

Laparoscopic-Assisted Vaginal Hysterectomy for Uteri Weighing 1000 Grams or More

James Fanning, DO, Bradford Fenton, MD, PhD,
Michella Switzer, DO, Jil Johnson, DO, Jessica Clemons

ABSTRACT

Introduction: Prospective randomized trials have proven the benefits of laparoscopic-assisted vaginal hysterectomy (LAVH) compared with abdominal hysterectomy. The purpose of this study was to evaluate the safety and efficacy of LAVH performed for uteri weighing ≥ 1000 grams.

Methods: Fifteen patients underwent attempted LAVH for uteri > 1000 g. Median age was 45 years old (range, 31 to 57), and median weight was 170 pounds (range, 130 to 236); 64% had medical comorbidities, and 43% had prior pelvic surgery. Five ports (5 mm) were used to allow maximum uterine manipulation. Uterine vessels were doubly coagulated.

Results: Fourteen of 15 cases (93%) were successfully completed laparoscopically. Median uterine weight was 1090 grams (range, 1000 to 1650). Median operative time was 3.5 hours (range, 2 to 4.6), and median blood loss was 400 mL (range, 100 to 1200). All patients were discharged on postoperative day one, and no patients developed a postoperative complication.

Conclusion: We believe that LAVH is a safe and effective approach for uteri larger than 1000 g. It is our opinion that 3 surgical techniques are required; maximum Trendelenburg position, adequate number of ports, and double coagulations of the uterine vessels.

Key Words: Laparoscopic-assisted vaginal hysterectomy, Abdominal hysterectomy, Trendelenburg position.

INTRODUCTION

Approximately 250,000 hysterectomies are performed annually in the United States for the treatment of leiomyomas.¹ Advanced laparoscopic procedures are increasingly being utilized as an alternative for laparotomy in gynecologic surgery. A metaanalysis² of 27 prospective randomized trials has proven the benefits of laparoscopic-assisted vaginal hysterectomy (LAVH) compared with abdominal hysterectomy (AH): decreased pain, decreased surgical-site infections (decreased relative risk 80%), decreased hospital stay (2 days less), quicker return to activity (2 weeks sooner), and fewer postoperative adhesions (decreased 60%). In a cost-effectiveness analysis of LAVH versus AH for large uteri, no significant increase in cost was noted with LAVH.³ Current Procedural Terminology (CPT) codes characterize large uteri as uteri > 250 g, (4 times normal uterine weight). Several authors have described the use of LAVH for uteri weighing 500 g.^{4,5} However, no authors have looked specifically at the use of LAVH for uteri weighing ≥ 1000 . The purpose of this study was to evaluate the safety and efficacy of LAVH performed for uteri weighing ≥ 1000 g.

MATERIALS AND METHODS

Fifteen patients underwent attempted LAVH for uteri > 1000 g. Patients were identified through the senior author's surgical log from January 2005 to May 2007. All patients requiring surgery for large leiomyomas were offered LAVH; no patients refused LAVH, and no patients were excluded. Institutional Review Board approval was obtained, and a retrospective computerized chart review was performed. A single LAVH was converted to laparotomy due to extensive pelvic adhesions, and the patient and surgical characteristics were not included. A minimally invasive, academic gynecological oncologist from our minimally invasive surgical institute performed all cases, assisted by a senior gynecologic resident and a junior gynecologic resident or medical student.

Technique of Laparoscopic-Assisted Vaginal Hysterectomy

All patients received a preoperative bowel prep with 45 mL of fleets phosphosoda orally, a single dose of preop-

Department of Obstetrics and Gynecology, Summa Health System, Northeastern Ohio Universities College of Medicine, Akron, Ohio, USA (all authors).

Presented at the 56th Annual Clinical Meeting of the American College of Obstetrics and Gynecology, New Orleans, Louisiana, USA, May 3–7, 2008.

Address reprint requests to: James Fanning, DO, Professor and Chairman, Department of Obstetrics and Gynecology, Summa Health System, Northeastern Ohio Universities College of Medicine, 525 E Market St., Medical II, Akron, OH 44309, USA. Telephone: 330 375 7896, Fax: 330 375 7831

© 2008 by JSL, *Journal of the Society of Laparoendoscopic Surgeons*. Published by the Society of Laparoendoscopic Surgeons, Inc.

erative prophylactic antibiotics and external pneumatic cuffs. On postoperative day 1, patients were given bowel stimulation with 45 mL of fleets phosphosoda, started on a general diet, and were discharged when fluid intake was adequate. Patients were followed up in the office 1 and 4 weeks after surgery.

All procedures were performed with the patient under general endotracheal anesthesia. An orogastric tube was inserted and removed at the end of surgery. The patient was positioned in the dorsolithotomy position with legs in Allen stirrups, and placed in a maximal Trendelenburg position ($\approx 30^\circ$). A gel pad was placed under the buttocks to prevent the patient from gravitating towards the head of the table.

A 5-port (5mm) transperitoneal approach was used. A 5-mm trocar was inserted in the supraumbilical or left upper quadrant (depending on uterus size, previous abdominal/pelvic incisions, and body habitus) following Veress needle pneumoinflation. Two additional 5-mm ports were placed in the right and left side, the position depending on the size and shape of the uterus. It is essential to place an adequate number of ports to allow maximum uterine manipulation out of the pelvis and medial off of the pelvic side wall. Typically, a vaginal manipulator and 3 laparoscopic graspers are used to manipulate the uterus. One grasper is applied to the contralateral round ligament, and 2 graspers are used as fulcrums (**Figure 1**). Round ligaments were excised with the PlasmaKinetic cutting forceps (Gyrus ACMI, Southborough, MA). Retroperitoneal spaces were dissected, both ureters

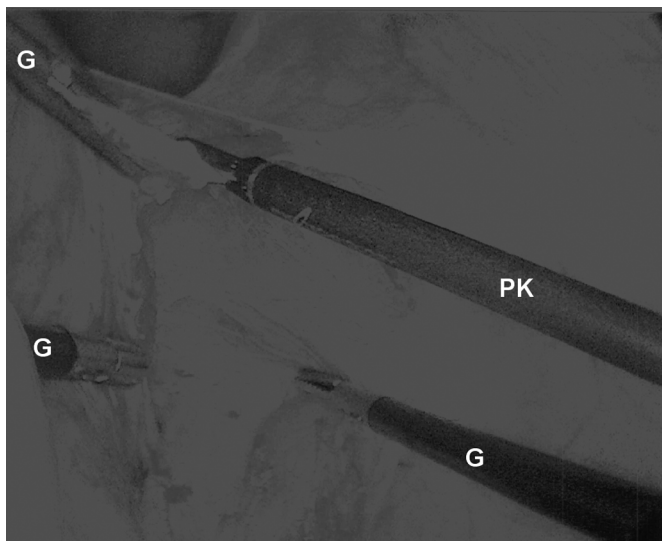


Figure 1. Uterine manipulation. G=laparoscopic graspers; PK=PlasmaKinetic Cutting Forceps.

were identified, and the infundibulopelvic ligaments or ovarian ligaments/fallopian tubes (depending on patient's preference for ovarian conservation) were excised with the PK cutting forceps. The anterior and posterior leaf of the broad ligament was dissected. Using multiple laparoscopic graspers and the vaginal uterine manipulator, the uterus was then manipulated out of the pelvis frequently requiring a "rocking" technique. After the uterus had been manipulated out of the pelvis, the bladder was dissected off the cervix with monopolar electrosurgery. Uterine vessels were then coagulated and cut with PK cutting forceps. Because of the enlarged size of the uterine vessels, the vessels were coagulated on the uterus prior to the standard coagulating and cutting. All attempts were made to excise the cardinal and uterosacral ligaments with the PK cutting forceps. The remainder of the case was performed from the vaginal approach. The cervicovaginal junction was opened with monopolar electrosurgery. The anterior and posterior cul-de-sacs were entered and retracted. The remainder of the uterosacral ligament was cut and suture ligated with 0 polyglycolic acid sutures. The uterus was then morcelated with the monopolar electrosurgery in a sequential coring fashion. Uterosacral vaginal fixation sutures were placed and reperitonealization was performed. The vaginal cuff was closed with interrupted figure of eight 0 polyglycolic acid sutures.

Pain assessment was evaluated using the Visual Analog Scoring system⁶: 0 - no pain, 2 - mild pain, 5 - moderated pain, 7 - severe pain, and 10 - excruciating pain. At our institution, Visual Analog Scoring is performed and recorded every 4 hours by the nursing staff. The highest visual analog score on postoperative day 0 or postoperative day 1 were used. All patients were evaluated by the same nursing staff and had the same preprinted postoperative pain management protocol.

RESULTS

Patient characteristics are presented in **Table 1**. Median age was 45 years old (range, 31 to 57), and median weight was 170 pounds (range, 130 to 236). Nine of the 14 patients (64%) had medical comorbidities, and 6 of 14 patients (43%) had prior pelvic surgery.

Surgical characteristics are presented in **Table 2**. Fourteen of 15 cases (93%) were successfully completed laparoscopically. Median uterine weight was 1090g (range, 1000 to 1650). Median operative time was 3.5 hours (range, 2 to 4.6), and median blood loss was 400cc (range, 100 to 1200). All patients were discharged on postoperative day one. Median postoperative pain score was 4 - discomforting (range, 0 to 8). At 28-day follow-up, no postoperative

Table 1.
Patient Characteristics

Age	45 years (range, 31 to 57)
Weight	170 lb (range, 130 to 236)
Caucasian	64%
African American	36%
Medical Comorbidities	64%
Prior Pelvic Surgery	43%

Table 2.
Surgical Characteristics

Uterine weight (g)	1090 (range, 1000 to 1650)
OR Time (h)	3.5 (range, 2 to 4.6)
Blood Loss (mL)	400 (range, 100 to 1200)
Hospital Stay (days)	1
Postoperative Pain (Visual Analog Score)	4 (range, 0 to 8)

complications had occurred. Interestingly, the one patient converted to laparotomy developed a pulmonary embolus on postoperative day 6.

DISCUSSION

We were successful in performing LAVH for uteri >1000 g in 14 of 15 patients (93%). Median operating time was 3.5 hours, and median blood loss was 400 mL. All patients were discharged on postoperative day one. Median postoperative pain was discomforting (VAS 4). No complications occurred in the first 30 days after surgery. Consistent with a large meta-analysis showing advantages of LAVH versus abdominal hysterectomy for normal size uteri,² our patients had little pain, no surgical site infections, and a hospital stay of only one day. If an abdominal approach is chosen for uteri weighing >1000 g, a long abdominal incision would be required resulting in increased postoperative pain, increased chance of surgical site infection, and longer hospital stay. As we have previously reported,³ no significant increased cost is incurred with LAVH versus abdominal hysterectomy for large uteri because the increased cost of operative time associated with LAVH is balanced by the increased cost of the additional 2 days of hospital stay for abdominal hysterectomy.

Because of the technical challenges in performing LAVH for uteri >1000 g, it is our opinion, that several surgical techniques are essential. First, patients must be placed in a maximum Trendelenburg position. Because median procedure time is 3.5 hours, we recommend placing a gel pad under the buttocks to prevent the patient from gravitating towards the head of the table. Second, an adequate number of ports and surgical assistants are necessary to manipulate the uterus out of the pelvis and off of the pelvic side wall. The round ligament, infundibulopelvic ligament (or ovarian ligament/fallopian tubes) and broad ligament must be resected to allow uterine manipulation. Frequently, the uterus needs to be "rocked" with the

laparoscopic graspers and vaginal uterine manipulator to manipulate it out of the pelvis. Third, we do not attempt to dissect the bladder off the cervix until the uterus has been manipulated out of the pelvis to avoid bladder injury. Fourth, a double coagulation of the uterine vessels is necessary. We performed multiple coagulations of the uterine vessels on the uterus bilaterally to control back bleeding before coagulating and cutting the uterine vessels. Without performing this technique, hemorrhage can be difficult to control. Finally, the surgeon must have patience when morcelating the uterus vaginally because it typically takes approximately one hour. It is our opinion that vaginal morcelization with monopolar electrosurgery is approximately 50% faster than using the laparoscopic morcelator.

We performed a Pub Med literature search from 1965 to the present and located 6 articles addressing LAVH for large uteri, but none specifically for uteri weighing 1000 g or more. Pelosi et al⁴ reported on LAVH for uteri weighing \geq 500 g. They described a single uterus that weighed >1000 g (1095 g), but the LAVH was converted to abdominal hysterectomy. Darai et al⁷ reported on LAVH for uteri between 290 g and 1560 g. Procedures for both of the large uteri, 1450 g and 1560 g had to be converted to laparotomy. Nimaroff et al⁸ removed 2 uteri >1000 g via LAVH. One patient required multiple blood transfusions. Wang et al⁹ presented a study on LAVH for uteri >500 g, and successfully removed 2 uteri weighing more than 1000 g. Lyons et al¹⁰ presented a study for LAVH for uteri >300 g. At least one uterus weighing >1000 g was successfully removed. Finally, Wattiez et al¹¹ reported on laparoscopic hysterectomies for uteri >500 g and successfully removed a uterus weighing 1230 g.

CONCLUSION

We successfully performed LAVH for uteri >1000 g in 14 of 15 patients (93%), with 3.5-hour operative time and 400 mL blood loss. All patients were discharged on postoperative day 1, and median pain was only discomforting.

None of the 14 patients experienced complications. We believe that LAVH is a safe and effective approach for uteri >1000 g. It is our opinion that 3 surgical techniques are required; maximum Trendelenburg position, adequate number of ports, and double coagulation of the uterine vessels.

References:

1. Becker ER, Spalding J, DuChane J, Horowitz IR. Inpatient surgical treatment for patients with uterine fibroids in the United States, 1998–2002. *J Natl Med Assoc.* 2005;97:1336–1342.
2. Johnson N, Barlow D, Lethaby A, Tavender E, Curr E, Garry R. Surgical approach to hysterectomy for benign gynaecological disease. *The Cochrane Database Syst Rev.* 2005;1:DC003677.
3. Mittapalli R, Fanning J, Flora R, Fenton BW. Cost-effectiveness analysis of the treatment of large leiomyomas: laparoscopic assisted vaginal hysterectomy versus abdominal hysterectomy. *Am J Obstet Gynecol.* 2007;196:e19–21.
4. Pelosi MA, Kadar N. Laparoscopically assisted hysterectomy for uteri weighing 500 g or more. *J Am Assoc Gynecol Laparosc.* 1994;1:405–409.
5. Salmanli N, Maher P. Laparoscopically-assisted vaginal hysterectomy for fibroid uteri weighing at least 500 grammes. *Aust N Z J Obstet Gynaecol.* 1999;39:182–184.
6. Fishman B, Pasternak S, Wallerstein S, et al. The Memorial Pain Assessment Card: a valid instrument for the assessment of cancer pain. *Cancer.* 1986;60:51–1157.
7. Darai E, Soriano D, Kimata P, Laplace C, Lecuru F. Vaginal hysterectomy for enlarged uteri, with or without laparoscopic assistance: randomized study. *Obstet Gynecol.* 2001;97(5 pt 1):712–716.
8. Nimaroff ML, Dimino M, Maloney S. Laparoscopic-assisted vaginal hysterectomy of large myomatous uteri with supracervical amputation followed by trachelectomy. *J Am Assoc Gynecol Laparosc.* 1996;3(4):585–587.
9. Wang CJ, Yuen LT, Yen CF, Lee CL, Soong YK. A simplified method to decrease operative blood loss in laparoscopic-assisted vaginal hysterectomy for the large uterus. *J Am Assoc Gynecol Laparosc.* 2004;11(3):370–373.
10. Lyons TL, Adolph AJ, Winer WK. Laparoscopic supracervical hysterectomy for the large uterus. *J Am Assoc Gynecol Laparosc.* 2004;11(2):170–174.
11. Wattiez A, Soriano D, Fiaccavento A, et al. Total laparoscopic hysterectomy for very enlarged uteri. *J Am Assoc Gynecol Laparosc.* 2002;9(2):125–130.