

# Laparoscopic Hysterectomy for Benign Pathology Does Not Yield More Perioperative Complications than Abdominal or Vaginal Hysterectomies: Our Experience in Introducing Laparoscopic Hysterectomy

Akimasa Takahashi\*, Mao Uemura, Jun Kitazawa, Mari Nakata, Yoshihiko Hayashi

Department of Obstetrics and Gynecology, Nagahama City Hospital, Nagahama City, Shiga, Japan

## Abstract

**Objectives:** Total laparoscopic hysterectomy (TLH) is increasing as a substitute for total abdominal hysterectomy (TAH) and total vaginal hysterectomy (TVH) with the growing prevalence of laparoscopic surgery. The aim of this study is to assess perioperative complications of the chosen hysterectomy techniques performed for benign indications when started performing TLH. This was retrospective cohort study. This study was conducted at Nagahama City Hospital.

**Materials and Methods:** There were 176 patients who underwent hysterectomy for benign indications from 2013 to 2016. Perioperative and postoperative outcomes were compared for the three different hysterectomy approaches laparoscopic; abdominal; and vaginal. Data were analyzed using the t-test or Chi-square and Fisher's exact test.

**Results:** TAH, TLH, and TVH were performed on 118 patients (67.0%), 32 (18.2%), and 26 (14.8%), respectively. Operation time was significantly longer for the TLH group than for the TAH and TVH groups. Blood loss was lower for the TVH and TLH groups than for the TAH group. Three days after surgery, C-reactive protein was lower in the TVH group than in the TAH group. The average uterus size in the TAH group was larger than in the TVH and TLH groups. Patients undergoing TLH experienced fewer perioperative complications than patients in the TAH and TVH groups; however, this difference was not statistically significant.

**Conclusion:** TLH for benign pathology does not yield more perioperative complications than TAH or TVH. However, vaginal hysterectomy is the least invasive approach. The final choice for the route of hysterectomy depends on many factors, including body mass index, uterus size, and experience of the gynecologist.

**Keywords:** Abdominal, hysterectomy, laparoscopy, perioperative complication, vaginal

## INTRODUCTION

Hysterectomy is the most commonly performed surgical procedure for the medical management of gynecologic conditions.<sup>[1]</sup> Various techniques for hysterectomy are available, including abdominal, vaginal, and laparoscopic hysterectomy, as well as combinations of techniques. Total abdominal hysterectomy (TAH) is the traditional surgical procedure for benign gynecological disease, but it has

several limitations such as abdominal trauma, intraoperative and postoperative complications, and slow operative recovery.<sup>[2]</sup> By contrast, total vaginal hysterectomy (TVH) is a minimally invasive approach that is associated with fewer complications, a shorter hospital stay, more rapid recovery, and lower overall costs.

**Address for correspondence:** Dr. Akimasa Takahashi, Department of Obstetrics and Gynecology, Nagahama City Hospital, 526-8580 313 Ooinui-Cho, Nagahama City, Shiga, Japan. E-mail: akimasat2009@gmail.com

### Article History:

Submitted: 21 November 2019

Revised: 4 March 2019

Accepted: 10 August 2020

Published: 15 October 2020

### Access this article online

#### Quick Response Code:



Website:  
www.e-gmit.com

DOI:  
10.4103/GMIT.GMIT\_116\_19

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Takahashi A, Uemura M, Kitazawa J, Nakata M, Hayashi Y. Laparoscopic hysterectomy for benign pathology does not yield more perioperative complications than abdominal or vaginal hysterectomies: Our experience in introducing laparoscopic hysterectomy. *Gynecol Minim Invasive Ther* 2020;9:215-9.

However, this procedure is difficult to perform on nulliparous and obese women.<sup>[3]</sup>

Minimally invasive surgical methods, such as total laparoscopic hysterectomy (TLH), laparoscopic-assisted vaginal hysterectomy, and robot-assisted hysterectomy have become increasingly popular worldwide.<sup>[4]</sup> At our hospital in Japan, TAH and TVH were routinely performed for benign lesions. However, with the growing prevalence of laparoscopic surgery, we started performing TLH as a substitute for TAH and TVH.

The aim of the present study is to review a consecutive series of patients treated with TLH that was just introduced at our hospital from 2013 to 2016 and to compare, for benign indications, perioperative results, and complications between the different types of hysterectomy performed.

## MATERIALS AND METHODS

Women aged older than 18 years who underwent abdominal, vaginal, or laparoscopic hysterectomy for benign indications at the Nagahama City Hospital between 2013 and 2016 were included in this retrospective observational study. All included patients had presented with gynecological complaints and were diagnosed with uterine benign diseases, including leiomyomas, adenomyosis, abnormal uterine bleeding, endometrial atypical hyperplasia, and cervical intraepithelial neoplasia. Cases involving prolapse of the uterus or malignancy of the female genital tract were excluded. This study was approved by the ethics committee of the Nagahama City Hospital (approval number 29–46) and the informed patient consent was all obtained.

In total, 176 consecutive patients were included. Of these, 118 patients (67.0%) underwent TAH, 26 patients (14.8%) underwent TVH, and 32 patients (18.2%) underwent TLH. The choice of hysterectomy method was determined entirely by the preference of the operating surgeons. The operating surgeons included in this study ranged from senior residents to consultants. The analysis was performed based on the following parameters: route of hysterectomy; age; parity; operating time; the size of the uterus; perioperative complications; and blood transfusion in the intra- and post-operative periods.

### Statistical analysis

Data collated from clinical records were analyzed using the SPSS software version 24 (SPSS Software, Chicago, IL, USA). Continuous variables were compared between the TLH, TAH, and TVH groups using Student's *t*-test. The level of statistical significance was set at  $P < 0.05$ .

## RESULTS

The characteristics of all included patients are shown in Table 1. Thirty-two patients met the criteria for the evaluation of TLH. The mean age of patients undergoing TLH was 45.88 years. The mean parity and body mass index (BMI) of TLH patients were 2.00 and 22.98, respectively. There were no significant differences in mean age, parity, or BMI between the TLH group and the TAH and TVH groups. The main indication for hysterectomy was fibroids (78.1%). Concomitant adnexal surgery was performed in eight TLH cases (25.0%). Previous pelvic surgery, such as cesarean section, myomectomy, adnexectomy, and appendectomy, had been performed in 10 cases (31.3%). Twenty-seven patients with TLH were premenopausal. No significant differences related to indications, previous pelvic surgery rate, menstrual status, or concomitant adnexal surgery rate were observed among the three hysterectomy groups.

The surgical outcomes of the three groups are presented in Table 2. No laparoscopic or vaginal cases were converted to open nephrectomy. The mean operation time was 163 min for the TLH group, 127 min for the TAH group ( $P < 0.001$  vs. TLH), and 86 min for the TVH group ( $P < 0.001$  vs. TLH). Comparing the TLH and TAH groups, serum C-reactive protein (CRP) level 1 day after surgery and the rescue analgesic requirements were similar. However, estimated blood loss, uterus weight, and serum CRP level 1 day after surgery were significantly lower in the TLH group than they were in the TAH group. There were no significant differences between the TLH and TVH groups for estimated blood loss, uterus weight, serum CRP level 1 and 3 days after surgery, rescue analgesic requirements, postoperative hospital days, or perioperative complication rates.

Complications were generally rare, and there were no patient deaths during the study period. Seven patients with TAH developed genital bleeding postoperatively, two of which underwent additional measures for pelvic repair. In the TAH group, two patients required blood transfusions in the intraoperative period and two patients developed small bowel obstruction during the postoperative period. One patient case in each group had an intraoperative urinary tract injury, which was immediately repaired in all cases. There were no significant differences between the various procedures for hysterectomy regarding perioperative complication rates [Table 3].

## DISCUSSION

Our results indicate that TLH for benign gynecological diseases does not cause more perioperative complications than TAH or TVH, even in the early days of introduction. Our results agree with those of previous studies that have

**Table 1: Clinical and demographic characteristics of women who underwent hysterectomy for benign indications**

Variable	Hysterectomy routes			Overall (n=176)
	TLH (n=32)	TAH (n=118)	TVH (n=26)	
Age	45.88±4.04	49.53±9.14	47.19±8.53	48.52±8.45
<i>P</i> versus TLH		0.075		
Parity	2.00±1.11	1.70±1.05	2.12±0.99	1.82±1.06
<i>P</i> versus TLH		0.335		
BMI	22.98±5.47	23.19±3.62	23.17±4.09	23.15±5.47
<i>P</i> versus TLH		0.967	0.984	
Main indication				
Fibroids	25 (78.1)	101 (85.6)	14 (53.8)	140 (79.5)
Adenomyosis	3 (9.4)	8 (6.8)	1 (3.8)	12 (6.8)
CIN	1 (3.1)	1 (0.8)	9 (34.6)	11 (6.3)
Uterine abnormal bleeding	0	1 (0.8)	2 (7.7)	3 (1.7)
Others	3 (9.4)	7 (5.9)	0	10 (5.7)
Previous pelvic surgery				
Yes	10 (31.3)	39 (33.1)	5 (19.2)	54 (30.7)
No	22 (68.8)	79 (66.9)	21 (80.8)	122 (69.3)
Menstrual status				
Premenopause	27 (84.4)	74 (62.7)	20 (76.9)	121 (68.8)
Postmenopause	5 (15.6)	44 (37.3)	6 (23.1)	55 (31.3)
Adnexectomy				
Unilateral	3 (9.4)	22 (18.6)	0	25 (14.2)
Bilateral	5 (15.6)	45 (38.1)	1 (3.8)	51 (29.0)

TLH: Total laparoscopic hysterectomy, TAH: Total abdominal hysterectomy, TVH: Total vaginal hysterectomy, CIN: Cervical intraepithelial neoplasia

**Table 2: Perioperative outcomes**

	Hysterectomy routes			Overall (n=176)
	TLH (n=32)	TAH (n=118)	TVH (n=26)	
Operating time (min)	163.31±43.82	127.36±34.23	86.12±16.61	127.80±40.64
<i>P</i> versus TLH		<0.001	<0.001	
Bleeding (g)	44.28±47.02	239.25±242.54	82.46±76.60	180.64±218.42
<i>P</i> versus TLH		<0.001	0.756	
Uterus weight (g)	217.86±103.30	526.04±386.12	150.33±79.92	417.78±359.80
<i>P</i> versus TLH		<0.001	0.735	
POD1 CRP (mg/L)	1.75±1.24	4.22±2.24	1.53±1.10	3.54±2.31
<i>P</i> versus TLH		<0.001	0.948	
POD3 CRP (mg/L)	1.89±1.33	3.07±3.16	1.03±0.72	2.55±2.77
<i>P</i> versus TLH		0.072	0.443	
Rescue analgesic requirements	2.94±1.46	3.09±1.90	1.96±1.15	2.90±1.77
<i>P</i> versus TLH		0.895	0.088	

TLH: Total laparoscopic hysterectomy, TAH: Total abdominal hysterectomy, TVH: Total vaginal hysterectomy, POD: Postoperative days

reported that three hysterectomy procedures are safe. Further, our results are consistent with the gynecology literature<sup>[2]</sup> showing that TLH for benign disease is associated with increased operative time, decreased intraoperative blood loss, smaller uterus size, and lower serum CRP level 1 day after operation; however, it is not associated with serum CRP level 3 day after the operation, analgesic intake, mortality, or severe complications.

The overall complication rate of TLH was low and was comparable to that of TVH and TAH. In the literature, TLH is

reported to result in more complications than TVH or TAH.<sup>[5]</sup> Most major complications of TLH are urinary tract lesions.<sup>[5-8]</sup> In our TLH group of 32 patients, there was only one case of ureter injury, which was repaired laparoscopically during the same operation. A meta-analysis of 3643 cases found that TLH had the lowest risk of hemorrhage.<sup>[3]</sup> Introduction of a new surgical technique can offer advantages, but may also present significant morbidities. However, our data showed that it was possible to introduce TLH without increasing the complication rate, as compared with other existing hysterectomy methods.

**Table 3: Complications within 30 days of hysterectomy**

Variable	Hysterectomy routes		
	TLH (n=32), n (%)	TAH (n=118), n (%)	TVH (n=26), n (%)
Any complication	3 (9.3)	20 (16.9)	3 (11.5)
Hemorrhage	0	7 (5.9)	0
Wound infections	1 (3.1)	6 (5.1)	0
Fever	1 (3.1)	3 (2.5)	2 (7.7)
Urinary tract injury	1 (3.1)	1 (0.8)	1 (3.8)
Urinary tract infection	0	1 (2.8)	0
Ileus	0	3 (2.5)	0
Blood transfusion	0	2 (1.7)	0
Readmission	0	3 (2.5)	0
Additional surgery required	1 (3.1)	3 (2.5)	1 (3.8)
Death	0	0	0

TLH: Total laparoscopic hysterectomy, TAH: Total abdominal hysterectomy, TVH: Total vaginal hysterectomy

Operative time emerged in our analysis as an important mediator of the relationship between surgical procedures and complications. TLH, with a median operative time of 163 min, was the significantly slowest method in our data, whereas TVH was the fastest. Abdelmonem *et al.*, in their study, reported mean operation times of 103 min for TVH, 157 min for TAH, and 157 min for TLH.<sup>[9]</sup> Similarly, Schindlbeck *et al.*, in their study, reported mean operation times of 90 min for TVH, 115 min for TAH, and 130 min for TLH.<sup>[8]</sup> Consistent among these reports is that TLH has the longest operation time, whereas TVH has the shortest operation time. These findings are not contradictory to our report, although it should be noted that the reported operation times in our data are for the introduction of the technique. In a large-scale retrospective study of 1647 cases, the median operation time of TLH was 115 min in the 1<sup>st</sup> year and 90 min in the following year.<sup>[10]</sup> Therefore, by accumulating experience we may be able to achieve a similar operation time for TLH as for TAH and TVH.

In this study, analgesic intake was equal for all hysterectomy routes. In general, it is thought that less invasive methods cause less pain. However, there is no randomized controlled trial comparing postoperative pain between the three hysterectomy routes. A nonrandomized controlled trial reported no differences in postoperative pain between the three routes, which is consistent with our data on pain.<sup>[11]</sup> By contrast, Schindlbeck *et al.*, in their study, reported that patients who underwent TLH had the lowest analgesic intake and the fastest recovery rate of the three routes.<sup>[7]</sup> Three studies have compared postoperative pain scores after TLH and TVH using visual analog scales,<sup>[12-14]</sup> but their findings were inconsistent. In the previous reports, we found evidence of heterogeneity, but there are too few trials to test for bias.

Indeed, we showed in this study that it is difficult to choose the appropriate surgical route to reduce pain.

Although TLH is technically challenging and has a prolonged operating time, it may be the preferred method when the pubic angle is narrow, the vagina is small, or the uterus is high or immobile. In such cases, TAH and TVH are difficult to perform. In the present study, the average uterus size in the TLH group tended to be bigger than it was in the TVH group. Further, the amount of bleeding and CRP level 1 day after operation were lower in the TLH group than in the TAH group. However, the wider adoption of TLH depends on the development of new and simplified techniques that can reduce complications and operation time.

The major limitations of our study include its retrospective nature and the choice of hysterectomy route being determined by the surgeon. In addition, the number of subjects was too small for a proper comparison between the three hysterectomy routes.

## CONCLUSION

To conclude, TLH for benign gynecological diseases does not cause more perioperative complications than TAH or TVH, even in the early days of introduction. We need to choose the most minimally invasive surgical method, and the procedures of TVH and TLH appear to offer advantages over TAH in terms of safety and efficacy for the treatment of benign gynecological diseases. However, the choice of the hysterectomy route also depends on disease condition, parity, uterus size, and adhesion.

## Acknowledgments

The authors would like to thank Enago ([www.enago.jp](http://www.enago.jp)) for the English language review.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

- Jones KA, Shepherd JP, Oliphant SS, Wang L, Bunker CH, Lowder JL. Trends in inpatient prolapse procedures in the United States, 1979-2006. *Am J Obstet Gynecol* 2010;202:501.e1-7.
- Akyol D, Esinler I, Guven S, Salman MC, Ayhan A. Vaginal hysterectomy: Results and complications of 886 patients. *J Obstet Gynaecol* 2006;26:777-81.
- Aarts JW, Nieboer TE, Johnson N, Tavender E, Garry R, Mol BW, *et al.* Surgical approach to hysterectomy for benign gynaecological disease. *Cochrane Database Syst Rev* 2015;12:CD003677.
- Wu JM, Wechter ME, Geller EJ, Nguyen TV, Visco AG. Hysterectomy rates in the United States, 2003. *Obstet Gynecol* 2007;110:1091-5.
- Mäkinen J, Johansson J, Tomás C, Tomás E, Heinonen PK, Laatikainen T, *et al.* Morbidity of 10 110 hysterectomies by type of approach. *Hum Reprod* 2001;16:1473-8.

6. Meltomaa SS, Mäkinen JI, Taalikka MO, Helenius HY. One-year cohort of abdominal, vaginal, and laparoscopic hysterectomies: complications and subjective outcomes. *J Am Coll Surg* 1999;189:389-96.
7. McPherson K, Metcalfe MA, Herbert A, Maresh M, Casbard A, Hargreaves J, *et al.* Severe complications of hysterectomy: The VALUE study. *BJOG* 2004;111:688-94.
8. Schindlbeck C, Klauser K, Dian D, Janni W, Friese K. Comparison of total laparoscopic, vaginal and abdominal hysterectomy. *Arch Gynecol Obstet* 2008;277:331-7.
9. Abdelmonem A, Wilson H, Pasic R. Observational comparison of abdominal, vaginal and laparoscopic hysterectomy as performed at a university teaching hospital. *J Reprod Med* 2006;51:945-54.
10. Wattiez A, Soriano D, Cohen SB, Nervo P, Canis M, Botchorishvili R, *et al.* The learning curve of total laparoscopic hysterectomy: Comparative analysis of 1647 cases. *J Am Assoc Gynecol Laparosc* 2002;9:339-45.
11. Lim PC, Crane JT, English EJ, Farnam RW, Garza DM, Winter ML, *et al.* Multicenter analysis comparing robotic, open, laparoscopic, and vaginal hysterectomies performed by high-volume surgeons for benign indications. *Int J Gynaecol Obstet* 2016;133:359-64.
12. Ghezzi F, Uccella S, Cromi A, Siesto G, Serati M, Bogani G, *et al.* Postoperative pain after laparoscopic and vaginal hysterectomy for benign gynecologic disease: A randomized trial. *Am J Obstet Gynecol* 2010;203:118.e1-8.
13. Candiani M, Izzo S, Bulfoni A, Riparini J, Ronzoni S, Marconi A. Laparoscopic vs. vaginal hysterectomy for benign pathology. *Am J Obstet Gynecol* 2009;200:368.e1-7.
14. Morelli M, Caruso M, Noia R, Chiodo D, Cosco C, Lucia E, *et al.* Total laparoscopic hysterectomy versus vaginal hysterectomy: A prospective randomized trial. *Minerva Ginecol* 2007;59:99-105.