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Original Research Article

An epidemiological study on complications of total laparoscopic hysterectomy in obese vs. non-obese patients at tertiary care centre

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ABSTRACT

Background: Total Laparoscopic Hysterectomy (TLH) is now the preferred approach for benign gynecological conditions due to reduced morbidity and faster recovery. However, obesity remains a challenge influencing surgical outcomes and complication rates. This study aimed to compare intraoperative and postoperative complications of TLH in obese versus non-obese women.

Methods: A comparative observational study was conducted at the Department of Obstetrics and Gynaecology, Government Medical College, Akola, Maharashtra, a tertiary care centre, including 146 women undergoing TLH. Participants were divided into obese (BMI ≥30 kg/m²; n=82) and non-obese (BMI <30 kg/m²; n=64) groups. Intraoperative and postoperative parameters, including blood loss, complications, operative time, and hospital stay, were recorded and analysed using the chi-square test and t-tests.

Results: The mean age of participants was 49.8±11.7 years. Obese patients had significantly higher intraoperative blood loss (306.0±20.4 mL vs 270.8±45.4 mL; p<0.001). Mean operative duration (117.8 vs 113.3 minutes; p=0.167) and hospital stay (2.6 vs 2.5 days; p=0.477) did not differ significantly. Most surgeries (83%) were completed without complications. Bleeding (8%) and conversion to laparotomy (5%) were the common intraoperative events. Postoperative vault infections (9% vs 2%; p=0.032) and port-site infections (4% vs 0%; p=0.022) were more frequent among obese women.

Conclusions: TLH can be safely performed in obese women with outcomes comparable to non-obese patients. Although obese women had higher minor wound-related complications, major intraoperative events were not significantly different.

Keywords: Intraoperative complications, Obesity, Postoperative infection, Total laparoscopic hysterectomy

INTRODUCTION

Hysterectomy is one of the most frequently performed gynecological procedures globally, with more than one-third of women undergoing the surgery by menopause. It is primarily indicated for benign conditions such as uterine fibroids, adenomyosis, abnormal uterine bleeding, and endometriosis, and remains an important treatment modality for selected malignant and premalignant conditions.[1] Over the last two decades, advances in minimally invasive surgery have shifted the preferred route of hysterectomy from abdominal to laparoscopic and vaginal approaches. Total Laparoscopic Hysterectomy (TLH) has gained widespread acceptance owing to its advantages of improved visualization, reduced intraoperative blood loss, shorter hospitalization, faster recovery, lower postoperative pain, and fewer wound-related complications.[2,3]

The American College of Obstetricians and Gynaecologists (ACOG) recommend vaginal hysterectomy as the first choice whenever feasible, TLH

has emerged as the most suitable alternative when vaginal access is limited or when anatomical considerations such as a large uterus, prior pelvic surgery, adhesions, or endometriosis necessitate enhanced laparoscopic visualization.[4,5] Increasing surgeon expertise, better energy platforms, and advances in optics have expanded the applicability of TLH even in surgically challenging populations.

The rising global prevalence of obesity has introduced new complexities for gynaecologic surgery. Obesity, defined as a BMI ≥30 kg/m², is escalating rapidly in India; NFHS-5 reports that nearly 40% of women aged 40-49 years are overweight or obese.[6,7] Obesity contributes to anaesthetic challenges, difficulty in establishing pneumoperitoneum, suboptimal visualization, increased operative time, and a higher risk of postoperative wound morbidity.[8,9] Although TLH theoretically offers advantages over open surgery in obese women by minimizing incision-related complications, published literature remains heterogeneous. Some studies suggest increased intraoperative blood loss, operative time, and conversion to laparotomy in obese patients, while several others demonstrate no clinically significant difference in complication rates across BMI groups.[10-13]

Given these inconsistencies and the increasing burden of obesity in India, there is a pressing need for robust, region-specific evidence that evaluates the safety and feasibility of TLH in obese women within real-world clinical settings. Therefore, the present study aimed to systematically compare intraoperative and postoperative outcomes of TLH between obese and non-obese women at a tertiary care hospital in Maharashtra, thereby contributing locally relevant data to guide surgical decision-making and patient counselling.

METHODS

This comparative observational study was conducted in the Department of Obstetrics and Gynaecology, Government Medical College, Akola, Maharashtra, between September 2023 and February 2025, after obtaining prior approval from the Institutional Ethics Committee in accordance with the Indian Council of Medical Research (ICMR) guidelines, 2006 for research involving human participants. Written informed consent was obtained from all study subjects before enrolment.

Inclusion criteria

Women undergoing Total Laparoscopic Hysterectomy (TLH) for benign gynecological conditions such as fibroid uterus, adenomyosis, endometriosis, abnormal uterine bleeding, or ovarian cysts were included.

Exclusion criteria

Patients were categorized into two groups based on Body Mass Index (BMI) according to WHO criteria-obese (BMI ≥30 kg/m²) and non-obese (BMI <30 kg/m²).[6] Women with uterine size >24 weeks, prior mesh repair, or suspected malignancy were excluded.

The sample size was calculated using the formula $n=Z^2 PQ/l^2$, with p = 41.6% based on Bhandari et al, yielding a total of 146 women (82 obese and 64 non-obese).[14] A simple random sampling technique was used to select eligible participants.

All surgeries were performed under general anaesthesia by experienced laparoscopic surgeons using a standard four-port technique. Pneumoperitoneum was created using a Veress needle, and dissection was carried out using harmonic and bipolar energy devices. The uterine specimen was removed vaginally, and the vaginal vault was closed laparoscopically. Intraoperative data such as operative time, estimated blood loss, visceral injury, and conversion to laparotomy were recorded. Postoperative parameters including pain (Visual Analogue Scale), fever, vault infection, port-site infection, and hospital stay were assessed until discharge and follow-up.

Statistical analysis

Data were analyzed using SPSS version 22.0. Quantitative variables were expressed as mean ± standard deviation (SD) and compared using the Student's t-test, while categorical data were analyzed using the Chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 146 women undergoing TLH were analyzed, of which 82 (56.2%) were obese and 64 (43.8%) non-obese. Both groups were comparable in baseline characteristics.

Table 1: Demographic and baseline characteristics.

Parameter	Obese (n=82), N (%)	Non-obese (n=64), N (%)	P value
Mean age (years)	49.8±11.7	48.6±10.9	0.428
Mean BMI (kg/m²)	32.8±2.6	25.1±2.9	<0.001*
Parity ≥2	71 (86.5)	55 (85.9)	0.914
Hypertension	22 (26.8)	11 (17.2)	0.169
Diabetes mellitus	18 (22.0)	9 (14.0)	0.235
Hypothyroidism	9 (10.9)	6 (9.3)	0.764

*Statistically significant

Intraoperative outcomes

Mean operative time was slightly higher in obese women (117.8±15.6 min) compared to non-obese (113.3±13.2 min), though not statistically significant (p=0.167). Mean blood loss was significantly higher among obese patients (306.0±20.4 mL vs 270.8±45.4 mL; p<0.001).

Conversion to laparotomy occurred in 7 patients (4.8%), four of whom were obese. The primary reasons were dense adhesions and uncontrolled bleeding. Fibroid uterus was the leading indication in both groups (44%) (table 2).

Table 2: Indications for TLH.

Indication	Obese (n=82), N (%)	Non-obese (n=64), N (%)	Total (%)
Fibroid uterus	36 (43.9)	28 (43.7)	44.0
Adenomyosis	22 (26.8)	17 (26.5)	27.0
Abnormal uterine bleeding	14 (17.1)	12 (18.7)	18.0
Endometriosis	6 (7.3)	4 (6.2)	6.8
Ovarian cyst	4 (4.9)	3 (4.6)	4.7

Table 3. Comparison of intraoperative parameters.

Parameter	Obese (n=82), N (%)	Non-obese (n=64), N (%)	P value
Mean operative time (min)	117.8±15.6	113.3±13.2	0.167
Blood loss (ml)	306.0±20.4	270.8±45.4	<0.001*
Conversion to laparotomy	4 (4.9)	3 (4.6)	0.942
Bladder injury	2 (2.4)	0	0.227
Bowel injury	1 (1.2)	0	0.412
Haemorrhage requiring transfusion	6 (7.3)	3 (4.6)	0.482

Postoperative outcomes

Mean hospital stay was 2.6±0.5 days for obese vs 2.5±0.4 days for non-obese women (p=0.477). Postoperative pain was comparable between groups (VAS: 4.8±0.9 vs 4.4±0.8; p=0.062).

Table 4: Duration of surgery and intraoperative blood loss of the participants.

	Obese		Non-obese	
	Mean	**SD**	**Mean**	**SD**
Duration of surgery (min)	117.76	23.66	113.27	15.63
Blood loss (ml)	306	20.36	270.8	45.36

Note: Independent t-test was applied, SD=Std. Deviation

Vault infections and port-site infections were significantly higher among obese women (p=0.032 and p=0.022, respectively). There were no thromboembolic events or re-admissions.

Table 5: Postoperative complications.

Complication	Obese (n=82), N (%)	Non-obese (n=64), N (%)	P value
Vault infection	7 (9.0)	1 (2.0)	0.032*
Port-site infection	3 (4.0)	0	0.022*
Postoperative fever	5 (6.0)	2 (3.0)	0.321
Secondary hemorrhage	2 (2.4)	1 (1.5)	0.702
Mean hospital stay (days)	2.6±0.5	2.5±0.4	0.477

*Statistically significant

Table 6: Postoperative complications among study participants.

Postoperative complications	Obese (n=82)		Non-obese (n=64)		Total		P value
	No.	**Percent**	**No.**	**Percent**	**No.**	**Percent**	
Fever	10	12	9	14	19	13	0.78
Port site infection	3	4	0	0	3	2	0.25
Secondary haemorrhage	4	5	3	5	7	5	1
Vaginal discharge	2	2	3	5	5	3	0.66
Vault infection	7	9	1	2	8	5	0.07*
None	56	68	48	75	104	71	0.35
Total	82	100	64	100	146	100	
P value	0.92						

*Statistically significant

DISCUSSION

In the present study, TLH was found to be a safe and feasible procedure in obese women, with complication rates comparable to those in non-obese patients. Although obese women experienced slightly higher intraoperative blood loss and wound-related infections, these did not significantly affect overall surgical outcomes.

Our findings are consistent with O'Hanlan et al, who studied 2,266 TLH cases and found no significant difference in major complications or hospital stay across BMI groups.[15] Similarly, Heinberg et al reported comparable complication rates between obese and non-obese women, concluding that TLH can be safely performed in the obese population.[16]

The mean operative time in our study (117.8 min) aligns with Bhandari et al and McMahon et al, who reported mean durations of 118 and 120 minutes, respectively.[14,17] Although Shreen et al observed a significant increase in operative time in obese women, they attributed this to higher BMI (>35 kg/m²) and comorbidities.[10]

Our mean intraoperative blood loss (306 mL in the obese group) was similar to Sehnal et al and Pande et al, who reported mean losses of 290-310 mL.[12,18] However, Barbaresso et al found no correlation between BMI and blood loss, suggesting that improved technology and surgical experience mitigate such effects.[19]

Postoperative complications in our study were predominantly minor (13.6%), with vault and port-site infections more frequent among obese women similar to findings by Ghezzi et al and Kumar et al.[20,21] These wound-related complications are likely due to poor tissue oxygenation, moisture retention, and delayed healing associated with obesity.

Notably, no major vascular, ureteric, or bowel injuries were encountered comparable to results by O'Hanlan et al and Heinberg et al.[15,16] Our overall conversion rate to laparotomy (4.8%) is within the acceptable range reported in global literature (3-7%).[22]

The study's strengths include a prospective design, single-surgeon consistency, and standardized technique. However, limitations include its single-centre scope, modest sample size, and lack of long-term follow-up. With the growing burden of obesity in India, surgeons should be encouraged to adopt minimally invasive techniques. Adequate preoperative optimisation, appropriate energy devices, and experience significantly reduce risks in obese patients.

This study has few limitations. This single-centre study with a limited sample size may restrict generalizability. Long-term postoperative outcomes were not evaluated, and some confounding factors could not be fully controlled. Larger multi-centre studies are needed for stronger evidence.

CONCLUSION

This study shows that total laparoscopic hysterectomy can be performed safely in obese women, with outcomes largely comparable to those of non-obese patients. Although higher intraoperative blood loss and a greater frequency of minor wound-related infections were noted in the obese group, these did not translate into prolonged hospitalization or increased rates of major complications. Operative time, need for conversion, and visceral injuries remained similar across BMI groups, indicating that obesity alone does not significantly compromise the safety or feasibility of the laparoscopic approach. With appropriate preoperative preparation, experienced surgical teams, and standardized operative techniques, TLH remains a reliable minimally invasive option for women with elevated BMI. Given the rising burden of obesity in India, promoting laparoscopic hysterectomy may help reduce postoperative morbidity and enhance recovery in this growing patient population.

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