

SURGICAL BLOOD LOSS AND LAPAROSCOPIC-ASSISTED VAGINAL HYSTERECTOMY

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SUMMARY

Objective: This study aimed to elucidate the possible relationship between surgical blood loss (SBL) and medical outcomes of laparoscopic-assisted vaginal hysterectomy (LAVH).

Materials and Methods: Patients who underwent LAVH performed by the same surgeon for benign gynecologic diseases from 2004 to 2006 were analyzed retrospectively. Patients were divided into two groups according to the amount of SBL (< 150 mL or ≥ 150 mL, 75th percentile of mean SBL). Clinical medical outcomes of all women were analyzed to identify the effects of SBL during LAVH.

Results: A total of 133 women with benign gynecologic disease were included. Group 1 (SBL < 150 mL) consisted of 108 patients and Group 2 (SBL ≥ 150 mL) consisted of 25 patients. The mean operative time for patients with SBL ≥ 150 mL was 36.1 minutes longer than that for patients with SBL < 150 mL ($p < 0.001$). Mean hospital stay, mean shift in serum hemoglobin, mean shift in serum hematocrit and mean flatulence relief time were not significantly different between the two groups.

Conclusion: Greater SBL (≥ 150 mL) during LAVH was significantly associated with longer operating time, but had no detrimental effect on short-term surgical outcomes. Thus, efforts to minimize intraoperative bleeding and so reduce operative time will be beneficial for women undergoing LAVH. [*Taiwan J Obstet Gynecol* 2009;48(4):400-402]

Key Words: hysterectomy, laparoscopic, operation time, quality indicator, robotic surgery, surgical blood loss

Introduction

Hysterectomy is one of the most common major surgical procedures for women with benign gynecologic diseases. Three main types of hysterectomy are now used: abdominal, vaginal, and laparoscopic. Laparoscopic-assisted vaginal hysterectomy (LAVH) has already gained widespread acceptance since it was first reported by Reich et al in 1989 [1]. LAVH was introduced in our hospital in 1993, and a clinical pathway for LAVH was initiated in January 1998. LAVH is now regarded

as a safe and feasible technique for managing benign uterine disease, because it offers minimal postoperative discomfort, less blood loss, shorter hospital stay, rapid convalescence, and an early return to the activities of daily living [2]. The amount of surgical blood loss (SBL) is an important indicator of surgical quality. It influences aspects of clinical care such as blood transfusion, postoperative recovery, and potential complications. It is also associated with the difficulty of surgery. Thus, any efforts to minimize intraoperative bleeding and the possible need for blood transfusions are justified. Sinha et al [3] suggested that uterine artery ligation should be performed as the first step before total laparoscopic hysterectomy, and concluded that this procedure reduced the average SBL. The aim of this study was to elucidate the relationship between SBL and surgical outcome of LAVH.



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Methods and Results

This retrospective cohort study included 133 patients in a medical center in central Taiwan from 2004 to 2006. All women underwent LAVH performed by the same surgeon for benign gynecologic diseases. The surgeon had more than 10 years' experience in performing LAVH procedures. Patient characteristics (age, body mass index [BMI], weight of removed uterus, pelvic adhesions, and American Society of Anesthesiologists [ASA] physical status scale) and medical care process data (operation time, length of hospital stay, the shift in serum hemoglobin, the shift in serum hematocrit, and flatulence relief time) were collected from the patients' charts and the hospital's computer system. Flatulence relief time was calculated as the number of hours required after surgery to expel the build-up of colon gas, as reported by the patient. Complete blood counts and differential counts were obtained at admission and 24 hours postoperatively. The operative time was calculated as the time from application of the vaginal douche for uterine manipulator insertion to final closure of the trocar incision wound. SBL was estimated by the surgeon and nurses at the end of the surgery by examining the amount of blood in the suction container and surgical sponges. All laparoscopic procedures were performed under general endotracheal anesthesia.

Regarding the laparoscopic technique, a 10-mm main trocar was inserted through the supraumbilical region and three 5-mm trocars were inserted in the lower abdomen (one suprapubic, two upper lateral). Bipolar forceps and monopolar scissors were used to perform all surgical steps. The vaginal vault was closed using interrupted or continuous locking 1-0 polyglactin. The 133 women were divided into two groups according to the amount of SBL (Group 1, <150 mL and Group 2, ≥ 150 mL; 75th percentile of mean SBL). The medical outcomes of 108 consecutive LAVH procedures in Group 1 and 25 consecutive LAVH procedures in Group 2 were compared. Student's *t* test was used to compare the means of continuous variables between the two groups. Chi-squared tests were used to measure the statistical significance of differences in nominal variables between the two groups. A *p* value of <0.05 was considered statistically significant.

Group 1 consisted of 108 patients with a mean age of 44.73 ± 6.47 years. Group 2 consisted of 25 patients with a mean age of 44.73 ± 7.75 years. There were no statistical differences between the two groups regarding parity, BMI, grade of pelvic adhesion, weight of removed uterus, or the ASA physical status scale (Table 1). Mean hospital stay, mean shift in serum hemoglobin, mean shift in serum hematocrit, and mean flatulence relief time were not significantly different between the two

Table 1. Comparison of characteristics of women undergoing laparoscopic-assisted vaginal hysterectomy*

Variable	Group 1 (SBL < 150 mL)	Group 2 (SBL ≥ 150 mL)	<i>p</i> [†]
Age (yr)	44.73 ± 6.47 (<i>n</i> = 108)	44.73 ± 7.75 (<i>n</i> = 25)	0.9988
BMI (kg/m ²)	24.32 ± 3.91 (<i>n</i> = 108)	24.32 ± 3.91 (<i>n</i> = 25)	0.9675
Parity	2.48 ± 1.15 (<i>n</i> = 105)	2.32 ± 1.38 (<i>n</i> = 25)	0.5589
Weight of removed uterus (g)	270.42 ± 150.42 (<i>n</i> = 101)	280.69 ± 139.09 (<i>n</i> = 23)	0.7650
Pelvic adhesion	90/108 (83.3)	22/25 (88.0)	0.7355
ASA physical status scale			0.0957
1	57/108 (52.8)	19/25 (76.0)	
2	51/108 (47.2)	6/25 (24.0)	

*Data are presented as mean \pm standard deviation or *n* (%); [†]Student's *t* test for continuous variables. SBL = surgical blood loss; BMI = body mass index; ASA = American Society of Anesthesiologists.

Table 2. Comparison of medical outcomes of women undergoing laparoscopic-assisted vaginal hysterectomy*

Variable	Group 1 (SBL < 150 mL)	Group 2 (SBL ≥ 150 mL)	<i>p</i> [†]
Operation time (hr)	3.31 ± 0.82 (<i>n</i> = 108)	3.92 ± 0.76 (<i>n</i> = 25)	0.0010
Hospital stay (d)	5.32 ± 2.30 (<i>n</i> = 107)	5.00 ± 0.41 (<i>n</i> = 25)	0.1823
Shift of Hb (g/dL)	-0.87 ± 0.80 (<i>n</i> = 108)	-0.48 ± 1.31 (<i>n</i> = 25)	0.1586
Shift of Hct (%)	-2.82 ± 2.39 (<i>n</i> = 108)	-1.77 ± 3.79 (<i>n</i> = 24)	0.2049
Flatulence relief time (hr)	22.67 ± 11.90 (<i>n</i> = 102)	20.72 ± 9.69 (<i>n</i> = 24)	0.4565

*Data are presented as mean \pm standard deviation; [†] χ^2 test for nominal variables. SBL = surgical blood loss; Hb = hemoglobin; Hct = hematocrit.

groups (Table 2). The mean operative time for patients in Group 2 was increased by 36.1 minutes, compared with that for Group 1 ($p < 0.001$).

Discussion

LAVH has been shown to be an acceptable alternative to abdominal total hysterectomy. Several randomized trial have demonstrated the advantages of operative laparoscopy compared with laparotomy [4]. Patient benefit is demonstrated by fast recovery, decreased pain, less SBL, and shorter operative time. Greater SBL may adversely affect the patient's well-being during intra- and postoperative care. Intraoperative blood loss has been attributed to multiple clinical variables, such as age, BMI, surgeon's experience, type of anesthesia, ASA score, intra-abdominal adhesions, and the weight of the removed uterus [5,6]. In trying to minimize these confounding variables, this study included a relatively homogeneous series of patients undergoing the same surgical procedure. Our results revealed that $SBL \geq 150$ mL during LAVH was significantly associated with longer operating times but with no detrimental effect on short-term surgical outcomes.

The advantages of minimally invasive surgery in terms of immediate outcome are well established, and LAVH has been used with increasing frequency for the treatment of gynecologic disease. However, the laparoscopic approach has been associated with a high incidence of major complications and longer operating times, but these can be reduced by surgeons with good training and broad experience. A study has shown that senior surgeons can shorten the mean operation time and length of hospital stay without increasing the complication rate. It is also believed that experienced surgeons can improve SBL and operative time [7]. Multidisciplinary team work (experienced, well-trained surgeon, surgical assistant, anesthesiologist, nurses, and up-to-date instrumentation) is also necessary for effective performance of LAVH.

Recent advances in equipment and instruments are also important. Robotic-assisted surgery is a recently developed technique that could improve SBL and maintain quality outcomes. Adoption of the traditional laparoscopic approach for major gynecologic procedures has been limited over the past decade, possibly

because of the steep learning curve involved [8]. However, the learning curve associated with robotic-assisted laparoscopic major gynecologic procedures may be less steep. A previous study demonstrated a significant improvement in operative time after the first 20 completed cases of robotic-assisted surgeries for benign gynecologic conditions. This information could be useful for training surgeons [9]. Robotic-assisted laparoscopy in gynecologic surgeries might thus represent a potential new frontier in current minimally invasive surgical techniques.

In conclusion, the operative time and SBL associated with LAVH decrease as the expertise of the surgeon increases. Given adequate training in laparoscopic surgery and using appropriate techniques, LAVH can be performed in all women with minimal blood loss, decreased operative times, and favorable medical outcomes.

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