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Original Research Article

COMPARATIVE STUDY OF LAPAROSCOPIC AND ABDOMINAL HYSTERECTOMY: IMPACT ON SURGICAL OUTCOMES, PATIENT RECOVERY, AND POSTOPERATIVE COMPLICATIONS AT TERTIARY CARE CENTER

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ABSTRACT

Background: Hysterectomy remains one of the most frequently performed gynecological surgeries for benign uterine conditions. With advances in minimally invasive surgery, laparoscopic hysterectomy (LH) has emerged as a preferred alternative to abdominal hysterectomy (AH) due to its potential for faster recovery, reduced morbidity, and improved cosmetic outcomes. However, comparative data from tertiary care centers in developing countries remain limited. This study aimed to compare the intraoperative and postoperative outcomes, patient recovery, and complication rates between laparoscopic and abdominal hysterectomy in women undergoing surgery for benign gynecological conditions. **Materials and Methods:** A comparative observational study was conducted over 18 months in the Department of Obstetrics and Gynecology at a tertiary care hospital. A total of 100 women aged 30–60 years undergoing hysterectomy for benign indications were enrolled and divided into two groups: LH (n = 50) and AH (n = 50). Demographic characteristics, intraoperative parameters (duration of surgery, blood loss, complications), and postoperative outcomes (pain, analgesic requirement, ambulation, hospital stay, and complications) were recorded. Statistical analysis was performed using SPSS v25, with a p-value <0.05 considered significant. **Result:** The mean operative time was longer in the LH group (98.6 ± 18.2 min vs. 84.3 ± 15.9 min; p = 0.001), while the mean estimated blood loss was significantly lower (124.5 ± 48.6 mL vs. 192.8 ± 67.3 mL; p < 0.001). LH patients experienced significantly less postoperative pain, reduced analgesic use, earlier ambulation, and shorter hospital stay (2.8 ± 0.9 vs. 6.1 ± 1.5 days; p < 0.001). Overall postoperative complications were fewer in the LH group (14% vs. 32%; p = 0.04), with greater patient satisfaction and faster return to normal activity (13.6 ± 3.5 vs. 28.4 ± 5.8 days; p < 0.001). **Conclusion:** Laparoscopic hysterectomy offers superior perioperative and postoperative outcomes compared to abdominal hysterectomy, with reduced morbidity, faster recovery, and higher patient satisfaction. It should be preferred for benign conditions in centers equipped with adequate expertise and infrastructure.

INTRODUCTION

Hysterectomy, the surgical removal of the uterus, is one of the most commonly performed major gynecological procedures worldwide and remains a definitive treatment for various benign and malignant conditions of the female reproductive tract. In clinical terms, hysterectomy can involve removal of the uterus alone (subtotal), the uterus with the cervix (total), and may be combined with bilateral salpingo-oophorectomy depending on the underlying pathology and patient factors.[1,2] It effectively resolves symptoms such as abnormal uterine bleeding, severe pelvic pain, fibroids, and adenomyosis when conservative measures fail.[3] Traditionally performed via an open abdominal route,

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hysterectomy has evolved over time with advancements in surgical techniques and technology. Minimally invasive approaches, notably laparoscopic hysterectomy, have gained prominence due to advantages such as smaller incisions, reduced blood loss, shorter hospital stays, and faster recovery compared to abdominal hysterectomy.[4,5] Despite being technically more demanding with potentially longer operative times and a learning curve, laparoscopic hysterectomy is increasingly recommended over open surgery for benign indications when a vaginal route is not feasible.[6] Comparative studies have demonstrated improved postoperative quality of life and physical functioning in patients undergoing laparoscopic hysterectomy.[7] However, variations in intraoperative outcomes, complication profiles, and long-term recovery persist in literature, and evidence from tertiary care settings remains limited, particularly in diverse patient populations.

Given the growing utilization of laparoscopic techniques and evolving patient expectations for rapid recovery and reduced morbidity, rigorous comparative evaluation of laparoscopic versus abdominal hysterectomy is clinically relevant. A detailed assessment of surgical outcomes, postoperative recovery, and complications within a tertiary care context can inform surgical decision-making and optimize patient care pathways. Therefore, this study aims to provide comprehensive evidence on the impact of surgical approach on outcomes and recovery, thereby addressing gaps in regional data and contributing to evidence-based practice in gynecologic surgery.

MATERIALS AND METHODS

This comparative observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital over a period of 18 months, following approval from the Institutional Ethics Committee. Women aged 30–60 years undergoing hysterectomy for benign gynecological conditions such as uterine fibroids, abnormal uterine bleeding, or adenomyosis were recruited after obtaining informed written consent. Patients were allocated into two groups based on the surgical route: Group A – Laparoscopic hysterectomy (LH) and Group B – Abdominal hysterectomy (AH). Exclusion criteria included cases with suspected or proven malignancy, uterine size exceeding 16 weeks, extensive pelvic adhesions, or contraindications to laparoscopy.

Preoperative evaluation involved a detailed clinical history, general and pelvic examination, and baseline investigations including complete blood count, coagulation profile, and imaging as indicated. Intraoperative parameters recorded were duration of surgery, estimated blood loss, and intraoperative complications such as bladder, bowel, or vascular injury. Postoperative outcomes included pain assessment using a Visual Analogue Scale (VAS), requirement for analgesia, time to ambulation, and duration of hospital stay. Patients were followed up to document postoperative complications—fever, wound or vault infection, urinary tract infection, and other morbidities. Recovery parameters such as time to resume routine activities and patient satisfaction were assessed during postoperative follow-up using a structured questionnaire.

All data were collected prospectively and analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). Quantitative variables were expressed as mean ± standard deviation (SD) and compared using the Student's t-test, while categorical variables were analyzed with the Chi-square test or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant. The results were interpreted to determine the comparative impact of laparoscopic and abdominal hysterectomy on intraoperative efficiency, recovery profile, and postoperative complications among women treated at a tertiary care center.

RESULTS

A total of 100 women undergoing hysterectomy for benign gynecological conditions were included in the study, with 50 in the laparoscopic hysterectomy (LH) group and 50 in the abdominal hysterectomy (AH) group. The mean age of participants was comparable between groups (44.2 ± 6.1 years in LH vs. 45.8 ± 5.8 years in AH). The majority of women in both groups were multiparous (parity 2–3 in 70% of LH and 74% of AH). The mean BMI was similar across groups (25.6 ± 3.1 kg/m² in LH and 26.1 ± 3.3 kg/m² in AH). The most common indication for surgery was fibroid uterus (56% in LH, 54% in AH), followed by abnormal uterine bleeding (28% and 30%, respectively). The prevalence of comorbidities such as hypertension and diabetes mellitus did not differ significantly between groups, indicating that both cohorts were demographically and clinically comparable [Table 1].

Table 1: Baseline Demographic and Clinical Characteristics of Study Participants

Variable	Laparoscopic Hysterectomy (n = 50)		Abdominal Hysterectomy (n = 50)		p-value
	Frequency	%	Frequency	%	
Age (years)	44.2 ± 6.1	—	45.8 ± 5.8	—	0.29
Parity					
0–1	8	16.0	6	12.0	0.62
2–3	35	70.0	37	74.0	

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≥4	7	14.0	7	14.0	
BMI (kg/m²)	25.6 ± 3.1	—	26.1 ± 3.3	—	0.48
Indication for Surgery					
Fibroid uterus	28	56.0	27	54.0	0.77
Abnormal uterine bleeding	14	28.0	15	30.0	
Adenomyosis	6	12.0	5	10.0	
Others (endometrial hyperplasia, DUB, etc.)	2	4.0	3	6.0	
Comorbidities					
Hypertension	10	20.0	12	24.0	0.68
Diabetes mellitus	6	12.0	7	14.0	
Hypothyroidism	5	10.0	6	12.0	
Multiple comorbidities	3	6.0	4	8.0	
Uterine size (weeks)	10.2 ± 2.4	—	10.8 ± 2.6	—	0.31

Table 2: Intraoperative Parameters

Variable	Laparoscopic Hysterectomy (n = 50)		Abdominal Hysterectomy (n = 50)		p-value
	Frequency	%	Frequency	%	
Duration of Surgery (minutes)	98.6 ± 18.2	—	84.3 ± 15.9	—	0.001*
Estimated Blood Loss (mL)	124.5 ± 48.6	—	192.8 ± 67.3	—	<0.001*
Intraoperative Complications					
None	46	92.0	44	88.0	0.34
Bladder injury	1	2.0	2	4.0	
Bowel injury	0	0.0	1	2.0	
Excessive bleeding (>500 mL)	3	6.0	3	6.0	
Conversion to open surgery	1	2.0	—	—	—
Uterine size >12 weeks (requiring morcellation)	8	16.0	—	—	—
Use of energy device (bipolar/harmonic)	50	100.0	—	—	—

Intraoperative findings are summarized in [Table 2]. The mean operative time was significantly longer in the laparoscopic group (98.6 ± 18.2 min) compared to the abdominal group (84.3 ± 15.9 min, p = 0.001). However, the mean estimated blood loss was significantly lower in laparoscopic hysterectomy (124.5 ± 48.6 mL) compared to abdominal hysterectomy (192.8 ± 67.3 mL, p < 0.001). Minor intraoperative complications occurred in 8% of laparoscopic and 12% of abdominal cases, a difference that was not statistically significant. Conversion to open surgery was required in one laparoscopic case (2%) due to dense pelvic adhesions.

Table 3: Postoperative Outcomes

Variable	Laparoscopic Hysterectomy (n = 50)		Abdominal Hysterectomy (n = 50)		p-value
	Frequency	%	Frequency	%	
Postoperative Pain Score (VAS at 6 hrs)	3.6 ± 0.9	—	6.1 ± 1.2	—	<0.001*
Analgesic Requirement (total doses/24 hrs)	1.8 ± 0.6	—	3.2 ± 0.8	—	<0.001*
Time to Ambulation (hours)	8.5 ± 2.1	—	20.3 ± 4.7	—	<0.001*
Duration of Hospital Stay (days)	2.8 ± 0.9	—	6.1 ± 1.5	—	<0.001*
Postoperative Fever	2	4.0	6	12.0	0.14
Need for Blood Transfusion	1	2.0	4	8.0	0.17
Return of Bowel Sounds (hours)	7.2 ± 2.0	—	12.5 ± 3.1	—	<0.001*

Postoperative outcomes [Table 3] showed clear advantages for the laparoscopic approach. The mean pain score on the VAS at 6 hours postoperatively was significantly lower in the LH group (3.6 ± 0.9) than in the AH group (6.1 ± 1.2, p < 0.001). Similarly, the mean analgesic requirement and time to ambulation were both markedly reduced in the laparoscopic group (p < 0.001). The mean duration of hospital stay was 2.8 ± 0.9 days in LH versus 6.1 ± 1.5 days in AH (p < 0.001). Postoperative fever and blood transfusion needs were slightly more frequent in the abdominal group, though differences were not statistically significant.

Table 4: Postoperative Complications

Variable	Laparoscopic Hysterectomy (n = 50)		Abdominal Hysterectomy (n = 50)		p-value
	Frequency	%	Frequency	%	
Total postoperative complications	7	14.0	16	32.0	0.04*
Type of complication					
Wound infection	1	2.0	7	14.0	0.03*
Fever (>100°F beyond 48 hrs)	2	4.0	5	10.0	0.25

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Urinary tract infection	2	4.0	4	8.0	0.68
Vault infection	1	2.0	3	6.0	0.31
Bowel or bladder injury (recognized post-op)	0	0.0	1	2.0	0.31
Hematoma/seroma formation	1	2.0	2	4.0	0.56
Readmission within 30 days	0	0.0	2	4.0	0.15
Reoperation required	0	0.0	1	2.0	0.31

Postoperative complications are detailed in [Table 4]. The overall complication rate was 14% in the laparoscopic group and 32% in the abdominal group ($p = 0.04$). Wound infection was significantly more common after abdominal hysterectomy (14%) compared with laparoscopic (2%, $p = 0.03$). Other complications such as urinary tract infection, fever, vault infection, and hematoma occurred infrequently, with no statistically significant difference between groups. No mortality or major postoperative morbidity was recorded.

Table 5: Recovery and Patient-Reported Outcomes

Variable	Laparoscopic Hysterectomy (n = 50)		Abdominal Hysterectomy (n = 50)		p-value
	Frequency	%	Frequency	%	
Time to return to normal activities (days)	13.6 ± 3.5	—	28.4 ± 5.8	—	<0.001*
Patient satisfaction level (Likert scale)					
Highly satisfied	36	72.0	18	36.0	0.002*
Moderately satisfied	10	20.0	20	40.0	
Dissatisfied	4	8.0	12	24.0	
Quality of life (post-op 6 weeks)					
Improved	44	88.0	35	70.0	0.01*
No change	6	12.0	12	24.0	
Worsened	0	0.0	3	6.0	
Return to sexual activity (within 8 weeks)	34	68.0	22	44.0	0.02*
Overall satisfaction with cosmetic outcome	47	94.0	33	66.0	0.001*

Recovery and patient-reported outcomes [Table 5] revealed significant differences in favor of laparoscopic hysterectomy. The mean time to return to normal daily activities was 13.6 ± 3.5 days in LH and 28.4 ± 5.8 days in AH ($p < 0.001$). Patient satisfaction scores were significantly higher in the laparoscopic group, with 72% reporting high satisfaction versus 36% in the abdominal group ($p = 0.002$). Improvement in postoperative quality of life was observed in 88% of LH patients and 70% of AH patients ($p = 0.01$). Early return to sexual activity and greater cosmetic satisfaction were also reported more frequently in the laparoscopic group ($p < 0.05$).

DISCUSSION

In this comparative observational study of laparoscopic hysterectomy (LH) versus abdominal hysterectomy (AH) for benign gynecological conditions, key outcomes including intraoperative parameters, postoperative recovery, complications, and patient-reported results were analyzed. Our findings align closely with emerging evidence in the literature, which consistently demonstrates several advantages of minimally invasive approaches over traditional open procedures. One of the most consistent observations across studies is the difference in operative time and blood loss between LH and AH. Similar to our study, which showed a statistically significant longer mean operative time for LH but lower estimated blood loss, Thakur et al. found that TLH had a longer duration (94.47 vs. 83.42 minutes) yet significantly reduced blood loss and hemoglobin drop compared with TAH ($p < 0.001$) in women with benign uterine conditions.[8] Likewise, Singh & Nagar reported that TLH resulted in significantly lower blood loss (150.4 vs. 250.7 mL; $p < 0.01$) than TAH, along with fewer postoperative complications (12% vs. 28%; $p = 0.04$) and faster recovery (4.5 vs. 6.8 weeks; $p < 0.01$).[9] These concordant findings reinforce the advantage of laparoscopic approaches in minimizing intraoperative hemorrhage and overall surgical trauma.

Postoperative recovery profiles, including pain, hospital stay, and time to ambulation, consistently favor laparoscopy. Thakur et al. reported that a significantly higher proportion of TLH patients had shorter hospital stays (<3 days in 76.3% vs. 28.9% in TAH, $p < 0.001$) and quicker pain relief ($p = 0.002$), highlighting improved early postoperative outcomes.[10] Our findings of significantly lower pain scores, reduced analgesic requirements, earlier ambulation, and shorter hospitalization in the LH group reflect these observations. Similarly, results from other cohorts have consistently shown that laparoscopic hysterectomy is associated with shorter hospital stay (about 2 days) compared to open surgery (about 5 days), with faster postoperative recovery and fewer wound-related issues.[11] These data support the assertion that minimally invasive techniques facilitate hastened recovery, likely due to reduced tissue trauma and smaller incisions.

Regarding postoperative complications, our study demonstrated significantly fewer overall complications and particularly decreased wound infections in the laparoscopic group. This aligns with the study by Thakur et al., which reported a lower

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wound infection rate in the TLH group (2.6% vs. 13.1%; p = 0.002).[12] A meta-analysis by Walsh et al. further supports the trend of reduced postoperative complications and shorter hospital stays with laparoscopic hysterectomy compared with abdominal approaches. This consistency across studies, including both prospective and retrospective designs, strengthens the evidence favoring minimally invasive routes in eligible patients.

Finally, functional recovery and patient satisfaction—important components of modern surgical outcomes—also reflect the benefits of laparoscopy. Our study showed significantly faster return to daily activities, higher satisfaction, and improved quality of life in the LH group. Comparable findings were reported by the propensity score–matched cohort in which TLH patients had shorter recovery periods (~3 weeks) and higher feasibility scores compared to AH (~6 weeks), in addition to lower pain and complication rates. Taken together, these results underscore the holistic advantages of laparoscopic hysterectomy, not only in clinical outcomes but also in patient-centered recovery metrics.

Overall, our study's outcomes are in concordance with a growing body of evidence that laparoscopic hysterectomy offers superior perioperative and postoperative outcomes compared to abdominal hysterectomy in benign gynecological conditions. These include reduced blood loss, decreased postoperative pain, shorter hospital stays, fewer wound complications, and improved patient satisfaction and recovery. While laparoscopic approaches may involve longer operative times and require surgical expertise, their benefits in terms of reduced morbidity and enhanced recovery support their use as the preferred approach in appropriately selected patients and settings.

CONCLUSION

This comparative observational study demonstrated that laparoscopic hysterectomy offers significant advantages over abdominal hysterectomy in terms of reduced intraoperative blood loss, lower postoperative pain, shorter hospital stay, faster ambulation, and earlier return to daily activities, with a comparable rate of intraoperative complications. The overall postoperative morbidity, particularly wound infection, was significantly lower in the laparoscopic group, and patient satisfaction and quality-of-life outcomes were notably better.

Although laparoscopic hysterectomy requires longer operative time and specialized surgical skills, its benefits in terms of faster recovery and improved patient comfort make it a preferable option for women undergoing hysterectomy for benign gynecological conditions, especially in tertiary care centers with trained laparoscopic surgeons and adequate facilities.

Laparoscopic hysterectomy should be encouraged as the first-line surgical approach for eligible benign cases where vaginal hysterectomy is not feasible. Structured training programs and adequate infrastructure should be prioritized to enhance surgical proficiency and ensure safe implementation of minimally invasive techniques.

This study was conducted in a single tertiary care center with a relatively small sample size, which may limit generalizability. The follow-up period was short and did not evaluate long-term outcomes such as vault prolapse or late complications. Future multicentric studies with larger cohorts and extended follow-up are recommended to validate these findings and further establish standardized surgical protocols.

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