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**Original Research Article**

# A comparative study of total laparoscopic hysterectomy and total abdominal hysterectomy at a tertiary care centre

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## ABSTRACT

**Background:** Hysterectomy is the commonest major gynaecological operation and the choice between laparoscopic and abdominal routes for benign disease remains debated. This study compared total laparoscopic hysterectomy (TLH) with total abdominal hysterectomy (TAH) in terms of indications, intraoperative and postoperative outcomes and recovery.
**Methods:** This prospective comparative observational study was conducted over 18 months in the Department of Obstetrics and Gynaecology of a government medical college in Maharashtra. Sixty-four women undergoing hysterectomy for benign uterine disease with a uterus of up to 16 weeks' size were studied, 32 by TLH and 32 by TAH. Operative time, blood loss, transfusion, complications, day-3 haemoglobin, duration of analgesia, hospital stay and return to daily activities were compared.
**Results:** Uterine fibroid was the commonest indication in both groups. Compared with TAH, TLH was associated with shorter operative time (92.2±17.2 vs 104.1±19.9 min; p=0.013), lower blood loss (126.4±72.1 vs 264.1±83.5 ml; p<0.001), higher day-3 haemoglobin (10.3±0.8 vs 9.2±1.1 g/dl; p<0.001) and fewer transfusions (12.5% vs 40.6%; p=0.022). Wound complications occurred only after TAH (25% vs 0%; p=0.005). Analgesia was needed for fewer days (4.6±1.3 vs 9.3±3.5), hospital stay was shorter (5.4±0.8 vs 12.6±4.0 days) and return to daily activities was earlier (2.4±0.7 vs 3.6±0.8 days) after TLH (all p<0.001). Bladder injury (9.4% vs 3.1%) and ileus (9.4% vs 3.1%) did not differ significantly.
**Conclusions:** In appropriately selected women, TLH is a safe alternative to TAH, with less blood loss, fewer wound complications and faster recovery.

**Keywords:** Abdominal hysterectomy, Blood loss, Hospital stay, Minimally invasive surgery, Postoperative complications, Total laparoscopic hysterectomy

## INTRODUCTION

Hysterectomy is the most frequently performed major gynaecological operation and, after caesarean section, one of the commonest major surgical procedures in women.[1] In India, most hysterectomies are performed for benign conditions such as uterine fibroids, abnormal uterine bleeding and adenomyosis.[2] The uterus may be removed by the abdominal, vaginal, laparoscopic or robotic route and the choice depends on uterine size and mobility, the indication, previous surgery, the need for concurrent procedures, the surgeon's training and the resources available.[3] Abdominal hysterectomy remains the most widely practised route, particularly for enlarged uteri, but

it is associated with greater blood loss, more wound infection, more postoperative pain and a longer hospital stay.[4] Since Reich and colleagues described laparoscopic hysterectomy in 1989, TLH has evolved as an alternative to abdominal hysterectomy when vaginal hysterectomy is not feasible.[5] Randomised trials and systematic reviews have shown that laparoscopic hysterectomy offers faster recovery, shorter hospital stay and fewer wound complications than abdominal hysterectomy, at the cost of a longer learning curve and, in some series, a higher rate of urinary tract injury.[4,6,7]

Current guidance recommends a minimally invasive route whenever feasible for benign disease.[3] However, abdominal hysterectomy is still performed for most benign indications in many Indian public-sector hospitals and comparative data from these settings are limited. This study was therefore undertaken to compare TLH and TAH with respect to indications, intraoperative and postoperative complications, anaesthesia-related complications and patient recovery, measured as duration of postoperative analgesia, hospital stay and time to return to daily activities.

## METHODS

### *Study design and setting*

This prospective comparative observational study was conducted in the Department of Obstetrics and Gynaecology, Vilasrao Deshmukh Government Medical College, Latur, Maharashtra, India, a tertiary care teaching hospital, over a period of 18 months.

### *Participants*

Women undergoing hysterectomy by the laparoscopic or abdominal route for benign uterine conditions or for premalignant cervical lesions (cervical intraepithelial neoplasia I–III), with a uterus of up to 16 weeks' size and who gave written informed consent were included.

Women with a uterus larger than 16 weeks, any primary or secondary gynaecological malignancy, serious cardiac or pulmonary disease, active abdominal tuberculosis, uterovaginal prolapse, an adnexal mass, endometriosis, a broad ligament fibroid or a BMI above 35 kg/m² were excluded. The route of hysterectomy was decided by the operating team after clinical and ultrasonographic assessment.

### *Sample size*

Assuming a two-sided significance level of 0.05, a power of 80% and an effect size of 0.60, the required sample size was 32 women per group. A total of 64 women were studied: 32 underwent TLH and 32 underwent TAH.

### *Data collection*

A structured proforma was used to record age, menstrual and obstetric history, menopausal status, comorbidities, BMI, examination findings, uterine size on bimanual examination, ultrasonographic findings, the indication for surgery and preoperative investigations. Intraoperative data included duration of surgery (skin incision to skin closure), estimated blood loss, blood transfusion, visceral injuries and whether bilateral salpingo-oophorectomy was performed.

Postoperatively, women were monitored for hypotension, fever, wound complications (redness, induration, discharge and wound gaping), paralytic ileus, haematoma, urinary tract infection and anaesthesia-related complications. Wound swabs were cultured where indicated. Haemoglobin was measured on the third postoperative day. The number of days for which analgesia was required, the duration of hospital stay and the time to return to daily activities were recorded.

### *Statistical analysis*

Continuous variables are presented as mean±standard deviation (SD) and were compared using the independent-samples t-test. Categorical variables are presented as frequencies and percentages and were compared using Fisher's exact test or the chi-square test, as appropriate. A p value<0.05 was considered statistically significant. Analysis was performed using the SciPy statistical library in Python.

### *Ethical considerations*

The study was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants and confidentiality was maintained throughout.

## RESULTS

The baseline characteristics of the two groups are shown in Table 1. Mean age was comparable (TAH 45.2±5.9 years vs TLH 43.3±6.5 years; p=0.221), as was mean BMI (24.2±4.4 vs 26.0±5.3 kg/m²; p=0.126). More women in the TAH group were postmenopausal (25.0% vs 3.1%; p=0.027). Comorbidities were present in 28.1% of women undergoing TAH and 9.4% of those undergoing TLH (p=0.107), hypertension being the commonest.

Uterine fibroid was the commonest indication in both groups (TAH 75.0%, TLH 59.4%), followed by fibroid with adenomyosis. Adenomyosis alone (15.6%) and endometrial hyperplasia (9.4%) were more frequent in the TLH group, although the overall distribution of indications did not differ significantly (p=0.087). Uterine size differed markedly between the groups: 81.3% of TLH cases had a uterus of 10 weeks' size or less, whereas 68.8% of TAH cases had a uterus of 14–16 weeks (p<0.001) (Table 1).

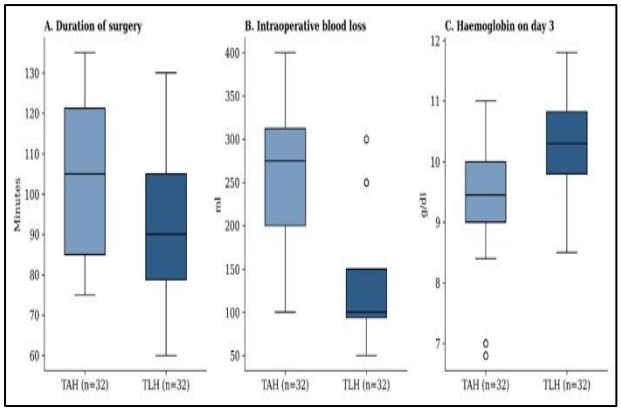



**Figure 1 (A-C): Intraoperative outcomes after total abdominal hysterectomy (TAH) and total laparoscopic hysterectomy (TLH). Duration of surgery. Intraoperative blood loss. Haemoglobin on the third postoperative day. Boxes show the median and interquartile range; whiskers show the range excluding outliers (circles).**

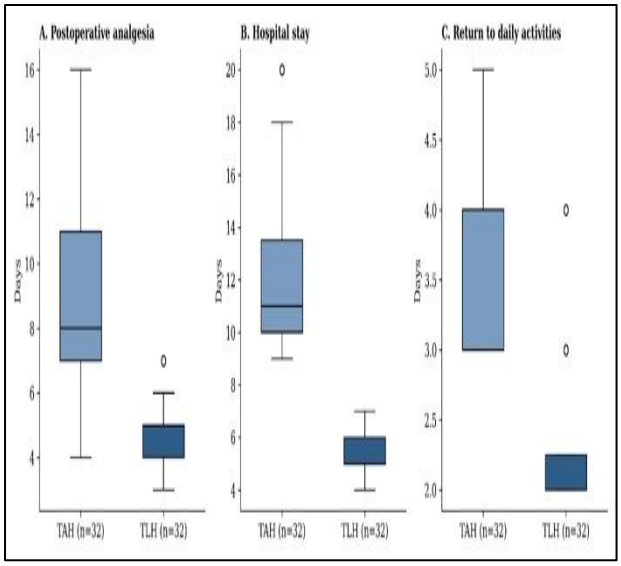



**Figure 2 (A-C): Postoperative recovery after TAH and TLH. Duration of postoperative analgesia. Duration of hospital stay. Time to return to daily activities. Boxes show the median and interquartile range; whiskers show the range excluding outliers.**

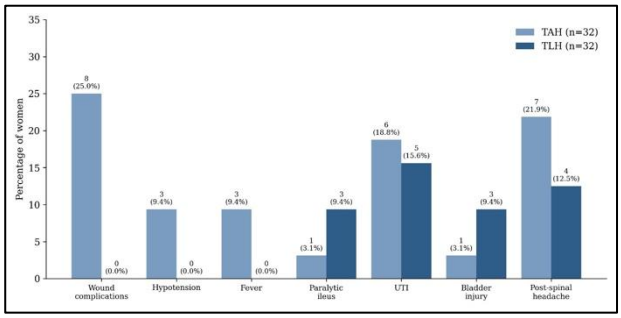



**Figure 3: Postoperative and intraoperative complications after TAH and TLH. Values are number (percentage). Wound complications include redness, induration, discharge and wound gaping; UTI: urinary tract infection.**

The mean duration of surgery was shorter for TLH than for TAH (92.2±17.2 vs 104.1±19.9 min; p=0.013). Mean blood loss was about half that of TAH (126.4±72.1 vs 264.1±83.5 ml; p<0.001) and mean day-3 haemoglobin was higher after TLH (10.3±0.8 vs 9.2±1.1 g/dl; p<0.001) (Table 2, Figure 1). Intraoperative transfusion was needed in 25.0% of TAH and 6.3% of TLH cases (p=0.082) and postoperative transfusion in 18.8% and 6.3%, respectively (p=0.257); overall, 40.6% of women undergoing TAH and 12.5% undergoing TLH required intraoperative or postoperative transfusion (p=0.022). There were no bowel or ureteric injuries. Bladder injury occurred in 1 TAH case (3.1%) and 3 TLH cases (9.4%) (p=0.613). Wound complications were seen only in the TAH group: redness and induration in 8 women (25.0%; p=0.005), discharge in 7 (21.9%; p=0.011) and wound gaping in 8 (25.0%; p=0.005). Wound swab cultures grew organisms (Klebsiella in 2, Escherichia coli in 1 and Staphylococcus aureus in 1) only in the TAH group. Hypotension and fever each occurred in 3 women (9.4%) after TAH and in none after TLH (p=0.238). Paralytic ileus (3.1% vs 9.4%; p=0.613), urinary tract infection (18.8% vs 15.6%; p=1.000) and post-spinal headache (21.9% vs 12.5%; p=0.509) did not differ significantly (Table 3, Figure 3). Recovery was faster after TLH (Table 3, Figure 2). Women undergoing TLH needed analgesia for fewer days (4.6±1.3 vs 9.3±3.5 days), had a shorter hospital stay (5.4±0.8 vs 12.6±4.0 days) and returned to daily activities earlier (2.4±0.7 vs 3.6±0.8 days) than those undergoing TAH (all p<0.001).

**Table 1: Baseline characteristics, indications and uterine size in the two groups.**

| Parameter | Category | TAH (n=32) | TLH (n=32) | P value |
|---|---|---|---|---|
| **Age (in years)** | Mean±SD | 45.22±5.86 | 43.31±6.46 | 0.221[a] |
| | > 50 years | 5 (15.6) | 2 (6.3) | 0.426 |
| **Postmenopausal** | Yes | 8 (25.0) | 1 (3.1) | 0.027* |
| **BMI (kg/m²)** | Mean±SD | 24.16±4.39 | 26.04±5.27 | 0.126[a] |
| | 18.5–24.9 | 19 (59.4) | 15 (46.9) | |
| | 25–29.9 | 9 (28.1) | 6 (18.8) | |
| | ≥ 30 | 4 (12.5) | 11 (34.4) | 0.075[b] |
| **Comorbidities** | Any | 9 (28.1) | 3 (9.4) | 0.107 |

Continued.

| Parameter | Category | TAH (n=32) | TLH (n=32) | P value |
|---|---|---|---|---|
| | Hypertension | 5 (15.6) | 2 (6.3) | |
| | Diabetes mellitus | 2 (6.3) | 1 (3.1) | |
| | HIV infection | 1 (3.1) | 0 | |
| | Hyperthyroidism | 1 (3.1) | 0 | |
| **Preoperative anaemia** | Yes | 23 (71.9) | 23 (71.9) | 1.000 |
| **Indication** | Uterine fibroid | 24 (75.0) | 19 (59.4) | 0.087[c] |
| | Fibroid with adenomyosis | 7 (21.9) | 5 (15.6) | |
| | Adenomyosis | 1 (3.1) | 5 (15.6) | |
| | Endometrial hyperplasia | 0 | 3 (9.4) | |
| **Uterine size (weeks)** | ≤ 10 | 0 | 26 (81.3) | <0.001[c] |
| | 10–12 | 4 (12.5) | 6 (18.8) | |
| | 12–14 | 6 (18.8) | 0 | |
| | 14–16 | 22 (68.8) | 0 | |

[a]Independent-samples t-test; [b]BMI ≥30 vs <30; [c]chi-square test; other p values by Fisher's exact test. *Statistically significant (p<0.05).

**Table 2: Intraoperative outcomes in the two groups.**

| Parameter | Category | TAH (n=32) | TLH (n=32) | P value |
|---|---|---|---|---|
| **Duration of surgery (min)** | Mean±SD | 104.12±19.94 | 92.19±17.22 | 0.013[a*] |
| **Blood loss (ml)** | Mean±SD | 264.06±83.51 | 126.41±72.07 | <0.001[a*] |
| **Blood transfusion** | Intraoperative | 8 (25.0) | 2 (6.3) | 0.082 |
| | Postoperative | 6 (18.8) | 2 (6.3) | 0.257 |
| | Intra- or postoperative | 13 (40.6) | 4 (12.5) | 0.022* |
| **Visceral injury** | Bladder | 1 (3.1) | 3 (9.4) | 0.613 |
| | Bowel | 0 | 0 | – |
| | Ureter | 0 | 0 | – |
| **Bilateral salpingo-oophorectomy** | Performed | 10 (31.3) | 2 (6.3) | 0.022* |
| **Haemoglobin on day 3 (g/dl)** | Mean±SD | 9.24±1.06 | 10.26±0.80 | <0.001[a*] |

[a]Independent-samples t-test; other p values by Fisher's exact test. *Statistically significant (p<0.05).

**Table 3: Postoperative complications and recovery in the two groups.**

| Parameter | Category | TAH (n=32) | TLH (n=32) | P value |
|---|---|---|---|---|
| **Immediate complications** | Hypotension | 3 (9.4) | 0 | 0.238 |
| | Fever | 3 (9.4) | 0 | 0.238 |
| | Paralytic ileus | 1 (3.1) | 3 (9.4) | 0.613 |
| | Haematoma | 0 | 0 | – |
| **Wound complications** | Redness and induration | 8 (25.0) | 0 | 0.005* |
| | Discharge | 7 (21.9) | 0 | 0.011* |
| | Wound gaping | 8 (25.0) | 0 | 0.005* |
| | Positive swab culture | 4 (12.5) | 0 | 0.113 |
| **Other complications** | Urinary tract infection | 6 (18.8) | 5 (15.6) | 1.000 |
| | Post-spinal headache | 7 (21.9) | 4 (12.5) | 0.509 |
| **Recovery (days)** | Postoperative analgesia | 9.31±3.48 | 4.59±1.29 | <0.001[a*] |
| | Hospital stay | 12.62±4.00 | 5.41±0.84 | <0.001[a*] |
| | Return to daily activities | 3.62±0.75 | 2.38±0.71 | <0.001[a*] |

[a]Independent-samples t-test; other p values by Fisher's exact test. *Statistically significant (p<0.05).

## DISCUSSION

In this study, TLH was associated with shorter operative time, less blood loss, fewer transfusions, no wound complications and substantially faster recovery than TAH, without a significant increase in major complications. These findings are consistent with the Cochrane review and earlier meta-analyses, which concluded that laparoscopic hysterectomy offers faster return to normal activities, shorter hospital stay and fewer wound or abdominal wall infections than abdominal hysterectomy.[4,6,8] Operative time was about 12 minutes shorter for TLH. Most randomised trials, including eVALuate, reported longer operating times for laparoscopic hysterectomy,[7,9] and the shorter time in our series probably reflects the smaller uteri operated

laparoscopically and the experience of the surgical team, since operative time falls considerably once the learning curve is overcome.[10] The selection of larger uteri for TAH is an important confounder when interpreting this result.

Blood loss after TLH was about half that after TAH and fewer women needed transfusion. The magnified view and meticulous haemostasis afforded by laparoscopy explain this advantage, which has been reported consistently in randomised trials and meta-analyses.[8,9,11] Uterine size and weight are among the strongest predictors of blood loss in laparoscopic hysterectomy and the larger uteri in the TAH group may have contributed to the difference.[10] The lower day-3 haemoglobin after TAH is of practical importance in our population, in whom preoperative anaemia was common in both groups.

Wound complications, including gaping, occurred in one-quarter of women after TAH and in none after TLH. Surgical site infection is a well-recognised morbidity of laparotomy and minimally invasive approaches markedly reduce this risk.[4,12] Fever and hypotension were also seen only after TAH. Bladder injury was more frequent after TLH, although the difference was not significant. Urinary tract injury is the principal concern with laparoscopic hysterectomy and its incidence falls with increasing surgical experience; routine intraoperative cystoscopy and careful bladder dissection help to recognise and reduce such injuries.[7,13,14]

The most striking differences were in recovery. Analgesia was required for about half as many days, hospital stay was shortened by about 7 days and return to daily activities was earlier after TLH. Similar benefits have been reported in randomised trials, which also showed better quality of life in the early postoperative period after TLH.[9,15] A shorter hospital stay is particularly valuable in overburdened public hospitals, where it releases beds and reduces indirect costs for patients and their families.[16]

Current guidelines recommend that a minimally invasive route be chosen whenever feasible for benign hysterectomy.[3] Our findings support wider use of TLH in government hospitals, together with structured training so that surgeons can offer the procedure to women with larger uteri and higher BMI, in whom it has been shown to be feasible and safe.[17,18]

This study has some limitations. It was a single-centre observational study with a small sample. Allocation to the two routes was based on clinical judgement, so the groups differed in uterine size and menopausal status and these differences may have influenced the outcomes. Blood loss was estimated rather than measured, pain was assessed by duration of analgesia rather than a validated score and long-term outcomes were not studied. Larger randomised studies with standardised outcome measures are needed.

## CONCLUSION

In women with benign uterine disease and a uterus of up to 16 weeks' size, TLH was associated with less blood loss, fewer transfusions, no wound complications, shorter hospital stay and faster return to daily activities than TAH, with a comparable rate of major complications. TLH is a safe and effective alternative to abdominal hysterectomy in appropriately selected women and its wider adoption in public-sector hospitals should be encouraged.b

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