

## Outcome of total laparoscopic hysterectomy in relation to BMI – A prospective study

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### Abstract

**Introduction:** Laparoscopy can be more complicated in the obese patient, but the complications tend to decrease over time with surgical experience. The aim of this study was to know the safety of total laparoscopic hysterectomy (TLH) for benign diseases in overweight and obese women when compared with women with lesser BMI.

**Materials and Methods:** Total of 105 cases of TLH were analysed prospectively from October 2014 to August 2016. The patients were divided into 4 groups based on BMI; underweight, normal weight, overweight and obese and the demographic data and intra and post-operative parameters were recorded until one month post-operative follow up. The data obtained was analyzed using descriptive and inferential statistics.

**Result:** Of 105 patients, 2(1.9%) were underweight, 14(13.3%) were normal weight, 20(19.0%) were overweight and 69 (65.7%) were obese. Majority were in the age group of 40 to 50 years. Fibroid was the main indication for hysterectomy. There were more number of women with blood loss of more than 100ml in overweight and obese group but the difference was not statistically significant. None of the women in all the groups suffered any major complication. The operation time was more in obese women when compared with the other groups but the difference was not statistically different. Also, when we compared the pain scores at 6 hours, 24 hours and at discharge, we found no difference between the groups.

**Conclusion:** TLH is safe and effective in women of all BMI categories undergoing hysterectomy for benign diseases.

**Keywords:** TLH, BMI, Operation time, Complications, Pain score, Opioid analgesia.

### Introduction

It is of great concern to note that the number of obese people has doubled in the country in the past 10 years. National Family Health Survey (NFHS-4). Most of the states have experienced sharp rise in the number of obese people. Andhra Pradesh, Andaman and Nicobar, Puducherry and Sikkim have more than 30 per cent of their population falling under the “obese” category.<sup>1</sup>

The safety and feasibility of gynaecological surgeries in obese women is an issue faced by surgeons routinely.<sup>2</sup>

Total laparoscopic hysterectomy (TLH) is associated with shorter lengths of hospital stay, lower intraoperative blood loss, lesser postoperative pain, faster recovery and lower infection rates than abdominal hysterectomy.<sup>3</sup> Moreover, laparoscopic surgery allows these patients at high risk of thromboembolism to resume normal activities more quickly.<sup>4</sup> Current evidence suggests that there is no significant difference in outcomes for normal weight versus obese women undergoing laparoscopic hysterectomy.<sup>5</sup>

However, research on the implementation and the preference of gynecologists shows that that the rate of abdominal hysterectomy increases as the BMI increases.<sup>6</sup>

O’Hanlan et al<sup>7</sup> suggest that a study comparing the outcomes of normal weight and obese women undergoing LH and abdominal hysterectomy (AH) would contribute to the gynecologic literature.

The objective of this study was to compare the surgical outcomes of overweight and obese women with normal weight women undergoing total laparoscopic hysterectomy for a benign indication.

### Materials and Methods

The study was a prospective study done on patients admitted to JSS hospital, Mysore, for total laparoscopic hysterectomy satisfying inclusion and exclusion criteria and who had given consent for the study during the study period from October 2014 to August 2016.

#### Inclusion Criteria

1. All women admitted for total laparoscopic hysterectomy for benign disease.

#### Exclusion Criteria

1. Uterine prolapse
2. Malignant disease

After a proper preoperative evaluation with clinical examination and laboratory investigations; and after getting informed consent, patients were selected for the study and divided into 4 groups according to their BMI i.e., underweight (BMI < 18.5 kg/m<sup>2</sup>), normal weight (BMI 18.5 – 22.9 kg/m<sup>2</sup>), overweight (BMI 23 – 24.9 kg/m<sup>2</sup>) and obese (BMI ≥ 25 kg/m<sup>2</sup>). Body mass index was calculated by dividing the patient’s weight in kilograms by the square of her height in meters. Total laparoscopic hysterectomy was defined as completing the entire surgical procedure by laparoscopic route with the closure of vagina laparoscopically or vaginally. Uteri were delivered vaginally or by morcellation depending on their sizes.

Data regarding baseline characteristics like age, parity, indication for hysterectomy, history of previous caesarean section and/or previous pelvic surgery were obtained and compared between these groups. Intra-operative parameters

like intra-operative blood loss, weight of uterus, size of uterus, time taken for surgery, intra-operative injury (any injury to bowel, bladder or ureter), and conversion to laparotomy were noted.

Postoperative parameters like pain perception after 6 hours, 24 hours and at discharge, any use of intramuscular opioids on the day of surgery other than analgesic doses as per hospital protocol, postoperative bleeding needing laparotomy, change in hemoglobin, fever during the postoperative period, wound infection, any other forms of infection like respiratory tract infection, urinary tract infection and other postoperative complications (vault hematoma, deep vein thrombosis, bladder disturbances, bowel disturbances and fistula) were also noted till one month post-operative follow up.

Blood loss was calculated by subtracting amount of saline used during surgery from total amount of fluid collected in the suction bottle. The time duration of surgery from the time of incision till the end of the procedure was noted by the assistant. The women scored their postoperative pain on a 10 cm visual analogue scale. Change in hemoglobin was the difference between preoperative hemoglobin and postoperative day 2 hemoglobin.

The statistical analysis of the study was done by descriptive statistics, inferential statistics and Chi-square test. All the statistical calculations were done through SPSS trail version 24.

## Result

Of 105 patients, 2(1.9%) were underweight, 14(13.3%) were normal weight, 20(19.0%) were overweight and 69

(65.7%) were obese. Majority of the patients were in the age group of 40 to 50 years and there was no statistically significant differences between the two groups with respect to age and parity. Ten women had undergone previous 1 LSCS, out of which 7 were in obese group and 8 had history of 2 previous LSCS, with 6 in the obese group. Three patients had undergone previous pelvic surgery like myomectomy, tubal sterilization and appendectomy and all of them were in obese and overweight group. Fibroid was the main indication for hysterectomy followed by AUB, endometrial hyperplasia, adenomyosis, adnexal mass and chronic PID. (Table 1)

When intraoperative parameters like operation time, uterine size and uterine weight were compared between the groups, no statistically significant differences were found. (Table 2) Although the blood loss of more than 300 ml was noted in 4 obese patients, the difference was not statistically significant. (Table 3) One case in the obese group was converted to laparotomy as recto-sigmoid colon was adherent to bladder and uterus. During adhesiolysis, serosal tear was noted on recto-sigmoid colon which was sutured and patient was discharged on postoperative day 10.

No patient suffered any major postoperative complication. There was no statistically significant difference with respect to use of opioid analgesics in all the groups. (Table 4) Similar findings were noted when we analyzed pain scores at 6 hours, 24 hours and at discharge too, where we found no statistically significant difference. (Table 5)

**Table 1: Indications for TLH**

Indication	BMI categories				Total
	Underweight	Normal weight	Overweight	Obese	
Fibroid	2	7	10	36	55
	100.0%	50.0%	50.0%	52.2%	
AUB	0	6	6	21	33
	0.0%	42.9%	30.0%	30.4%	
Adenomyosis	0	1	1	4	6
	0.0%	7.1%	5.0%	5.8%	
Adnexal mass	0	0	0	2	2
	0.0%	0.0%	0.0%	2.9%	
Endometrial hyperplasia	0	0	1	6	7
	0.0%	0.0%	5.0%	8.7%	
Chronic PID	0	0	2	0	2
	0.0%	0.0%	10.0%	0.0%	
Total	2	14	20	69	105
	100.0%	100.0%	100.0%	100.0%	

Fisher's value = 13.48; p value = 0.444

**Table 2: Operation time, uterine weight and uterine size**

	BMI Categories				P value
	Underweight	Normal weight	Overweight	Obese	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Operation time (minutes)	77.50 ± 60.01	106.78 ± 31.23	102.00 ± 26.07	91.23 ± 30.69	0.187
Uterus weight (g)	200.00 ± 159.70	197.14 ± 110.05	271.00 ± 191.42	233.33 ± 160.6	0.688
Uterus size (weeks)	7.00 ± 1.14	9.14 ± 3.30	11.16 ± 4.23	10.28 ± 3.81	0.302

**Table 3: Blood loss**

Blood loss		BMI categories				Total
		Underweight	Normal weight	Overweight	Obese	
< 100 ml		1	9	12	40	62
		50.0%	64.3%	60.0%	58.0%	59.0%
101 - 300 ml		1	5	8	25	39
		50.0%	35.7%	40.0%	36.2%	37.1%
> 301 ml		0	0	0	4	4
		0.0%	0.0%	0.0%	5.8%	3.8%
Total		2	14	20	69	105
		100.0%	100.0%	100.0%	100.0%	100.0%

Fisher's value = 2.53; p value = 0.495

**Table 4: Use of opioid analgesics**

Any use of intramuscular opioids		BMI categories				Total
		Underweight	Normal weight	Overweight	Obese	
Opioid analgesia not used		0	8	12	45	65
		0.0%	57.1%	60.0%	65.2%	61.9%
Opioid analgesia used		2	6	8	24	40
		100.0%	42.9%	40.0%	34.8%	38.1%
Total		2	14	20	69	105
		100.0%	100.0%	100.0%	100.0%	100.0%

$\chi^2 = 3.73$ ; p value = 0.291

**Table 5: Pain scores at 6 hours, 24 hours and at discharge**

Pain score	BMI Categories				P value
	Underweight	Normal weight	Overweight	Obese	
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
6 hr	5.50 $\pm$ 0.70	6.07 $\pm$ 0.99	6.35 $\pm$ 0.74	6.203 $\pm$ 0.86	0.528
24 hr	3.50 $\pm$ 0.70	3.35 $\pm$ 0.84	3.65 $\pm$ 0.67	3.65 $\pm$ 0.74	0.587
Discharge	0.50 $\pm$ 0.09	0.50 $\pm$ 0.08	0.80 $\pm$ 0.16	0.72 $\pm$ 0.19	0.541

## Discussion

Gynecologic surgeons should have the knowledge to counsel obese women on the risks specific to this group during hysterectomy. Laparoscopy in the obese patient is more technically challenging than in the normal-weight patient and should be undertaken by those who have adequate laparoscopic surgical experience. Given the increase in size of the anterior abdominal wall, if the Veress needle is used, the 150 mm length may help achieve pneumoperitoneum and avoid pre-peritoneal insufflation; longer ancillary trocars (up to 150 mm) also may be useful. Placement of ancillary trocars can be more challenging because of the suboptimal visualization of the inferior epigastric vessels. Exposure can be difficult when operating in the pelvis of an obese patient. Operating in the pelvis requires the Trendelenburg position, which may cause difficulty in ventilating the patient.

A higher pneumoperitoneal pressure may be required, but the higher pressure may hamper the ability to provide adequate ventilation. The omental fat and limited manipulation of instruments also pose difficulty. Closure of any port of size at least 10 mm or greater often presents the greatest challenge; a port closure technique that affords laparoscopic visualization may be useful in this situation.<sup>8</sup>

The results of the study done by Divya Kelath Shah et al<sup>9</sup> which included 55,409 women who underwent hysterectomy

for benign conditions between January 2005 and December 2012 suggest that high BMI is adversely associated with certain outcomes (operative time, wound dehiscence, wound infection, and sepsis) but has a minimal association with others (hospital stay, reoperation or readmission rates, blood transfusion, urinary tract infection, and thromboembolism). Moreover, the association between increasing BMI and wound or infectious complications varies by surgical route and is most pronounced in women undergoing abdominal, followed by vaginal, hysterectomy. Aside from a prolonged operative time, obesity is associated with little additional surgical risk in women undergoing laparoscopic hysterectomy.

Heinberg et al. (2004)<sup>10</sup> divided patients undergoing TLH into two groups: 'obese' (BMI  $\geq$  30 kg/m<sup>2</sup>) and 'non-obese' (BMI < 30 kg/m<sup>2</sup>). In their work the authors reported that the intra-operative (inferior epigastric vessel injury; cystotomy; bowel injury) and post-operative (pelvic abscess; vaginal cuff haematoma, cellulitis or dehiscence; hyperthermia; vesico-vaginal fistula; thromboembolic event; wound infection) complication rates, risk of conversion to laparotomy and duration of hospitalization did not differ statistically between the two groups. However, the authors did report a significantly greater operating time and risk of losing more than 500 ml of blood with BMI  $\geq$  30 kg/m<sup>2</sup>.

Mikhail E et al in 2014<sup>11</sup> concluded that total laparoscopic hysterectomy is a route that can offer advantages in obese patients including smaller incisions that are less likely to become infected as well as less post-operative pain and good visualization. With appropriate perioperative planning and techniques, excellent outcomes can be achieved.

Paul R. Brezina<sup>5</sup> et al in their study did a retrospective analysis of 293 hysterectomy procedures and concluded that, even with the inclusion of the learning curve, the laparoscopic route benefited obese patients with shorter hospital stays, less blood loss, and fewer complications.

Guraslan H et al in 2015<sup>3</sup> aimed at estimating the effect of body mass index (BMI) on clinical outcomes in total laparoscopic hysterectomy (TLH) cases. The rate of conversion to laparotomy, blood loss, complications and length of hospital stay did not vary according to BMI. They concluded that TLH could be considered a safe and feasible alternative to abdominal hysterectomy in obese and morbidly obese patients.

Shilpa Bhandari et al<sup>12</sup> evaluated operative and perioperative outcomes in patients undergoing total laparoscopic hysterectomy according to their body mass index and concluded that total laparoscopic hysterectomy is a safe and effective procedure for obese patients and can be performed with an efficacy similar to that in non-obese patients.

In the present study, we found no significant differences when we compared various intraoperative parameters including operative time and blood loss in patients with different BMI. The operative time was comparable in our study in contrast to the findings of studies done by Shilpa Bhandari et al,<sup>12</sup> Divya Kelath Shah et al<sup>9</sup> and Nicolas Chopin et al<sup>13</sup> where the operative time increased with increasing BMI. This may be due to the reason that all patients in our study were operated by experienced surgeons.

However, in this study, among the cases included, route of hysterectomy (TLH) was chosen by the surgeon after discussion with the patient. This may be considered as a limitation of this study.

## Conclusion

Obesity is a serious problem worldwide and it becomes important to device standard of care for managing not only medical morbidities but also diseases that warrant surgery. Hence optimal route and technique of hysterectomy for gynaecological disorders is a topic which warrants further research. In this study, among women who underwent TLH for benign indications, we found that there were no differences in intraoperative and postoperative parameters between overweight/obese individuals when compared with women with normal BMI. TLH should be considered the route of choice for obese women in experienced hands.

**Conflict of Interest:** None.

## References

1. National Family Health Survey (NFHS-4). International institute for population sciences, Mumbai. 2015-16.
2. McMahon MD, Scott DM, Saks E, Tower A, Raker CA, Matteson KA. Impact of obesity on outcomes of hysterectomy. *J Minim Invasive Gynecol* 2013;21(2):259-265.
3. Guraslan H, Senturk M.B, Dogan K, Guraslan B, Babaoglu B, Yasar L. Total laparoscopic hysterectomy in obese and morbidly obese women. *Gynecol Obstet Invest* 2015;79:184–188.
4. Curet MJ. Special problems in laparoscopic surgery: Previous abdominal surgery, obesity, and pregnancy. *Surg Clin North Am* 2000;80:1093–1110.
5. Paul R. Brezina, Todd M. Beste, Keith H. Nelson. Does route of hysterectomy affect outcome in obese and nonobese women? *JSL* 2009;13:358–363.
6. Mathijs D. Blikkendaal, Evelyn M. Schepers, Erik W. van Zwet, Andries R. H. Twijnstra, Frank Willem Jansen. Hysterectomy in very obese and morbidly obese patients: a systematic review with cumulative analysis of comparative studies. *Arch Gynecol Obstet* 2015;292:723–738.
7. O'Hanlan K, Lopez L, Dibble S, Garnier A, Huang G, Leuchtenberger M. Total laparoscopic hysterectomy: body mass index and outcomes. *Obstet Gynecol* 2003;102:1384–1392.
8. Committee on Gynecologic Practice. Committee opinion no. 619: Gynecologic surgery in the obese woman. *Obstet Gynecol* 2015;125(1):274–278.
9. Divya Kelath Shah, Allison F. Vitonis, Stacey A. Missmer. Association of Body Mass Index and Morbidity after Abdominal, Vaginal, and Laparoscopic Hysterectomy. *Obstet Gynecol* 2015;125(3):589-598.
10. Eric M. Heinberg, Benjamin L. Crawford III, Sherry H. Weitzen, David J. Bonilla. Total Laparoscopic Hysterectomy in Obese Versus Nonobese Patients. *Obstet Gynecol* 2004;103(4):674-680.
11. Mikhail E, Scott L, Imudia AN, Hart S. Total laparoscopic hysterectomy in the obese patient. *Surg Technol Int* 2014;25:167-174.
12. Bhandari S, Agrawal P, Singh A. Body Mass Index and Its Role in Total Laparoscopic Hysterectomy. *Int Sch Res Notices* 2014;2014:787604.
13. Nicolas Chopin, Jean Marie Malaret, Marie-Christine Lafay-Pillet, Adolphe Fotso, Herve´ Foulot, Charles Chapron. Total laparoscopic hysterectomy for benign uterine pathologies: obesity does not increase the risk of complications. *Hum Reprod* 2009;24(12):3057–3062.

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