

## Laparoscopically Assisted Vaginal Hysterectomy Appears to Be an Alternative to Total Abdominal Hysterectomy

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### ABSTRACT

Seventy percent of hysterectomies in the United States are performed as total abdominal hysterectomies (TAH). Laparoscopic assisted vaginal hysterectomy (LAVH) has been promoted by some to be a low morbidity substitute for TAH. In this study, we compared the outcomes of 61 recent LAVH cases to 65 TAH cases performed during an earlier time interval. Data were abstracted from the charts of 65 TAH cases performed between August 1988 and December 1990 and 61 LAVH cases performed between June 1991 and September 1992 by the same gynecologist (E.D.R.). Patient characteristics and perioperative morbidities were compared. Patient characteristics were similar between the two groups except that LAVH procedures were performed on thinner women ( $148 \pm 3.4$  vs  $162 \pm 4.3$  lbs,  $p \leq 0.01$ , LAVH vs TAH) and operating time was longer ( $137 \pm 4.1$  vs  $66 \pm 1.7$  min,  $p \leq 0.0001$ ). Uterine weights were comparable ( $152 \pm 12$  vs  $194 \pm 31$  g,  $p = 0.2$ ). There was less intraoperative blood loss ( $337 \pm 21$  vs  $417 \pm 16$  ml,  $p \leq 0.003$ ), febrile morbidity (9.8 vs 66%,  $p \leq 0.0001$ ), respiratory complications (6.6 vs 22%,  $p \leq 0.05$ ), and urinary morbidity (6.6 vs 24.4%,  $p \leq 0.02$ ) and shorter postoperative hospitalization ( $22 \pm 1.2$  vs  $99 \pm 2.3$  h,  $p \leq 0.0001$ ) in the LAVH group. Thinner patients were selected for the LAVH procedure, and operating room time was twice that of those undergoing TAH. Conversely, perioperative morbidity and postoperative hospitalization time were significantly less with LAVH. LAVH appears to be an alternative to TAH.

### INTRODUCTION

**H**YSTERECTOMY IS ONE OF THE MOST COMMONLY PERFORMED surgical procedures in the United States. It is estimated that 33% of women will undergo this procedure by the age of 60.<sup>1,2</sup> In the last decade, approximately 6.5 million hysterectomies were performed, of which 70% were by the abdominal approach. Vaginal hysterectomy is generally reserved for patients with smaller or prolapsing uteri. Usually, vaginal hysterectomy is associated with fewer complications and shorter hospitalization than laparoscopic hysterectomy.<sup>3-7</sup>

Reich and DeCaprio<sup>8</sup> have proposed a combined laparoscopic and vaginal approach to hysterectomy. They have suggested that laparoscopic assisted vaginal hysterectomy (LAVH) is a substitute for total abdominal hysterectomy (TAH). LAVH is praised for retaining surgical advantages attributed to the abdominal technique while offering reduced surgical and postoperative morbidity. Nezhat and Nezhat<sup>5</sup> suggest from the results of a

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small study that LAVH is preferable to TAH for selected patients. These suppositions were made before completion of larger comparative studies.<sup>9</sup>

There seems to be no advantage in substituting LAVH for standard vaginal hysterectomy.<sup>10</sup> Results of some prior investigations of LAVH are confounded by the possibility that this technique may have been selected for cases better performed by standard vaginal hysterectomy. Conversely, standard TAH patients in these studies may have benefited from LAVH. A large, randomized, prospective study comparing LAVH to TAH has not been reported.

Despite the apparent lack of conclusive data about LAVH, many gynecologists are offering the procedure. In this study, we compared the results of recently performed LAVH cases with older TAH cases performed by the same gynecologist before the introduction of LAVH into the hospital. If LAVH is not just a "technical gimmick",<sup>9</sup> we hypothesized that operative indications and patient populations should be similar between the two groups and that outcomes in the LAVH group should be superior.

## MATERIALS AND METHODS

Medical records from 65 consecutive TAH cases performed between August 1988 and December 1990 and 61 consecutive LAVH cases performed between June 1991 and September 1992 by the same gynecologist (E.D.R.) constitute the database for this study. The study population consisted of upper middle-class suburban white women. Conceptualization and data collection of the study occurred well after the procedures had been performed. A 6-month hiatus in data collection was placed arbitrarily between the last TAH case and the first LAVH case to reduce the risk that easier cases were not saved for LAVH as the surgeon was contemplating embarking on this newer procedure.

Charts were examined for patient demographic data, obstetric index, indications for hysterectomy, estimated blood loss, operating time, uterine weight, postoperative complications, and length of hospital stay. Cases not considered in the study were excluded because of incomplete data and combined procedures (e.g., anterior/posterior colporrhaphy, appendectomy). Conversion from LAVH to TAH caused exclusion of 1 case with intraoperative bleeding and 2 cases with dense adhesions. The majority of cases included in this study were performed using endobipolar cautery to dissect the uterine pedicles. Dissection was usually carried below the level of the uterine arteries and cardinal ligaments to include the anterior and posterior peritoneal reflections. These cases were performed and analyzed before development of a classification system for LAVH.<sup>11</sup>

The effects of LAVH on practice pattern were analyzed using frequency plots of the total LAVH, TAH, and standard vaginal hysterectomy procedures performed during the study time interval. An experience curve (operating room time per procedure) was constructed to analyze the effect of acquired surgical experience with this newer procedure. Other data were analyzed using SPSS/PC for descriptive, univariate and multivariate statistics where appropriate. A  $p < 0.05$  was considered significant.

## RESULTS

Patients' characteristics and outcomes of the LAVH and TAH groups are represented in Table 1. Those selected for LAVH were thinner but were otherwise similar in age, gravidity, height, and uterine weight. An outlier in the TAH group did not affect the uterine weight distribution between the two groups ( $p = 0.21$ , Fig. 1). Overall, there was more blood loss in the TAH group than in the LAVH group ( $p < 0.003$ , Table 1). In the TAH group, blood loss was significantly related to operating room time ( $p \leq 0.0001$ ) but not other patient characteristics. Blood loss in the LAVH group was also related to operating room time ( $p \leq 0.0002$ ), but uterine weight also appeared to contribute ( $p \leq 0.04$ ).

Indications for hysterectomy are represented in Table 2. No significant difference was found between the two groups ( $p \leq 0.09$ ). Operating room time was not related to type of skin closure in the TAH group.

Operating room time was longer in the LAVH group but appeared to shorten with surgical experience (Fig. 2). During the first 9 months LAVH, operating room time was significantly longer than in the second 9 months ( $150 \pm 5.4$  vs  $119 \pm 4.8$  min,  $p \leq 0.0001$ ).

## LAVH PREFERABLE TO TAH IN SELECTED PATIENTS

TABLE 1. COMPARISON OF PATIENT CHARACTERISTICS

	LAVH mean $\pm$ SE (range)	TAH mean $\pm$ SE (range)	<i>p</i>
Age (years)	40 $\pm$ 1.1 (25–79)	43 $\pm$ 1.2 (26–72)	NS
Gravidity	2.1 $\pm$ 0.20 (0–9)	2.7 $\pm$ 0.26 (0–10)	NS
Height (inches)	65 $\pm$ 0.38 (59–71)	64 $\pm$ 0.30 (59–70)	NS
Weight (lbs)	148 $\pm$ 3.4 (110–221)	162 $\pm$ 4.3 (104–270)	0.01
Uterine weight (g)	152 $\pm$ 12 (52–620)	194 $\pm$ 31 (40–1870)	NS
Estimated blood loss (ml)	337 $\pm$ 21 (100–800)	417 $\pm$ 16 (100–700)	0.003
Operative time (min)	137 $\pm$ 4.1 (80–250)	66 $\pm$ 1.7 (41–110)	0.0001
Postoperative length of stay (h)	22 $\pm$ 1.2 (6–66)	99 $\pm$ 2.3 (70–189)	0.0001

Postoperative complication rates are compared in Table 3. Fever (defined as  $\geq 100.4^{\circ}\text{F}$  on any single oral temperature), respiratory (atelectasis and/or pneumonia), and urinary tract (infection and/or retention) complications occurred more frequently in the TAH group. One TAH patient developed cuff cellulitis, and 2 had postoperative ileus. One LAVH patient required rehospitalization 4 months after the initial procedure for fistula repair at one of the trocar sites. Four LAVH patients required blood transfusion postoperatively, and 2 developed cuff cellulitis treated as outpatients.

The total number of TAH operations (including those combined with other procedures, such as appendectomy, anterior and/or posterior colporrhaphy), was observed to decrease from 128 to 29 after LAVH became

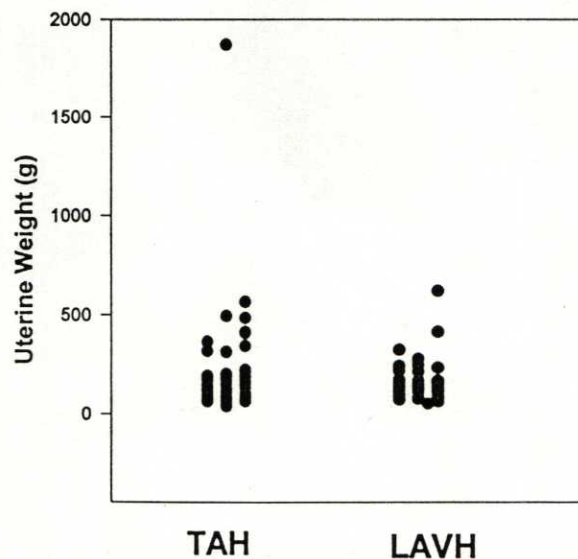


FIG. 1. Scatterplot demonstrating no difference in uterine weight distributions between the total abdominal hysterectomy (TAH) and laparoscopic assisted vaginal hysterectomy (LAVH) groups ( $p = 0.21$ ).



TABLE 2. SURGICAL INDICATIONS FOR LAVH AND TAH<sup>a</sup>

	LAVH	TAH
Menorrhagia	6 (9.8%)	3 (4.6%)
Leiomyomas	23 (37.7%)	25 (38.5%)
Endometriosis	13 (21.3%)	13 (20.0%)
Adenomyosis	13 (21.3%)	7 (10.8%)
Other	6 (9.8%)	17 (26.2%)

<sup>a</sup>No significant difference was found between groups.

available, suggesting case substitution. The standard vaginal hysterectomy procedure rate remained the same during the study period (Fig. 3).

## DISCUSSION

This study analyzes the results of recently performed LAVH cases and TAH cases performed before the advent of LAVH in the hospital. All cases were performed by the same gynecologist, thus reducing the risk of varying surgical skill among cases. It is apparent that there is an experience curve associated with operating time and blood loss, and this is the first study to document this observation related to LAVH. These disadvantages may be overcome in future gynecologic surgery training, making the LAVH procedure more efficient.

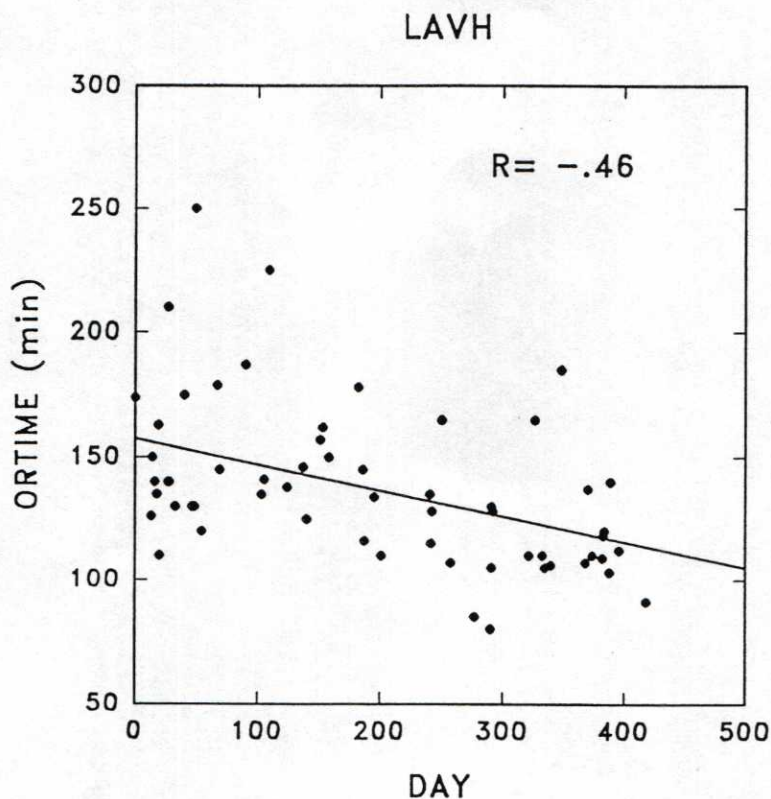


FIG. 2. Linear regression demonstrating the operating time (OR TIME) compared to the laparoscopic assisted vaginal hysterectomy experience (days) of the same gynecologist.

# LAVH PREFERABLE TO TAH IN SELECTED PATIENTS

TABLE 3. COMPARISON OF POSTOPERATIVE MORBIDITY BETWEEN LAVH AND TAH

	LAVH	TAH	p
None	38 (62.3%)	17 (41.5%)	≤0.05
Fever <sup>a</sup>	6 (9.8%)	28 (66%)	≤0.001
Respiratory <sup>b</sup>	4 (6.6%)	9 (22%)	≤0.05
Urinary <sup>c</sup>	4 (6.6%)	10 (24.4%)	≤0.02
Wound <sup>d</sup>	1 (1.6%)	2 (4.9%)	NS
Other <sup>e</sup>	8 (13.1%)	3 (7.3%)	NS

<sup>a</sup>Fever, any single postoperative oral temperature ≥ 100.4°F (38°C).

<sup>b</sup>Respiratory complications, atelectasis and pneumonia.

<sup>c</sup>Urinary, infection and retention.

<sup>d</sup>Wound, infection at the incision site.

<sup>e</sup>Other, cuff cellulitis (1 in the TAH group, 2 in the LAVH group), ileus (2 in the TAH group), 1 fistula repair from the trocar site in the LAVH group, and 4 transfusions in the LAVH group.

Effects of selection bias may have been minimized by comparing TAH and LAVH cases from separate time intervals in this study. We hypothesized that patient characteristics and indications for surgery should be similar between the LAVH and TAH groups. The observation that thinner patients had LAVH procedures, however, suggests that the surgeon may have been biased in patient selection. Laparoscopic techniques generally are selected with patient weight taken into consideration.

The retrospective design of this study did not allow for randomization of patients among TAH, total vaginal hysterectomy (TVH), and LAVH. It is possible that some patients who underwent LAVH may have been candidates for TVH. Similarly, some patients who underwent TAH may have been candidates for TVH. The gynecologist's judgment as to whether to perform hysterectomy (as opposed to initiating or continuing other

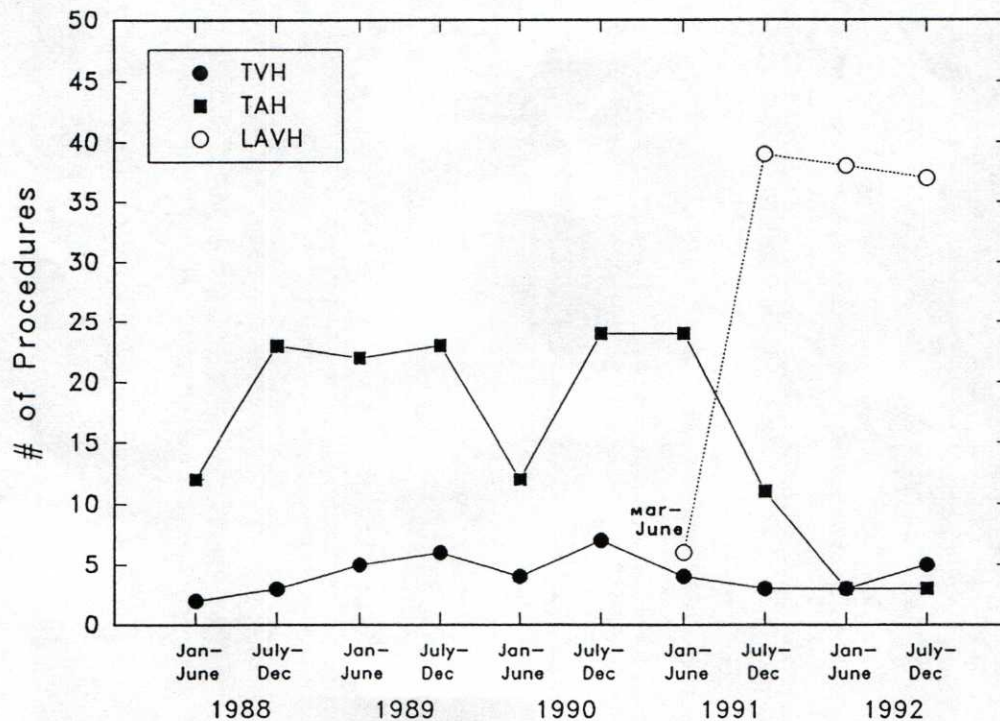


FIG. 3. Trends in all cases of total vaginal hysterectomies (TVH), total abdominal hysterectomies (TAH), and laparoscopic assisted vaginal hysterectomies (LAVH) performed by the same gynecologist during the study period.



therapies) and which type of hysterectomy selected relies on previous training and experience. Indications for hysterectomy in this study approximate national averages.<sup>12</sup> More hysterectomies were performed for endometriosis/adenomyosis and leiomyomas. Fewer were performed for menorrhagia (Table 2).

The proportion of vaginal/abdominal hysterectomies ( $23.5 \pm 3.4$  SE, 95% confidence interval 15.6–31.4) performed before the initiation of the LAVH procedure by this gynecologist fits within the national average (30%). Following introduction of LAVH, we observed no major change in the TVH rate, whereas LAVH rates increased well above the previous TAH rate. This may reflect an increased willingness (decreased threshold) of the gynecologist to perform hysterectomy with the availability of the LAVH technique. Conversely, it may reflect increased patient referrals for this procedure.

Throughout the past century, significant changes have occurred in anesthesia, instruments, suture materials, medications, and blood-banking capabilities. Meanwhile, there have been few technical modifications to the performance of the TAH procedure itself, and morbidity is still substantial. Patient immobility and wound pain are known to lead to postoperative atelectasis, fever, and occasionally deep vein thrombosis, with associated complications.<sup>3,13</sup> The indwelling urinary catheter necessary after TAH may foster development of urinary tract infection.<sup>14</sup> Bowel function is often slow to return.<sup>15,16</sup> These morbidities prolong recovery and delay return to full activity. Finally, the abdominal scar associated with TAH may be perceived as disfiguring to some couples.<sup>15</sup>

This study demonstrates that intraoperative blood loss, postoperative fever, respiratory and urinary complications, and hospitalization time are significantly reduced with the LAVH approach. Although controversy over LAVH vs TAH exists, these benefits of LAVH cannot be discounted.

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