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Comparison of Clinical Outcomes Between Total Laparoscopic Hysterectomy and Total Abdominal (Open) Hysterectomy for Benign Gynaecological Disease: A Prospective Comparative Study

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ABSTRACT

Background: Hysterectomy is one of the most frequently performed gynaecological operations. For women unsuitable for the vaginal route, the choice between minimally invasive laparoscopic surgery and conventional open abdominal surgery is an important clinical decision, particularly in resource-limited settings where open surgery still predominates.

Objective: To compare the intra-operative and post-operative outcomes of total laparoscopic hysterectomy (TLH) with total abdominal (open) hysterectomy (TAH) in women undergoing hysterectomy for benign indications.

Methods: A prospective comparative study was conducted in the Department of Obstetrics & Gynaecology, MGM Medical College & LSK Hospital, Kishanganj. Sixty women with benign uterine pathology were studied — 30 in the TLH group and 30 in the TAH group. Primary outcomes were operative time, estimated blood loss, post-operative pain and length of hospital stay; secondary outcomes were transfusion requirement, ambulation time, complications and time to return to normal activity. Continuous data were compared using the independent t-test or Mann–Whitney U test and categorical data using the chi-square or Fisher exact test; $p < 0.05$ was considered significant.

Results: The two groups were comparable in age, BMI, uterine size and pre-operative haemoglobin (all $p > 0.05$). Mean operative time was significantly longer in the TLH group (116.1 ± 20.3 vs 90.2 ± 14.0 min; $p < 0.001$). However, the TLH group had significantly lower mean blood loss (131.3 ± 38.3 vs 325.3 ± 93.0 mL; $p < 0.001$), lower 24-hour pain scores (3.0 ± 0.9 vs 5.5 ± 0.9; $p < 0.001$), earlier ambulation (10.0 ± 3.2 vs 23.1 ± 3.9 h; $p < 0.001$), shorter hospital stay (3.1 ± 0.9 vs 5.4 ± 1.1 days; $p < 0.001$) and faster return to normal activity (16.4 ± 5.0 vs 31.4 ± 5.1 days; $p < 0.001$). Post-operative complications were significantly fewer after TLH (6.7% vs 33.3%; $p = 0.021$), while intra-operative complications and transfusion rates were comparable. No TLH case required conversion to laparotomy.

Conclusion: In appropriately selected women with benign disease, TLH offers significantly less blood loss, less post-operative pain, earlier mobilisation, shorter hospitalisation, faster recovery and fewer post-operative complications than open hysterectomy, at the cost of a longer operative time. TLH is a safe and effective alternative to open hysterectomy in a teaching-hospital setting.

Key Words: *Total laparoscopic hysterectomy; Total abdominal hysterectomy; Benign gynaecological disease; Operative outcomes; Minimally invasive surgery; Length of hospital stay.*

INTRODUCTION

Hysterectomy is one of the most commonly performed major surgical procedures in gynaecology, undertaken predominantly for benign conditions such as symptomatic uterine fibroids, abnormal uterine bleeding, adenomyosis and

chronic pelvic pain. A substantial proportion of women undergo hysterectomy by the age of 60, making it a major contributor to gynaecological surgical workload worldwide [1].

The procedure can be performed through several routes — abdominal (open), vaginal, laparoscopic, robotic-assisted and, more recently, vaginal natural-orifice approaches [1]. The vaginal route, where feasible, is widely regarded as the least invasive. For women unsuitable for vaginal surgery — for example, because of a large or fixed uterus, suspected adhesions or the need for concurrent adnexal surgery — the choice typically lies between the laparoscopic and the open abdominal approaches [1,2].

Open abdominal hysterectomy has historically been the default approach in much of India and in many resource-limited settings, owing to its short operative time, low equipment requirement and familiar learning curve. However, it involves a larger abdominal incision, greater post-operative pain, longer hospital stay and slower convalescence. Total laparoscopic hysterectomy (TLH), by contrast, is associated with smaller incisions, less intra-operative blood loss, reduced post-operative pain, shorter hospitalisation and faster return to normal activity, although it generally requires a longer operative time and advanced laparoscopic skill [2,3].

Randomised and observational comparisons have repeatedly shown that, although laparoscopic hysterectomy takes longer, it confers meaningful advantages in recovery. A randomised comparison found that the laparoscopic approach took longer yet gave a shorter hospital stay and shorter convalescence [4]; a meta-analysis of randomised trials reported reduced peri-operative complications and lower estimated blood loss with the laparoscopic route [3]. Comprehensive systematic reviews confirm faster return to normal activities with minimally invasive routes, while noting longer operative time and a technique- and experience-dependent risk of urinary-tract injury [1].

Despite this evidence, uptake of laparoscopic hysterectomy in tertiary teaching hospitals in eastern India remains limited, and locally generated outcome data are scarce. Documenting institutional experience is important for surgical audit and patient counselling. The present study was therefore undertaken to compare the intra-operative and post-operative outcomes of TLH and TAH for benign gynaecological disease at MGM Medical College & LSK Hospital, Kishanganj.

Aim and objectives

Aim: To compare clinical outcomes of total laparoscopic hysterectomy and total abdominal (open) hysterectomy for benign uterine conditions.

1. To compare operative time, estimated blood loss and transfusion requirement between the two groups.
2. To compare post-operative pain, ambulation time, length of hospital stay and time to return to normal activity.
3. To compare intra-operative and post-operative complications, including conversion to laparotomy.

MATERIALS AND METHODS

This was a prospective comparative study conducted in the Department of Obstetrics & Gynaecology, MGM Medical College & LSK Hospital, Kishanganj, Bihar, over a period of December 2024- May 2026. Sixty consecutive women meeting the eligibility criteria and undergoing hysterectomy for benign uterine disease were enrolled, comprising 30 women in the TLH group and 30 in the TAH group. Allocation to the surgical approach was based on [clinical suitability and patient/surgeon preference — describe your actual method].

Inclusion criteria

- Women requiring hysterectomy for benign uterine conditions (fibroid uterus, abnormal uterine bleeding, adenomyosis, chronic pelvic pain or endometrial polyp).
- Uterine size clinically equivalent to ≤ 16 weeks of gestation.
- Willingness to participate and to undergo the allocated procedure.

Exclusion criteria

- Known or suspected genital-tract malignancy.
- Very large uterus or gross pelvic pathology precluding the laparoscopic route.
- Severe cardiorespiratory disease contraindicating pneumoperitoneum or general anaesthesia.
- Major uncorrected bleeding disorder; pregnancy.

Group A (TLH): Total laparoscopic hysterectomy under general anaesthesia using a standard multiport technique, with the uterus removed vaginally (with morcellation where required) and the vault closed laparoscopically or vaginally per institutional practice.

Group B (TAH): Total abdominal hysterectomy through a Pfannenstiel or lower-midline incision under regional or general anaesthesia, following standard technique.

All procedures were performed or supervised by experienced consultants. Standardised peri-operative antibiotic prophylaxis, thromboprophylaxis and a uniform post-operative analgesia and mobilisation protocol were applied to both groups.

Outcome measures

Primary: operative time (skin incision to closure, minutes); estimated intra-operative blood loss (mL); post-operative pain (Visual Analogue Scale at 24 hours); length of post-operative hospital stay (days).

Secondary: need for blood transfusion; ambulation time (hours); intra-operative complications (visceral/vascular injury, wound extension); conversion to laparotomy (TLH group); post-operative complications (fever, wound/port-site infection, urinary tract infection, ileus); and time to return to normal activity (days).

Data were entered in Microsoft Excel and analysed using [statistical software, e.g. SPSS v__]. Normality of continuous variables was assessed using the Shapiro–Wilk test. Normally distributed continuous variables are expressed as mean ± standard deviation and compared using the independent-samples t-test; non-normally distributed variables were compared using the Mann–Whitney U test. Categorical variables are expressed as frequencies and percentages and compared using the chi-square or Fisher exact test. A two-tailed p-value < 0.05 was considered statistically significant.

RESULTS

Sixty women were studied, 30 in each group. The two groups were comparable with respect to baseline demographic and clinical characteristics, with no statistically significant differences (Table 1).

Table 1. Baseline characteristics of the two study groups.

Characteristic	TLH (n=30)	TAH (n=30)	p-value
Mean age (years)	46.1 ± 5.1	47.9 ± 6.3	0.238
Mean BMI (kg/m²)	26.6 ± 3.0	26.1 ± 2.5	0.487
Mean uterine size (weeks)	11.3 ± 2.0	11.8 ± 2.2	0.353
Mean pre-operative Hb (g/dL)	11.3 ± 0.8	11.2 ± 0.9	0.471
Previous pelvic surgery, n (%)	11 (36.7)	12 (40.0)	1.000

Data are mean ± SD or n (%). Hb = haemoglobin.

The commonest indication for surgery in both groups was fibroid uterus (TLH 12/30, 40.0%; TAH 18/30, 60.0%), followed by abnormal uterine bleeding (TLH 8, TAH 7) and adenomyosis (TLH 7, TAH 3); the distribution of indications and of parity did not differ significantly between the groups.

The principal intra-operative and post-operative outcomes are summarised in Table 2.

Table 2. Comparison of operative and post-operative outcomes.

Outcome	TLH (n=30)	TAH (n=30)	p-value
Mean operative time (min)	116.1 ± 20.3	90.2 ± 14.0	**< 0.001**
Mean estimated blood loss (mL)	131.3 ± 38.3	325.3 ± 93.0	**< 0.001**
Blood transfusion, n (%)	2 (6.7)	2 (6.7)	1.000
Mean post-op pain (VAS, 24 h)	3.0 ± 0.9	5.5 ± 0.9	**< 0.001**
Mean ambulation time (h)	10.0 ± 3.2	23.1 ± 3.9	**< 0.001**
Mean hospital stay (days)	3.1 ± 0.9	5.4 ± 1.1	**< 0.001**
Return to normal activity (days)	16.4 ± 5.0	31.4 ± 5.1	**< 0.001**
Conversion to laparotomy, n (%)	0 (0.0)	—	—

Data are mean ± SD or n (%). VAS = Visual Analogue Scale. Bold p-values are statistically significant.

Operative time was significantly longer in the TLH group, whereas estimated blood loss, post-operative pain, ambulation time, hospital stay and time to return to normal activity were all significantly lower in the TLH group. The transfusion rate was identical in both groups (6.7%), and no laparoscopic procedure required conversion to laparotomy.

Table 3. Intra-operative and post-operative complications.

Complication	TLH n (%)	TAH n (%)	p-value
Intra-operative			
Bladder injury	3 (10.0)	1 (3.3)	1.00
Vascular bleeding	2 (6.7)	1 (3.3)	
Wound extension	0 (0.0)	4 (13.3)	
Any intra-operative complication	**5 (16.7)**	**6 (20.0)**	
Post-operative			
Urinary tract infection	0 (0.0)	4 (13.3)	**0.021**
Wound / port-site infection	1 (3.3)	3 (10.0)	
Fever	1 (3.3)	2 (6.7)	
Ileus	0 (0.0)	1 (3.3)	
Any post-operative complication	**2 (6.7)**	**10 (33.3)**	

Bold p-values are statistically significant. Some patients had more than one event; percentages are of 30 patients per group.

Intra-operative complications were uncommon and statistically comparable between the groups (16.7% vs 20.0%; p = 1.000). Bladder injury was numerically more frequent in the TLH group (3 vs 1), reflecting the known learning-curve-

related risk of urinary-tract injury in laparoscopic surgery, whereas wound extension occurred only in the open group. Post-operative complications were significantly fewer in the TLH group (6.7% vs 33.3%; p = 0.021), driven largely by urinary tract and wound infections in the open group.

DISCUSSION

In this prospective comparison of 60 women undergoing hysterectomy for benign disease, the two groups were well matched at baseline, allowing a fair comparison of operative and recovery outcomes. The central finding — a longer operative time for the laparoscopic approach offset by clear advantages in blood loss, pain, mobilisation, hospital stay, recovery and post-operative morbidity — is highly consistent with the established literature.

The significantly longer operative time observed for TLH (116.1 vs 90.2 minutes) reflects the greater technical complexity of laparoscopic hysterectomy and the influence of the surgical learning curve. This mirrors a randomised comparison in which laparoscopic hysterectomy took substantially longer than the open approach yet still delivered a shorter hospital stay and convalescence [4], and is in keeping with the wider evidence base that consistently reports longer operating times for the minimally invasive route [1,3].

The marked reduction in estimated blood loss with TLH (131.3 vs 325.3 mL) accords with a meta-analysis of randomised trials, which found lower estimated blood loss and fewer peri-operative complications with the laparoscopic compared with the open abdominal approach [3]. Despite this difference in blood loss, the transfusion rate was identical (6.7%) in our cohort, indicating that the difference, while statistically and clinically meaningful, did not commonly cross the threshold for transfusion in either group.

The advantages of TLH in post-operative recovery were striking and statistically significant: lower 24-hour pain scores (3.0 vs 5.5), earlier ambulation (10.0 vs 23.1 hours), shorter hospital stay (3.1 vs 5.4 days) and faster return to normal activity (16.4 vs 31.4 days). These findings reproduce the most consistent benefits of minimally invasive hysterectomy reported in the Cochrane systematic review, namely a faster return to normal activities than open surgery [1], and are quantitatively comparable to Indian and international hospital-based series reporting shorter hospital stay and lower blood loss with the laparoscopic route [6,7].

With regard to safety, intra-operative complications were uncommon and statistically comparable between the groups (16.7% vs 20.0%). Bladder injury was numerically more frequent in the TLH group, consistent with the recognised, experience-dependent risk of lower-urinary-tract injury associated with the laparoscopic approach highlighted in systematic reviews [1]; this risk is expected to diminish as unit experience accumulates. Importantly, post-operative complications were significantly fewer after TLH (6.7% vs 33.3%; p = 0.021), driven mainly by urinary tract and wound infections in the open group — a finding attributable to the smaller incisions, reduced tissue handling and earlier mobilisation of minimally invasive surgery. The absence of any conversion to laparotomy supports the feasibility of TLH with appropriate case selection in this setting.

Professional guidance recommends that the least invasive feasible route of hysterectomy be selected for each individual woman [5]. Taken together with the present results, the evidence supports offering laparoscopic hysterectomy to appropriately selected women who are not candidates for vaginal surgery, provided the necessary surgical expertise and equipment are available. For a teaching hospital, documenting and auditing local outcomes is an important step in safely expanding minimally invasive practice and in training future surgeons. From an anaesthetic and peri-operative standpoint, the longer pneumoperitoneum and positioning demands of TLH must be weighed against its benefits of reduced pain, earlier mobilisation and shorter hospitalisation, underscoring the value of close obstetric–anaesthetic collaboration.

Limitations

- Single-centre study with a modest sample size (30 per group), which limits the power to detect differences in uncommon events such as individual complications.
- Allocation was not randomised, which may introduce selection bias; outcomes such as operative time are also influenced by the surgical learning curve during the study period.
- Follow-up may be insufficient to capture late complications such as vault-related morbidity.
- Cost-effectiveness and quality-of-life outcomes were not assessed.

CONCLUSION

In women undergoing hysterectomy for benign gynaecological disease at our institution, total laparoscopic hysterectomy was associated with significantly less intra-operative blood loss, reduced post-operative pain, earlier ambulation, shorter hospital stay, faster return to normal activity and fewer post-operative complications than total abdominal (open) hysterectomy, at the expense of a longer operative time. With appropriate patient selection and surgical expertise, TLH is a safe and effective alternative to open hysterectomy and merits wider adoption in teaching-hospital practice. Larger,

adequately powered and ideally randomised studies are recommended to confirm these findings and to evaluate long-term outcomes and cost-effectiveness.

Declarations
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Author contributions: Both authors contributed to study design, data collection and analysis, and manuscript preparation, and approved the final version.

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