Available online at www.medicinescience.org

ORIGINAL ARTICLE

Medicine Science International Medical Journal

Medicine Science 2023;12(4):1174-9

Comparison of vaginal, abdominal and laparoscopic hysterectomy performed in our hospital

Aliye Nigar Serin, Gamze Savci

Karamanoğlu Mehmetbey University, Faculty of Medicine, Department of Obstetrics and Gynecology, Karaman, Türkiye

Received 24 August 2023; Accepted 24 September 2023
Available online 09.10.2023 with doi: 10.5455/medscience.2023.08.167

Abstract

Hysterectomy is the most common pelvic surgical operation and is often performed for benign reasons. We aimed to compare clinical total abdominal hysterectomy (TAH), total laparoscopic hysterectomy (TLH), and vaginal hysterectomy (VH) in benign gynecological conditions. Patients' age, operation duration (min), length of stay in the hospital (days), Preop Hb (g/dL), Postop Hb (g/dL) values, complications according to the performed surgical procedures were analyzed. Determining which procedure will be the most appropriate option for which patient is the most important factor in preventing complications. it was observed that the patients' ages were significantly higher in the VH group (H=71.721; p=0.000), the operation duration was significantly shorter in the TAH group (H=125.689; p=0.000), and the length of hospital stay was significantly shorter in the TLH group (H=71.492; p=0.000). Preoperative and postoperative hemoglobin values were significantly higher in the VH group (H=57.222; p=0.000, H=52.824; p=0.000). It was determined that the complication rate was lower in the TAH group. The type of surgical procedure was found to not have a statistically significant effect on transfusion requirement ($\chi 2$=4.852; p>0.05) and history of previous surgery ($\chi 2$=0.115; p>0.05). The surgical approach of hysterectomy plays a significant role in postoperative morbidity. Determining which procedure will be the most appropriate option for which patient is the most important factor in preventing complications.

Keywords: Hysterectomy, vaginal hysterectomy, laparoscopic hysterectomy, abdominal hysterectomy

Introduction

Hysterectomy is the most common pelvic surgical operation and 70% is performed for benign reasons such as treatment-resistant severe bleeding, myomas, uterine prolapse, and adenomyosis [1,2]. Various techniques exist for performing hysterectomy, and each approach comes with its own distinct pros and cons. The surgical approach of hysterectomy, including vaginal, abdominal, laparoscopic, and robotic-assisted laparoscopic techniques, is the most significant determinant of postoperative morbidity [3]. Vaginal hysterectomy (VH) is considered a minimally invasive method and offers a faster recovery process and shorter hospital stay compared to abdominal hysterectomy (TAH) [3]. While vaginal hysterectomy is frequently employed for treating uterine prolapse, its safety and efficacy have been established; however, its usage for non-prolapse surgical interventions involving pelvic masses, pelvic relaxation deficiency, or a history of abdominal surgery is still limited [4-6]. After Reich's initial laparoscopic hysterectomy (TLH) procedure in 1989, different laparoscopic methods and tools have been advanced, leading to the widespread adoption of TLH techniques, such as laparoscopic-assisted vaginal hysterectomy (LAVH) and TLH in the current era [7,8] Recent research has demonstrated that TLH offers certain benefits compared to the abdominal approach, encompassing quicker resumption of activities, reduced febrile episodes, shorter hospital stays, decreased intraoperative blood loss, better cosmetic results, diminished wound complications, lower post-operative discomfort, and decreased mortality [5,9-11] TLH might involve lengthier operative durations than the abdominal method, which has been associated with unfavorable outcomes, which is consistent regardless of the surgical approach [5,9-13].

The increasing trend towards laparoscopy in recent years has also been reflected in our hospital, and laparoscopy is preferred in appropriate cases. This study is conducted to compare total

CITATION
Serin AN, Savci G. omparison of vaginal, abdominal and laparoscopic hysterectomy performed in our hospital. Med Science. 2023;12(4):1174-9.

Corresponding Author: Aliye Nigar Serin, Karamanoğlu Mehmetbey University, Faculty of Medicine, Department of Obstetrics and Gynecology, Karaman, Türkiye
Email: nserin85@hotmail.com

DOI: 10.5455/medscience.2023.08.167

abdominal hysterectomy (TAH), total laparoscopic hysterectomy (TLH), and vaginal hysterectomy (VH) in benign gynecological conditions, aiming to determine the most effective surgical approach based on various surgical outcomes, particularly complication rates.

Material and Methods

The results of total laparoscopic hysterectomies, vaginal hysterectomies, and total abdominal hysterectomies performed for benign indications between January 2020 and May 2023 at the Karaman Training and Research Hospital Gynecology and Obstetrics Clinic have been retrospectively analyzed. Patient age, history of previous abdominal surgery, additional surgical procedures performed, indications for hysterectomy, and operation duration were recorded. Intraoperative and postoperative complications were recorded as either present or absent. Estimated blood loss and lengths of hospital stay were also recorded. Estimated blood loss was calculated based on the difference between preoperative and postoperative hemoglobin values. Hemoglobin values were measured one day before the preoperative period and at 12 hours postoperatively. The duration of the operation was defined as the interval between the initial incision made at the umbilicus and the removal of the large trocar. The length of hospital stay was calculated as the duration between the patient's operation day and the day of discharge. The Foley catheter of all patients without complications was removed at 8 hours postoperatively. After the surgery, inquiries about defecation and urination were conducted, and patients without any issues were discharged.

As routine preoperative preparation, systemic and pelvic examinations were performed, anesthesia consultations were conducted, and cervicovaginal smears and endometrial biopsies were taken. Our study included all female patients who underwent total laparoscopic hysterectomy, vaginal hysterectomy, and total abdominal hysterectomy for benign indications. Patients with uncontrolled diabetes, those diagnosed with malignancy, those who underwent postpartum hysterectomy due to bleeding after cesarean section, patients who had supracervical hysterectomy, laparoscopy-assisted vaginal hysterectomy, and patients with missing records were excluded from the study.

All patients received 1 gram of intravenous cefazolin one hour before surgery and at 6 hours postoperatively. Prior to the surgery, patients were placed under general anesthesia with a Foley catheter and nasogastric tube inserted.

Statistical analysis

Statistical analyses were performed using the SPSS software (Version 25, IBM Statistics, USA). The normal distribution fit of the data was examined using the Kolmogorov-Smirnov/Shapiro-Wilk tests. Descriptive analyses for variables were provided using means, standard deviations, and frequency tables. Since age, operation duration, length of hospital stay, preoperative, and postoperative hemoglobin values did not follow a normal distribution, groups were compared using the Kruskal-Wallis test. Pairwise comparisons were conducted using the Mann-Whitney U test and evaluated using the Bonferroni correction. The presence of complications, the need for transfusion, and the presence of a history of previous operations were presented using cross tables based on groups. The Chi-square test was used to assess whether there were differences in these frequencies between groups. For the comparison between VH and VH+SIS, the Independent Samples T-test was used for age and operation duration, which exhibited a normal distribution. Since length of hospital stay, preoperative, and postoperative hemoglobin values did not follow a normal distribution, groups were compared using the Mann-Whitney U test. Situations where the p-value was below 0.05 were considered statistically significant results.

Ethical approval

Written informed consent was obtained from all participants in our study in accordance with the Declaration of Helsinki. Approval from the Karamanoglu Mehmetbey University Medical Faculty Clinical Research Ethics Committee was acquired through a decision dated August 22, 2023, bearing the reference number 07-01.

Results

The distribution of patients' age, operation duration (min), length of stay in the hospital (days), Preop Hb (g/dL), and Postop Hb (g/dL) values according to the performed surgical procedures is presented in Table 1. Indicationas of the hysterectomies are shown in Table 2. The most common indication for TAH was myoma (67.9%), for VH it was prolapse (93.9%), for TLH it was treatment-resistant menometrorrhagia (33.3%), and myoma (27.2%).

Table 1. Distribution of descriptive variables of patients according to surgical procedures

Variables	TAH		VH		LH	
	Mean±SD	Min-Max	Mean±SD	Min-Max	Mean±SD	Min-Max
Age (years)	51.78±6.06	38-86	61.97±8.71	43-87	50.24±5.99	38-70
Operation duration (min)	67.35±10.03	45-110	89.03±16.28	58-120	99.24±18.94	75-170
Length of stay (days)	2.75±0.71	2-7	2.53±0.66	1.5-5	1.48±0.55	1-3
Preop Hb (g/dL)	12.01±1.08	9-14	13.02±0.41	12.10-13.70	12.00±1.07	10-13.40
Postop Hb (g/dL)	10.88±1.28	7-13	12.09±0.65	9.5-13.10	11.37±1.06	9.5-13

TAH: total abdominal hysterectomy, VH: vaginal hysterectomy, LH: laparoscopic hysterectomy; min: minutes, Hb: hemoglobin, g/dL: grams per deciliter, SD: standard deviation

DOI: 10.5455/medscience.2023.08.167

Table 2. Indications of hysterectomies

	TAH		VH		TLH	
Indicatioons	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
Fibromyoma	121	67.9%	3	4.5%	11	33.3%
Menometrorrhagia	20	11.2%	1	1.5%	9	27.2%
Hyperplasia	22	12.3%	0		8	24.2%
Prolapse	6	3.3%	62	93.9%	0	
Postmenopausal bleeding	4	2.2%	0		5	15.1%
Pelvic mass	4	2.2%	0		0	
Pelvic pain	1	0.5%	0		0	
Total	178		66		33	

TAH: total abdominal hysterectomy, VH: vaginal hysterectomy, LH: laparoscopic hysterectomy

The comparison of patients' descriptive variables according to surgical procedures is presented in Table 3.Accordingly, it was observed that the patients' ages were significantly higher in the VH group (H=71.721; p=0.000), the operation duration was significantly shorter in the TAH group (H=125.689; p=0.000), and the length of hospital stay was significantly shorter in the TLH group (H=71.492; p=0.000). Preoperative and postoperative hemoglobin values were significantly higher in the VH group (H=57.222; p=0.000, H=52.824; p=0.000).

The type of surgical procedure was found to significantly affect the presence of complications ($\chi2$=9.655; p=0.008). Pairwise comparisons were performed to determine the source of this difference. Since the complication rate in the TAH group appeared significantly different, this group was excluded, and when comparing the other two groups (VH and TLH), no significant difference was found in terms of the complication rate (p=0.372). Therefore, it was determined that the complication rate was lower in the TAH group. The type of surgical procedure was found to not have a statistically significant effect on transfusion requirement ($\chi2$=4.852; p>0.05) and history of previous surgery ($\chi2$=0.115; p>0.05) (Table 3).

Table 3. Comparison of descriptive variables of patients according to surgical procedures

Variables	**TAH (n=178)**	**VH (n=66)**	**LH (n=33)**	**Statistical analysis**			
	Median (IQR)	**Median (IQR)**	**Median (IQR)**	**Kruskal-Wallis Test (H) P**	**Pairwise comparisons**		
					TAH vs V	**VH vs LH**	**TAH vs LH**
Age (years)	51.50 (8.00)	62.50 (13.00)	50.00 (6.00)	71.721 0.000[a]	0.000[b]	0.000[b]	0.560
Operation duration (min)	68.00(14.25)	90.00 (22.00)	96.00 (13.50)	125.689 0.000[a]	0.000[b]	0.143	0.000
Length of stay (days)	2.50 (1.00)	2.50 (1.00)	1.50 (1.00)	71.492 0.000[a]	0.053	0.000[b]	0.000[b]
Preop Hb (g/dL)	12.25 (1.33)	12.95 (0.63)	12.50 (1.80)	57.222 0.000[a]	0.000	0.000[b]	1.000
Postop Hb (g/dL)	11.00 (1.93)	12.10 (0.80)	11.70 (1.75)	52.824 0.000[a]	0.000[b]	0.000[b]	0.115
	Categorical variables			**Statistical analysis**			
	N (%)	**N (%)**	**N (%)**	**Chi-square Test ($\chi2$) P**			
Complication							
Yes	1 (0.6)	3 (4.5)	3 (9.1)	9.655			
No	177 (99.4)	63 (95.5)	30 (90.9)	0.008[c]			
Transfusion required							
Yes	8 (4.5)	- (0)	- (0)	4.852			
No	170 (95.5)	66 (100)	33 (100)	0.101			
History of previous surgery							
Yes	33 (18.5)	11 (16.7)	6 (18.2)	0.115			
No	145 (81.5)	55 (83.3)	27 (81.8)				

TAH: total abdominal hysterectomy, VH: vaginal hysterectomy, LH: laparoscopic hysterectomy, min: minutes, Hb: hemoglobin, g/dL: grams per deciliter, IQR: interquartile range, [a]p<0.05 and Kruskal-Wallis test result, [b]p<0.05 and Bonferroni-corrected Mann-Whitney U test result, [c]p<0.05

DOI: 10.5455/medscience.2023.08.167

The comparison of variables between patients who underwent VH and VH+Sistorectosel procedures is presented in Table 4. According to the results, when comparing the operation durations of participants, it was determined that the duration was significantly shorter in the VH group (t=-7.560; p=0.000). In terms of patients' length of hospital stay, it was found that the duration was significantly shorter in the VH group (U=185.500; p=0.000), and postoperative hemoglobin values were significantly higher in the VH group (U=211.500; p=0.001). The mean ages of patients were similar in both groups, and there was no statistically significant difference between them (U=377.000c, p>0.05). Additionally, preoperative hemoglobin values were similar in both groups, and there was no statistically significant difference between them (t=0.049; p>0.05).

It was concluded that whether patients underwent VH or VH+Sist surgery did not affect the presence of complications or the history of previous surgeries (p>0.05). It was observed that there was no need for postoperative/intraoperative transfusion in both groups (Table 4).

Table 4. Comparison of patients with VAH and VAH+Sistorectosel operations according to variables

Variables	VH (N=19)	VH+Sistorectosel (N=47)	Statistical analysis t-value, U-value	*P*
	Median (IQR) X±SD	Median (IQR) X±SD		
Age (years)	62.05±11.20	61.93±7.62	0.049[a]	0.961
Operation duration (min)	71.58±10.23	96.08±12.52	-7.560[a]	0.000[b]
Length of stay (days)	2.0±0.0	2.50±1.0	185.500[c]	0.000[d]
Preop Hb (g/dL)	13.0±0.70	12.9±0.09	377.000[c]	0.323
Postop Hb (g/dL)	12.50±0.90	12.0±0.80	211.500[c]	0.001[d]
Categorical variables				
	N (%)	**N (%)**	**Chi-square (χ2)**	***P***
Complication				
Yes	- (-)	3 (6.4)	1.271	0.260
No	19 (100)	44 (93.6)		
Transfusion required				
Yes	- (-)	- (-)	-	-
No	19 (100)	47 (100)		
History of previous surgery				
Yes	2 (89.5)	9 (19.1)	0.724	0.395
No	17 (10.5)	38 (80.9)		

*min: minutes, g/dL: grams per deciliter, IQR: interquartile range, SD: standard deviation, [a]t-value from Independent Samples T-test,[b]p<0.05 and result from Independent Samples T-test, [c]U-value from Mann-Whitney U test, [d]p<0.05 and result from Mann-Whitney U test

Discussion

Comparing surgical approaches and complications based on the type of surgery has been a common method in various studies to determine the optimal approach for patients, as the surgical approach of hysterectomy plays a significant role in postoperative morbidity. As in our study, fibromyoma, prolapsus and abnormal uterine bleeding are the largest indication groups for hysterectomies [14]. As in our study, consistent with the literature, there is an increased tendency towards total abdominal hysterectomy (TAH), particularly in cases of fibroids due to the larger uterus, while total laparoscopic hysterectomy (TLH) has also become more common for cases of abnormal uterine bleeding [3,4,11]. Although open surgical procedures are preferred to reduce the risk of complications and avoid the increased risk of transition from laparoscopy to laparotomy in patients with previous abdominal surgery, we found that previous surgeries did not significantly affect the choice of surgical approach in our study [15]. In our study, hospital stays were found to have significantly decreased in TLH cases compared to VH and TAH. Phipps et al. [16] found that the postoperative hospital stay was shorter in TLH compared to TAH. On the other hand, Garry R. et al. [17] demonstrated that there was no significant difference in hospital stays between TLH and vaginal hysterectomy, but there was a difference compared to abdominal hysterectomy.

In our study, the durations of laparoscopic hysterectomy and vaginal hysterectomy were similar, but both were significantly longer than the operation duration of abdominal hysterectomy. There is insufficient data to identify patients who are prone to experiencing prolonged operating times or to ascertain whether such individuals might gain advantages from considering an alternative surgical approach [18]. In the case of benign hysterectomy, it remains uncertain whether there exists a specific operative time at which a prolonged laparoscopic procedure becomes less effective compared to a quicker abdominal procedure. Recent studies examining the impact of operative time on outcomes in laparoscopic hysterectomy have revealed

DOI: 10.5455/medscience.2023.08.167

that morbidity significantly rises in cases exceeding 240 minutes [18-20].

In our study, additional operations were performed on 47 out of 66 cases of VH. The additional surgeries did not increase the complication rate; as expected, they extended the operation and discharge times.

İn our study, the postoperative average hemoglobin level was higher in the VH group compared to TLH and TAH, and it was statistically significant; the highest estimated increase in bleeding was observed in TAH. In many studies, it has been reported that intraoperative and perioperative blood loss is lower in laparoscopic hysterectomy compared to abdominal hysterectomy [21,22].

A significant concern associated with TLH is the increased occurrence of urinary tract injuries [23]. When considering complications in our study as a whole, the rate of complications was higher in TLH cases. In a review article, it has been reported that the incidence of ureteral injury is estimated to be between 0.03% and 2% for AH, between 0.02% and 0.5% for VH, and between 0.2% and 6% for TLH [24]. While performing TLH, numerous surgeons utilize electrical laparoscopic instruments to cauterize the uterine artery and dissect the vesicouterine fold; consequently, the occurrence of fistula formation might increase due to thermal injury [25].

In a recent meta-analysis study comparing VH and TLH, except for the shorter duration of the operation in VH compared to TLH, no differences were observed among all complications, blood loss, hospital stay, and postoperative recovery [3]. In 2015, a Cochrane review concluded that VH demonstrates better outcomes than TLH for benign conditions, VH is associated with a faster return to normal activities than TLH, as suggested by a meta-analysis involving two studies comprising 140 patients [9,26,27]. Furthermore, TLH did not present any benefits over VH; TLH had longer operation times, and showed a higher occurrence of urinary tract injuries compared to VH [5].

Conclusion

Determining which procedure will be the most appropriate option for which patient is the most important factor in preventing complications. Not all hysterectomies can be carried out via VH or TAH, and not all hysterectomies should be performed laparoscopically. Due to the fact that the advantages of the three types of hysterectomy have not yet been demonstrated over each other, the surgeon bears a significant responsibility in choosing the appropriate type of hysterectomy for the patient by considering the advantages and disadvantages.

Conflict of Interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical Approval
Approval from the Karamanoglu Mehmetbey University Medical Faculty Clinical Research Ethics Committee was acquired through a decision dated August 22, 2023, bearing the reference number 07-01.

References

1. ACOG Committee Opinion No. 444: choosing the route of hysterectomy for benign disease. Obstet Gynecol. 2009;114:1156-8.
2. Whiteman MK, Hillis SD, Jamieson DJ, et al. Inpatient hysterectomy surveillance in the United States, 2000-2004. Am J Obstet Gynecol. 2008;198:34.
3. Lee SH, Oh SR, Cho YJ, et al. Comparison of vaginal hysterectomy and laparoscopic hysterectomy: a systematic review and meta-analysis. BMC Womens Health. 2019;19:83.
4. Buhur A, Erdem D. Total laparoskopik histerektomi ile total abdominal histerektomi olgularının karşılaştırılması. Ege Tıp Dergisi. 2022;61:541-8.
5. Aarts JW, Nieboer TE, Johnson N, et al. Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Syst Rev. 2015;2015:CD003677.
6. Moen MD, Richter HE. Vaginal hysterectomy: past, present, and future. Int Urogynecol J. 2014;25:1161-5.
7. Reich H. Laparoscopic hysterectomy. Surg Laparosc Endosc. 1992;2:85-8.
8. Driessen SR, Van Zwet EW, Haazebroek P, et al. A dynamic quality assessment tool for laparoscopic hysterectomy to measure surgical outcomes. Am J Obstet Gynecol. 2016;215:754.
9. Walsh CA, Walsh SR, Tang TY, Slack M. Total abdominal hysterectomy versus total laparoscopic hysterectomy for benign disease: a meta-analysis. Eur J Obstet Gynecol Reprod Biol. 2009;144:3-7.
10. Wiser A, Holcroft CA, Tulandi T. et al. Abdominal versus laparoscopic hysterectomies for benign diseases: evaluation of morbidity and mortality among 465,798 cases. Gynecol Surg. 2013;10:117-22.
11. Görkemli H, Eren G, Şimşekler T. Comparison of clinical results in patients with total abdominal hysterectomy and total laparoscopic hysterectomy. TJRMS. 2021;5:73-8.
12. Ditto A, Martinelli F, Bogani G, et al. Implementation of laparoscopic approach for type B radical hysterectomy: a comparison with open surgical operations. Eur J Surg Oncol. 2015;41:34-9.
13. Barber EL, Neubauer NL, Gossett DR. Risk of venous thromboembolism in abdominal versus minimally invasive hysterectomy for benign conditions. Am J Obstet Gynecol. 2015;212:609.
14. Mereu L, Carlin R, Pellegrini A. et al. Total laparoscopic hysterectomy for benign disease: outcomes and literature analysis. Gynecol Surg. 2018;15:19.
15. Donnez O, Donnez J. A series of 400 laparoscopic hysterectomies for benign disease: a single centre, single surgeon prospective study of complications confirming previous retrospective study. BJOG. 2010;117:752-5.
16. Perino A, Cucinella G, Venezia R, et al. Total laparoscopic hysterectomy versus total abdominal hysterectomy: an assessment of the learning curve in a prospective randomized study. Hum Reprod. 1999;14:2996-9.
17. Garry R, Fountain J, Mason S, et al. The eVALuate study: two parallel randomised trials, one comparing laparoscopic with abdominal hysterectomy, the other comparing laparoscopic with vaginal hysterectomy. BMJ. 2004;328:129.
18. Margulies SL, Vargas MV, Denny K, et al. Comparing benign laparoscopic and abdominal hysterectomy outcomes by time. Surg Endosc. 2020;34:758-69.
19. Catanzarite T, Saha S, Pilecki MA, et al. Longer operative time during benign laparoscopic and robotic hysterectomy is associated with increased 30-day perioperative complications. J Minim Invasive Gynecol. 2015;22:1049-58.

DOI: 10.5455/medscience.2023.08.167

20. Hanwright PJ, Mioton LM, Thomassee MS, et al. Risk profiles and outcomes of total laparoscopic hysterectomy compared with laparoscopically assisted vaginal hysterectomy. Obstet Gynecol. 2013;121:781-7.

21. Howard FM, Sanchez R. A comparison of laparoscopic assisted vaginal hysterectomy and abdominal hysterectomy. J Gynecol Surg. 1993;9:83-90.

22. Seracchioli R, Venturoli S, Vianello F, et al. Total laparoscopic hysterectomy compared with abdominal hysterectomy in the presence of a large uterus. J Am Assoc Gynecol Laparosc. 2002;9:333-8.

23. Forsgren C, Altman D. Risk of pelvic organ fistula in patients undergoing hysterectomy. Curr Opin Obstet Gynecol. 2010;22:404-7.

24. Ugurlu EN. Ureteric injuries during laparoscopic gynecological operations. World Journal of Laparoscopic Surgery. 2010;3:123-5.

25. Adelman MR, Bardsley TR, Sharp HT. Urinary tract injuries in laparoscopic hysterectomy: a systematic review. J Minim Invasive Gynecol. 2014;21:558-66.

26. Ottosen C, Lingman G, Ottosen L. Three methods for hysterectomy: a randomised, prospective study of short term outcome. BJOG. 2000;107:1380-5.

27. Hwang JL, Seow KM, Tsai YL, et al. Comparative study of vaginal, laparoscopically assisted vaginal and abdominal hysterectomies for uterine myoma larger than 6 cm in diameter or uterus weighing at least 450 g: a prospective randomized study. Acta Obstet Gynecol Scand. 2002;81:1132-8.