Complaints at discharge - /PV bleed/WDPV	Complaints at follow up visit - /PV bleed/WDPV
43	42	40	18.5	endometrial hyperplasia without atypia	1	Laparoscopic hysterectomy	Normal	no	no	Vaginal	Vicryl no 1-0	no	7	Pv bleed+	no	no
44	43	42	18.2	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
45	44	39	24.3	Adenomyosis	no	Laparoscopic hysterectomy	14 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
46	45	40	20.2	AUB	no	Laparoscopic hysterectomy	24 weeks	no	no	Vaginal	Vicryl no 1-0	no	6	no	no	no
47	46	40	23.2	Adenomyosis	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
48	47	42	24.2	AUB	1	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
49	48	39	23	AUB	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
50	49	47	20.2	Adenomyosis	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
51	50	51	20.2	Fibroid uterus	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
52	51	40	19.5	AUB	no	Laparoscopic hysterectomy	6 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
53	52	49	18.2	Fibroid uterus	1	Laparoscopic hysterectomy	20 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
55	53	42	19.5	Adenomyosis	no	Laparoscopic hysterectomy	bulky	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
56	54	40	18.5	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no
57	55	40	22.2	Adenomyosis	2	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	7	no	no	no

Screening no	Participant No.	Age(in years)	BMI(kg/m2)	Pre op Diagnosis	Previous surgeries	Surgery	Intra op- Size of the uterus	Vaginal tear during specimen delivery (yes/no)	Intra operative complication (yes/no)	Route of vaginal vault closure (Vaginal/Laparoscopic)	Suture material	Difficulty during vault closure	Duration of hospital stay (in days)	Complaints on POD 1- /Pv bleed/WDPV	Complaints at discharge - /PV bleed/WDPV	Complaints at follow up visit - /PV bleed/WDPV
58	56	36	19.5	Adenomyosis	no	Laparoscopic hysterectomy	Bulky	no	no	Laparoscopic	Vicryl no 1-0	no	5	no	no	no
59	57	40	19	Fibroid uterus	1	Laparoscopic hysterectomy	16 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
60	58	40	18.5	Adenomyosis	no	Laparoscopic hysterectomy	Bulky	no	no	Vaginal	Vicryl no 1-0	no	3	PV bleed+	Pv bleed+	no
61	59	33	27.2	Fibroid uterus	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	pv bleed +	no	no
62	60	39	19.2	AUB	1	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
63	61	53	20.4	AUB	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
64	62	46	27.2	Fibroid uterus	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
65	63	44	32.3	Adenomyosis	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	Pv bleed+	no	pv bleed+
66	64	44	17.2	AUB	1	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
67	65	52	18.2	Fibroid uterus	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
68	66	53	27.2	Fibroid uterus	no	Laparoscopic hysterectomy	20 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	5	no	no	no
69	67	34	28.5	Fibroid uterus	1	Laparoscopic hysterectomy	18 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
70	68	42	18.2	Heavy menstrual bleeding	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
71	69	49	20.2	AUB	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	no

Screening no	Participant No.	Age(in years)	BMI(kg/m2)	Pre op Diagnosis	Previous surgeries	Surgery	Intra op- Size of the uterus	Vaginal tear during specimen delivery (yes/no)	Intra operative complication (yes/no)	Route of vaginal vault closure (Vaginal/Laparoscopic)	Suture material	Difficulty during vault closure	Duration of hospital stay (in days)	Complaints on POD 1- /Pv bleed/WDPV	Complaints at discharge - /PV bleed/WDPV	Complaints at follow up visit - /PV bleed/WDPV
72	70	33	20.2	Fibroid uterus	no	Laparoscopic hysterectomy	14 weeks	no	intra operative hemorrhage +	Laparoscopic	Vicryl no 1-0	no	4	Fever +, urinary retention +	no	discharge pv+
73	71	37	27	Adenomyosis	3	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
74	72	37	28.2	AUB	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
75	73	38	18.2	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
76	74	38	28.2	Fibroid uterus	1	Laparoscopic hysterectomy	20 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
77	75	42	18.2	Fibroid uterus	no	Laparoscopic hysterectomy	18 weeks	no	no	Vaginal	Vicryl no 1-0	no	5	no	no	no
78	76	42	20.2	Fibroid uterus	no	Laparoscopic hysterectomy	14 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	pelvic pain +	no	no
79	77	50	20.2	AUB	1	Laparoscopic hysterectomy	8 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
80	78	72	29.5	Postmenopausal bleeding	no	Laparoscopic hysterectomy	8 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
81	79	53	18.2	Fibroid uterus	no	Laparoscopic hysterectomy	18 weeks	no	no	Vaginal	Vicryl no 1-0	yes	4	no	no	no
82	80	50	20.5	Fibroid uterus	no	Laparoscopic hysterectomy	20 weeks	no	no	Vaginal	Vicryl no 1-0	no	4	no	no	no
83	81	51	22.8	Fibroid uterus	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	4	no	no	no
84	82	41	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	14 weeks	no	no	Laparoscopic	Vicryl no 1-0		3	no	no	no
85	83	39	25	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no

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86	84	43	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	PV bleed+	no	pv bleed+
87	85	40	23	aub	no	Laparoscopic hysterectomy	10 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
88	86	50	23	Fibroid uterus	no	Laparoscopic hysterectomy	10 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
89	87	50	22.5	Fibroid uterus	no	Laparoscopic hysterectomy	10 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
90	88	51	25	Heavy menstrual bleeding	no	Laparoscopic hysterectomy	14 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
91	89	45	23.2	Adenomyosis	2	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
92	90	52	23	simple endometrial hyperplasia	no	Laparoscopic hysterectomy	14 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	PV bleed+
93	91	39	23	Fibroid uterus	no	Laparoscopic hysterectomy	12 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
94	92	62	23	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	6 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
95	93	42	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
96	94	66	23	endometrial hyperplasia without atypia	2	Laparoscopic hysterectomy	6 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
97	95	64	23	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	no
98	96	47	23	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	no	discharge pv+

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99	97	42	23	Adenomyosis	no	Laparoscopic hysterectomy	8 weeks	no	no	Laparoscopic	Vicryl no 1-0	no	3	no	Discharge pv+	no
100	98	44	23.5	AUB	1	Laparoscopic hysterectomy	8 weeks	No	no	Vaginal	Vicryl no 1-0	no	3	No	No	No
101	99	44	21	Adenomyosis	no	Laparoscopic hysterectomy	12 weeks	No	No	Vaginal	Vicryl no 1-0	no	3	No	No	discharge pv+
102	100	46	24	Fibroid uterus	no	Laparoscopic hysterectomy	20 weeks	no	No	Vaginal	Vicryl no 1-0	no	3	No	Discharge pv+	No
103	101	52	22	Heavy menstrual bleeding	no	Laparoscopic hysterectomy	6 weeks	no	No	Vaginal	Vicryl no 1-0	no	3	no	No	No
104	102	54	19.2	Postmenopausal bleeding	no	Laparoscopic hysterectomy	6 weeks	no	No	Laparoscopic	Vicryl no 1-0	no	3	no	No	No
105	103	56	22.0	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	6 weeks	no	No	Laparoscopic	Vicryl no 1-0	no	3	PV bleed +	No	PV bleed+
106	104	52	19	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	6 weeks	No	No	Vaginal	Vicryl no 1-0	no	3	no	No	No
107	105	57	21	endometrial hyperplasia without atypia	no	Laparoscopic hysterectomy	6 weeks	no	No	Laparoscopic	Vicryl no 1-0	no	3	no	No	No
108	106	48	23.5	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	No	No	Vaginal	Vicryl no 1-0	no	3	PV bleed+	No	Pv bleed+
109	107	46	25	Fibroid uterus	no	Laparoscopic hysterectomy	16 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	discharge pv+	no
110	108	42	26	Fibroid uterus	no	Laparoscopic hysterectomy	12 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	discharge pv+
111	109	40	25.5	Adenomyosis	no	Laparoscopic hysterectomy	6 weeks	no	no	Vaginal	Vicryl no 1-0	no	3	no	no	PV bleed+