# Laparoscopically Assisted Vaginal Hysterectomy: Report of 190 Cases

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## ABSTRACT

We report 190 cases where laparoscopy assisted vaginal hysterectomy (LAVH) was used as a primary procedure when the patients were not suitable candidates for a vaginal hysterectomy (VH) either because of lack of prolapse or multiple abdominal surgeries. All the surgeries were done by the same gynecologist. A total of 209 cases were performed, but 8 cases (3.8%) have been converted to TAH because of intraoperative bleeding or severe adhesions. The remaining 201 (96.2%) cases have been completed as LAVH. In this study we have evaluated only 190 cases as 19 cases had additional associated surgeries or incomplete records. The average operating time was 117 ± 25.9 min, the intraoperative blood loss was 242.3 ± 213.3 mL, and the average hospitalization was 0.7 ± 0.7 days. Although the operating time and intraoperative blood loss over a span of time showed significant reduction, the hospitalization did not show any significant change. The complication rate was 6.6%. The average hospitalization cost excluding the surgeons and anesthesiologist charges was $3936.00. With these findings we have concluded that regardless of preoperative diagnosis and findings when vaginal hysterectomy is not suitable, LAVH is a viable alternative to TAH. To the best of our knowledge this is the first article discussing this particular approach.

## INTRODUCTION

IN 1989 REICH ET AL.[1] proposed a combined laparoscopic and vaginal approach to hysterectomy. They have suggested that laparoscopy-assisted vaginal hysterectomy (LAVH) is a substitute for total abdominal hysterectomy (TAH).

LAVH is praised for retaining surgical advantage attributed to the TAH while offering shorter hospitalization,[3,8] reduced complication rates,[4–7] reduced postoperative pain,[3,8] and earlier returning to normal life and activity.[3] The disadvantages are longer operative time,[3,5,7,8] the higher costs,[3,4,6] the need for special training, and experience for LAVH including a learning curve.

Although LAVH is becoming an acceptable procedure there seems to be no advantage in substituting LAVH for standard vaginal hysterectomy (VH).[2] LAVH has been promoted in cases where VH was not suitable because of dense adhesions, the need for oopherectomy, and lack of pelvic relaxation.[3–8]

Comparison of cases of the previous investigators is difficult because of lack of standardization of the laparoscopic part, as different techniques and level of dissection have been used. It appears that classification offered by Munro and Parker[9] may be a solution for standardization and comparison.

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Late publications reveal LAVH being as or less expensive than TAH, when reusable instruments are used instead of disposables for cautery and haemostsis.[7,8] Previously we compared the outcome of 61 LAVH cases to 65 TAH in 1994.[5] Now we are presenting results and outcome of 190 cases of hysterectomy. As a new approach, all the cases that did not qualify for a VH have been treated solely by LAVH by the same gynecologist.

## MATERIALS AND METHODS

Between January 1992 and June 1995, 190 LAVH cases were performed by the same gynecologist. All cases not deemed suitable for a VH in the author's judgment were treated with LAVH. Of the attempted 209 cases 8 cases were converted into TAH because of adhesions or intraoperative bleeding.

Data were abstracted from the office and the hospital medical records. The charts were examined for patients demographic data, obstetric index, operative indications for hysterectomy, estimated blood loss, operating time, uterine weight, body weight and postoperative complications, length of the hospital stay, and cost per procedure. Operative indications are presented in Table 1.

Operative technique: After preop assessment, routine abdominal preparation, no preop enemas were administered. Under general anesthesia with intubation patients were placed in a modified dorsolithotomy position. After pelvic examination, an intrauterine elevator was placed. Initial trocar placement was with an open laparoscopy technique at the umbilical level or between the xyphoid and umblicus depending on the size of the uterus or presence of previous midline scars, following pneumoperitoneum establishment with $CO_2$ under 12–14 mm Hg pressure. Additional 2 lateral and a suprapubic port were placed under direct visualization. After trocar placement, first the round ligaments were cauterized and dissected followed by securing the ovarian vessel pedicles (either infindulopelvic ligaments or ovarian suspending ligament with the tubes). In 145 cases (79.9%) endobipolar cautery, in 35 cases (19.2%) Endo-GIA (US.Surgical, Norwalk), and in 2 cases (1.1%) intracorporeal suturing technique have been used for securing the arterial pedicles.

After reflection and dissection of the bladder flap beyond the cervix, bilateral uterine arteries and vein were occluded with bipolar cautery. In some of the cases a fundal fibroidectomy has been performed for access to the lateral walls and broad ligaments. Dissection of the uterosacral ligaments and cardinal ligaments was followed by posterior colpotomy. In some of the cases anterior colpotomy was performed. Surgery was proceeded with the removal of uterus and adnexa via the vaginal route en toto or by morcellation and closure of the vaginal cuff after uterosacral approximation as a high cul-de-sac closure. Reexamination of the peritoneal cavity and irrigation with copious normal saline was followed by visualization of the pedicles under low insufflation pressure relieving the tamponade effect of insufflation. Some small bleeders were secured with endobipolar cautery. For all 10-mm or larger trocar defects, fascial closure was performed with the R-R® System (R-Med Inc., Oregon, OH) and skin infiltrated with Marcaine 0.25% without epinephrine. Skin closures were followed with steri-strips or Band-Aids. Intraoperative 1 g of Ancef or 400 mg Cipro as iv piggybag was infused during the procedure.

Some of these cases were performed before development of a classification system for LAVH. But all the cases fall into the Type IV D(2) classification system proposed by Munro and Parker.[9]

TABLE 1. INDICATIONS FOR SURGERY

| Indications | LAVH (n = 182) |
|---|---|
| Endometriosis | 95 (52.2%) |
| Leiomyomas | 55 (30.2%) |
| Endometriosis + leiomyomas | 16 (8.8%) |
| Menorrhagia | 9 (5%) |
| Adenocarcinoma (endometrium) | 2 (1.1%) |
| Squamous Ca (cervix) | 2 (1.1%) |
| Ca in situ (cervix) and menorragia | 1 (0.5%) |
| Other | 2 (1.1%) |

TABLE 2. PATIENT CHARACTERISTICS

|  | LAVH (Mean ± SD) (range) |
| --- | --- |
| Age (years) | 41.3 ± 7.7 (23–79) |
| Gravidity | 2.7 ± 1.4 (0–9) |
| Weight (lb) | 159.6 ± 39.7 (95–378) |
| Uterine wieght | 178.6 ± 133.3 (40–1035) |

All the parameters were analyzed as a whole and at 1-year segments. Data were analyzed for correlation, variance, and Student's $t$ tests. A $p < 0.05$ was considered significant.

## RESULTS

A total of 209 cases underwent LAVH; only 8 cases (3.8%) had been converted from LAVH to TAH because of intraoperative bleeding or dense adhesions; 201 (96.2%) cases have been completed as LAVH. Fourteen cases (6.7%), because of incomplete data, 5 cases (2.4%), with combined procedures (e.g., 4 cases additional Raz bladder suspension and 1 appendectomy) were not considered in the study and were excluded. This study encompasses only the analysis of 182 LAVH cases.

The clinical characteristics of the patients are represented in Table 2.

Operative time was $117.3 \pm 25.9$ (69–228) min. The operating room time shortened in 3.5 years time (Fig 1), and showed a negative correlation ($r = -0.13$). In 1992 operating room time was $124 \pm -23.3$ min; in 1995 this was shortened to $113.2 \pm -23.5$ min ($p = 0.03$).

Postoperative length of stay was $0.7 \pm 0.7$ (0–6) days. The average length of stay has been $0.7 \pm 0.7$ days, except in 1993 when it showed a significant drop temporarily ($p < 0.0001$). The length of stay is represented in Figure 1.

Intraoperative blood loss was $242.3 \pm 213.3$ (60–2000) mL. The Intraoperative blood loss in 1992 was $284 \pm 199.8$ mL and in 1995 was $163 \pm 101.0$ mL (Fig. 1). These are statistically significant ($p < 0.01$).
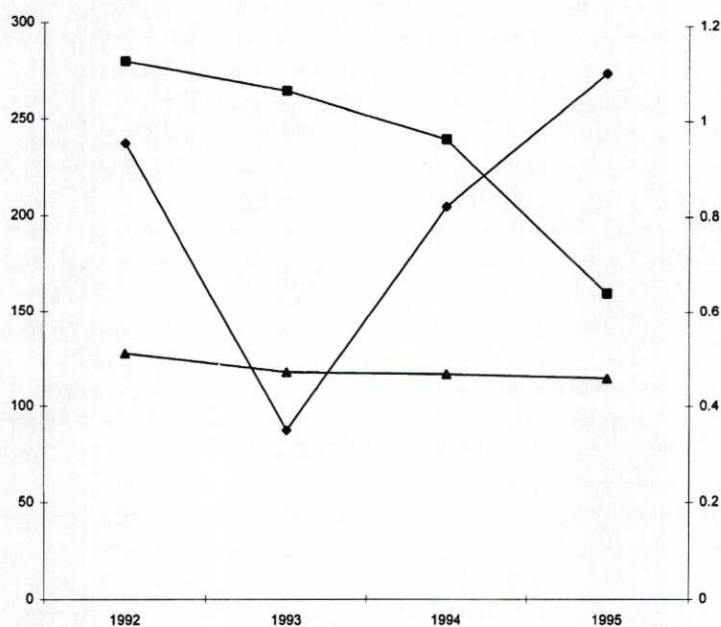


FIG. 1. Intraoperative blood loss (mL) (■), operating time (min) (▲), and length of hospital stay (days) (◆).

TABLE 3. COMPLICATIONS

| Complications | LAVH (n = 182) |
|---|---|
| Fever (> 101°F) | 6 (3.3%) |
| Intraoperative bleeding requiring transfusion | 3 (1.7%) |
| Urinary tract infection | 2 (1.1%) |
| Vaginal cuff cellulitis | 1 (0.5%) |

During the time span of the study there has been a slightly negative correlation between the operative time and the blood loss ($r = -0.17$).

A total of 3 patients needed blood transfusion (1.7%). Two transfusions were in 1992 and 1 was in 1994. Average hospital charge was $3936.00. Main complications were fever, intraoperative bleeding requiring transfusion, urinary tract infections, and vaginal cuff cellulitis. All the complications were mild with the exception of one adult respiratory distress syndrome that occurred in 1993. No intraoperative urinary or gastrointestinal complications have occurred. Complications are presented in Table 3.

## DISCUSSION

LAVH is praised for retaining surgical advantage attributed to the TAH while offering shorter hospitalization,[3,8] reduced complication rates,[4–7] reduced postoperative pain,[3,8] and earlier returning to normal life and activity.[3] The disadvantages are longer operative time[3,5,7,8] and higher cost.[3,4,6]

The literature research reveals that in the LAVH cases parameters were compared either with TAH[3,5,8] or VH[2] or both.[4,6,7] Some of these studies were confounded because of dissimilarity of the comparison parameters; as in the TAH study groups the operative indications and the pelvic organ findings were dissimilar. In the study of Phipps et al.[3] there were no fibroid uteri larger than 8 weeks size and they have not mentioned any cases of endometriosis. In Martel and Gilliland[8] only uterine weights have been compared; the other clinical characteristics have not been mentioned. In Harris and Olive[6] only clinical characteristics were compared. In Jones et al.[7] comparison of LAVH, TAH, and VH reveals that there is a bias toward TAH when endometriosis, myomatous uteri, and pelvic masses are encountered. In Boike et al.[4] there is dissimilarity between TAH and LAVH cases as they favor TAH for complicated cases. Obviously it is difficult to conclude if LAVH is a substitute for selective cases or is an alternative to TAH in all cases.

After our initial experience[5] since 1992, as a new approach all cases that did not qualify for a VH have been treated solely by LAVH. To the best of our knowledge this is the first article discussing this particular approach. Of an attempted 209 cases 201 (96.2%) have been completed as LAVH. Only 8 cases (3.8%) have been converted to TAH because of intraoperative bleeding or severe adhesions. This is an acceptable success rate to approach all cases by the laparoscopic route.

With previous report on 61 cases,[5] operative time was $137 \pm 4.1$ min and with experience and improvement there was a decline in the operative time ($r = -0.46$). In this study though there is a reduction in the operative time; this trend has been slower ($r = -0.13$). This is an anticipated result. In Martel and Gilliland[8] the operating time was $146.0 \pm 3.4$ min and in Johns et al.[7] selective LAVH studies were $102 \pm 2.3$ min.

In this study intraoperative blood loss was $242.3 \pm 213.3$ mL and there is a reduction from the previous study ($337 \pm 21$ mL).[5] This reduction in blood loss can be attributed (related) to the reduced operative time. The larger standard deviation is a reflection of the more complicated cases treated solely with LAVH.

There has been a positive correlation between the size of the uterus and the operative time ($r = 0.31$) and the intraoperative blood loss ($r = 0.32$). Also, as expected, the operating time and the blood loss had a positive correlation ($r = 0.55$). The length of stay has stayed under 24 h, and appears to be shorter than existing studies.[3,4,6–8]

In our study febrile morbidity was (3.3%) and intraoperative bleeding necessitating transfusions was (1.7%), and is about the same as other publications.[4–8] Reported complications of ureteric trauma and bowel and bladder perforations[7,8,10] have not been observed in our study.

Late publications reveal LAVH is as expensive or less expensive than TAH, when reusable instruments are used instead of disposables for cautery and hemostasis.[7,8] In the study the average cost excluding the surgeons and anesthesiologist charges was 3936.00 dollars. This is less than the reported costs.[4,6–8] In our previous study it was not reported, but reevaluation of our data revealed that LAVH was $1038.00 less than TAH. We attribute these savings to utilization of reusable instruments for cauterization and dissection and shorter length of stay.

Previously we compared the outcome of 61 LAVH cases to 65 TAH.[5] All cases were performed by the same gynecologist, thus reducing the risk of varying surgical skill among cases. With this study we have demonstrated that intraoperative blood loss, postoperative fever, respiratory and urinary complications, and hospitalization time are significantly reduced with the LAVH approach. However, the observation that thinner patients had LAVH procedures suggested that the surgeon may have been biased in patient selection. This was the first study to document that there is an experience curve associated with operating time and blood loss related to LAVH.

With this study we see the same tendency of the learning/experience curve (Fig. 1). With experience there is a reduction in the operative time. There is a reduction in blood loss attributable to the reduced operative time. In this study we see a positive correlation between the size of the uterus and the operative time and intraoperative blood loss and apparently a larger standard deviation in blood loss as a reflection of the more complicated cases treated solely with LAVH. We believe with experience the standard deviation will decline.

With these findings we have concluded that regardless of preoperative diagnosis and findings when vaginal hysterectomy is not suitable, LAVH is a viable alternative to TAH.

## ACKNOWLEDGMENTS

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