

# Surgical Morbidity of Laparoscopic Hysterectomy versus Abdominal Hysterectomy: A Retrospective Overview

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## Abstract

**Objectives:** Laparoscopic skills are not an innate behavior, nor can they be easily mimicked, and can only be acquired through hands-on training. The need for reliable training and its assessment is becoming increasingly important with the course of time.

**Materials and Methods:** A retrospective comparative study was done in a tertiary care center where all patients undergoing hysterectomy by laparoscopic and abdominal route were included in the study.

**Objectives:** Our study aims to compare the operative and postoperative complications of laparoscopic hysterectomy with abdominal hysterectomy. The study was conducted from June 2016 to October 2022.

**Results:** The mean operative time for uteri size lesser than 12 weeks was found significant in the total laparoscopic hysterectomy (TLH) group ( $75 \pm 25$  min) to total abdominal hysterectomy (TAH) ( $117 \pm 28$  min,  $P < 0.001$ ). The mean blood loss in the TLH group was significant ( $110 \pm 30$  ml vs.  $160 \pm 116$  ml,  $P < 0.002$ ). The mean hospital stay was significantly shorter in TLH ( $4 \pm 2.4$  days vs.  $7 \pm 2.41$  days,  $P < 0.002$ ). The operative and postoperative complications observed were 3.1% in the TLH group and 11.7% in the TAH group.

**Conclusion:** TLH when performed efficiently has proved to be a preferable route over other conventional hysterectomies.

**Keywords:** Clavein-dindo classification, complication, minimal invasive surgeries

## INTRODUCTION

Hysterectomy is one of the most common procedures in gynecological practice. It itself is a surgical challenge, regardless of the route—vaginal, open abdominal, or endoscopic. The vaginal route is still considered the preferred route when considering lesser invasions. However, the abdominal route provides more flexibility to surgeons. With the advent of laparoscopy, its recent development and widespread application of minimally invasive surgeries in gynecology have gained an edge over the laparoscopic route of hysterectomy over the abdominal and vaginal route. The indications have expanded to include conditions once reserved for open surgeries, such as large fibroids, pelvic prolapse, and endometriosis,<sup>[1]</sup> improving postoperative

quality life and satisfaction as compared to conservative management.<sup>[2]</sup> The technical difficulties of this procedure can be highly variable depending on the uterine size and possible concomitant conditions affecting the patient, such as pelvic adhesive disease, endometriosis, or the presence and location of leiomyoma's.<sup>[2]</sup> Herbert, each case when addressed and secured individually could essentially mitigate the occurrence of complications.

## Objectives

In the present study, we aim to compare operative and postoperative complications of laparoscopic hysterectomy with abdominal hysterectomy hence, assess the preferable route of surgery.

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## MATERIALS AND METHODS

This retrospective comparative study was conducted in a tertiary care center in a single unit institutional setup over a period of June 2016 to October 2022. The study conforms to the ethical norms and standards in the Declaration of Helsinki, including the local ethics committee approval statement, registration no. and informed consent statement, and the local Institutional Ethics Committee, All India Institute of Medical Science, India (ref no. AIIMS/Pat/IEC/2021/724). All patients who underwent total laparoscopic hysterectomy (TLH) and total abdominal hysterectomy (TAH) were included in the study. All hysterectomies performed either through the vaginal route, secondary to obstetrics cause or intractable hemorrhage and malignancy were excluded. The included patients were divided into two groups: TLH (Group 1) and TAH (Group 2) respectively. The operative data/register was studied thoroughly, and patients were contacted telephonically if required. The baseline characteristics of the two groups were comparable. It included the age and body mass index (BMI) of the patient, indication of surgery, size of the uterus, intraoperative complication, injury to adjacent organs, postoperative complications like surgical site infections (SSI), fever, hematuria, fistula formation, duration of hospital stay and readmission rates were studied. The peroperative and postoperative complications were categorized according to Clavien Dindo’s classification. Also, as performed in a single unit, hence the inter-surgeon experience/variation was excluded. All data analysis was done by IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY). All the continuous variables were presented as mean and standard deviation and categorical data as frequency and percentage. Continuous data were analyzed using the Students *t*-test and categorical data was analyzed using the Chi-square test. *P* < 0.05 will be considered significant.

## RESULTS

In the present study, a total of 600 patients were included in the study of which 344 underwent TLH (Group 1) and 256 underwent TAH (Group 2). The baseline characteristics of patients were comparable. The age and BMI of the patients in the two groups were comparable. The mean operative time for uteri size lesser than 12 weeks was found significant in the TLH group (75 ± 25 min) to TAH (117 ± 28 min, *P* < 0.001). However, with an increase in uterine size, the mean operative time was comparable in both groups. The mean blood loss in the TLH group was significant (110 ± 30 ml vs. 160 ± 116 ml, *P* < 0.002). The mean hospital stay was significantly shorter in TLH (4 ± 2.4 days vs. 7 ± 2.41 days, *P* < 0.002). The mean follow up duration for TLH was 45 (60) days and for TAH was 150 (120) days [Table 1].

The operative and postoperative complications were categorized according to Clavien Dindo’s classification and observed to be 3.1% in the TLH group and 11.7% in the TAH group. The major complications comprised ureteric injury at 1.4%, bladder mucosal injury at 0.05%, port site hernia at 0.02%, and port site infection at 0.08% in the TLH group [Table 2] along with a comparative analysis of the results with other studies [Table 3].<sup>[3-7]</sup>

## DISCUSSION

The surgical approach many at times form the determining factor for postoperative surgical morbidity in patients especially in cases of abnormal uterine bleeding which is considered a diagnosis of exclusion.<sup>[8,9]</sup> It accounts for most of the referrals to the gynecological outpatient department and in the majority of patients, no organic pathology is identified that which makes it difficult to convince patients to medical management and follow-up, thus preferring

**Table 1: Demographic characteristic comparison between two groups**

Parameters	Mean ± SD		P
	TLH (n=344)	TAH (n=256)	
Age (years)	47.4±3.95	48.6±4.91	0.080
BMI (kg/m <sup>2</sup> )	26.7±1.78	25.4±2.12	0.455
Mean operative time (min) (weeks)			
Uterine size <12	75±25	117±28	<0.001
Uterine size 12–20	84.8±18	108±26	0.250
Uterine size 20–28	113±23	128±52	0.451
Blood loss (mL)	110±30	160±116	0.002
Hospital stay (days)	4±2.49	7±2.41	0.002

*P*<0.05: Significant. *n*: Total number of cases, BMI: Body mass index, SD: Standard deviation, TLH: Total laparoscopic hysterectomy, TAH: Total abdominal hysterectomy

**Table 2: Categorization of complications as per Clavien–Dindo classification**

Grade	Complications	WC	TLH	TAH
I (no admission)	Superficial bladder	300	2	4
	Port site infection		3	14
	Port site hernia (conservative)		1	2
II (admission)	Blood transfusion	1750	0	5
	UTI-antibiotic		0	3
IIIa regional anesthesia	Uterine injury requiring DJ Stent	2750	0	0
	Abscess requiring drainage		0	0
IIIb general anesthesia	Small bowel injury	4550	1	1
	Ureteric injury		2	1
IVa	Renal failure	7200	0	0
IVb	Multiple-organ failure	8550	0	0
V	Death		0	0

TLH: Total laparoscopic hysterectomy, TAH: Total abdominal hysterectomy, UTI: Urinary tract infection, WC: Weight of calculation

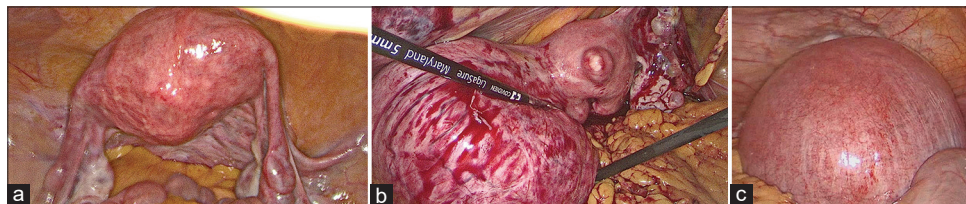
surgical management as their ultimate solution.<sup>[10]</sup> The studies done previously have demonstrated a dependence of surgical morbidity not only on the surgeon’s degree of experience with the respective laparoscopic operation but also on the amount of experience with endoscopic procedures of the entire treating center.<sup>[11]</sup> Technicalities and skilled assistance to surgeon act as vital support toward uneventful surgeries, right from the decision of port placement, adequate vaginal manipulation, and counter-hand assistance during laparoscopic surgeries to proficient, observant perspective in abdominal hysterectomy. As a rule of thumb, the camera trocar is placed at the umbilicus, either supra-umbilical or infra-umbilical as long as it is a minimum of 15 cm from the symphysis pubis. With the da Vinci S and Si systems, the trocars must be at least 10 cm apart at approximately a 30° angle.<sup>[12]</sup> Also, the 10 mm trocar needs to be placed a 2–3 finger breadth distance from the upper border of the uterus in order to provide a complete panoramic view of the uterus, adnexa, and adjoining structures. With an increase in the size of the uterus meant for hysterectomy, it gets impossible to see it completely via panoramic view. The cephalic displaced vascular pedicles contribute further to difficulties faced while operating for a larger-size uterus, thus increasing the chances of complications like ureteric injury. Also, the technical difficulties and suture time was seen to be reduced with use of barbed sutures over conventional<sup>[13]</sup> [Figure 1a-c].

The technical difficulties of this intervention can be highly variable depending on the uterine size and possible concomitant conditions affecting the patient, such as pelvic adhesive disease, endometriosis, or the presence and location of leiomyoma’s.<sup>[14]</sup> In the present study, it was seen the time taken for uterine size lesser than 12 weeks was significant

with TLH (75 ± 25 min vs. 117 ± 28 min *P* < 0.001) as compared to TAH. However, with an increase in uterine size, the time taken was comparable. The blood loss during TLH was significantly less as compared to that during TAH (110 ± 30 ml vs. 160 ± 116 ml, *P* < 0.002).

In our present study, the mean postoperative hospital stay was 4 ± 2.47 days for TLH as compared to 7 ± 2.43 days for TAH in patients with nonSSI, however, the median was 11 days for patients with SSI (*P* < 0.001). In a study done by Aboufotouh *et al.*, 2020 the length of hospital stay for LH (3.63 ± 1.28 days) as compared to TAH (5.22 ± 4 days).<sup>[15]</sup> In another study done in Bhubaneswar by Pattanaik *et al.*, the hospital stay in TLH was seen to be 2.58 ± 1.98 days. The result is significant showing shorter hospital stays in TLH when compared with conventional hysterectomy.<sup>[16]</sup> In a study done by Balci where TLH was compared with open surgical procedures showed laparoscopic surgery causes less tissue trauma and inflammatory response and thus a shorter healing period.<sup>[17]</sup> The length of hospital stay increases with the complexity of cases, and the development of complications operated via laparotomy as compared to laparoscopy.

In the present study, the overall rate of complications was seen to be 3.1% in the TLH group (11/344) as compared to the 11.7% TAH group (30/256), with bulk complications requiring conservative management. The rate of postoperative urinary tract infection in TLH is almost nil with % in TAH indicating TLH to be safe and less invasive thus, protecting against hospital-acquired infections. Healthcare-associated UTIs (HAUTIs) represent the largest subtype among all healthcare-associated infections. The prevalence of HAUTIs assessed in regional studies ranges from 12.9% in the US and 19.6% in Europe to up to 24% in developing countries.<sup>[18]</sup>



**Figure 1:** (a) Illustrates panoramic view of smaller sized uterus where vascular appendages and near-by structures seen completely without any difficulty (b) with increasing size and associated fibroid causing distortion of structural anatomy and view (c) illustrates larger sized uterus difficult to antevert, visibility restricted to vascular appendages increasing level of difficulty in surgery

**Table 3: Comparative analysis of baseline parameters of total laparoscopic hysterectomy in different studies**

Parameters	Sana Ashfaq <i>et al.</i> , 2021	Liliana Mereau <i>et al.</i> , 2018	Stefano Uccella <i>et al.</i> , 2018	Pande <i>et al.</i> , 2023	Aboufotouh <i>et al.</i> , 2020	Our study
Total number of cases enrolled (n)	50	361	258	223	41	344
Operative time duration (min)	124.26±44.74	115±36.00	120 (range: 50–360)	113.7±29.22	2.43±0.94	75±25
Hospital stay (days)	2.01±0.39	2.60±1.1	1 (range: 1–8)	3.25±0.82	3.63±1.28	4±2.49
Complications (%)	10	0.8	10.8	8.07	19.5	3.1

n: Total number of cases

In our study 2 patients, one with bladder serosal injury and another with ureteric injury diagnosed intraoperatively and thus managed immediately improving the prognosis of the patient as compared to delayed diagnosis. The delayed diagnosis led to relaparotomy for the repair of injury which in our study was seen in 1 case where the patient had a complete transaction. The risk of injury was increased in patients with a previous history of surgeries resulting in the adhered bladder. Balci observed in laparoscopic hysterectomy, urinary tract injuries were more, however, no significant difference was observed with other visceral organ injuries.<sup>[17]</sup> In another study done by Macciò *et al.*, 461 consecutive TLH were performed by a single surgeon. He found TLH to be safe even with larger uteri and found no significant difference in intraoperative and postoperative complications.<sup>[19]</sup> In a study done by Ajjammanavar *et al.* previous 1 or 2 Caesarian sections or previous history of, any pelvic surgeries were taken into the TAH group.<sup>[20]</sup>

In this study, 1 each case of bowel injury was noted in the TLH versus TAH group. Both cases had delayed diagnosis (2–3 days) thus, subjecting the patient to colostomy with primary repair. Bowel injuries occur in <1% of laparoscopic procedures, occurring more frequently during operative laparoscopy and by less experienced surgeons.<sup>[21]</sup> An International Society for Gynecologic Endoscopy survey found that bowel injury was less frequent among experienced surgeons, yet the risk of injury during abdominal access was unrelated to experience.<sup>[22]</sup> The next most common cause was the electro-surgical injuries (28.7%). Therefore, it becomes of utmost importance that all trocars should be placed and removed under vision, and energy sources should be handled with care and under vision. A significant portion (40%) of bowel injuries were not recognized intraoperatively.<sup>[21]</sup> The median time to diagnosis was 3 days, varying between 1 and 13 days postoperative.

As surgeons continue to expand their laparoscopic skills and increase the number and type of complex laparoscopic procedures offered to their patients over conventional surgeries, it is important for them to be familiar with the potential complications that may arise during and after surgeries. Emphasis should be placed on the prevention of complications by meticulous surgical training in technique and appropriate patient selection and meticulous management of complications both intraoperatively and postoperatively.

## CONCLUSION

Surgical morbidity can be reduced with efficient and skillful practice and meticulous postoperative care. Thus, surgeries performed are the result of teamwork and leadership skills

that are essential in ensuring that patients have minimal morbidity and mortality.

## Limitations

1. The patients in the study were mostly distant remote area residents coming for treatment; hence, their hospital stay and discharge on will, took longer time to that actually was a necessity to the condition
2. The data collection was on the basis of medical records which as a confounding factor cannot be excluded.

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## Conflicts of interest

There are no conflicts of interest.

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