A New Technique for Performing a Laparoscopic Hysterectomy Using Microlaparoscopy: Microlaparoscopic Assisted Vaginal Hysterectomy (mLAVH)

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ABSTRACT

In an effort to further decrease patient postoperative scarring and discomfort, a new technique of microlaparoscopic assisted vaginal hysterectomy is employed. Using a 2-mm lateral port, a single infraumbilical port for the power source, and a 3-mm or 5-mm suprapubic port for aid in manipulation, seven consecutive patients underwent hysterectomy without complication and had rapid return to their daily activities.

Key Words: Laparoscopy, Laparoscopic hysterectomy, Microlaparoscopy.

INTRODUCTION

The techniques of performing laparoscopic assisted vaginal hysterectomy (LAVH), laparoscopic hysterectomy and laparoscopic supracervical hysterectomy are well established in the literature.[1-10] These methods have utilized laparoscopes greater than 5 mm in diameter, usually 10 mm or larger. When this surgery is accomplished, multiple trocar sites of 5 mm, 10 mm and 12 mm are necessary in order to place the various instruments and power sources within the abdominal cavity. If the infraumbilical incision is made within the umbilicus in a semicircular fashion for insertion of the trocar and sleeve, the resulting scar is not seen upon healing. The majority of diagnostic laparoscopic procedures utilize a port in the umbilical area and a midline suprapubic 5-mm port for a probe or suction-irrigation device. Additional ports in the abdominal wall (5 mm to 12 mm) are usually lateral to the inferior epigastric vessels and cause additional discomfort postoperatively. It was felt that if it were possible to have only two working ports when performing a hysterectomy by laparoscopic means (one infraumbilical and one suprapubic midline), the discomfort level would be decreased in comparison to the normally performed procedure. In addition to this reduced postoperative pain, there would hopefully be a quicker recovery time, reduced abdominal wall scarring and a lower risk of trocar-site herniation. This new technique utilizes an infraumbilical port for the power source (mechanical stapling device, harmonic scalpel or bipolar cautery/scissor device), a suprapubic port for grasping instruments or suction/irrigation devices and a small port through an incision approximately 3 cm lateral and 3 cm below the level of the umbilicus for a 2-mm microlaparoscope.

MATERIALS AND METHODS

Patient selection for this study was similar to that of any patient selected for a LAVH **(Table 1)**. Candidates for treatment were initially given a thorough preoperative evaluation for their presenting symptoms, and preoperative physical examinations were performed. Seven consecutive patients requiring a hysterectomy were selected without regard to weight or preoperative diagnosis.

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Table 1.
Characteristics of the patients who underwent a mLAVH.

Patient	Age	G / P	Weight	Height	Indications	Prior Rx	Length of surgery (minutes)	Size of uterus
1	26	3/3	127 lbs	5'4"	Pain, menorrhagia	D+C, hysteroscopy, medical rx., laparoscopy	78	110 gms
2	37	4/4	217 lbs	5'4"	Dysmenorrhea, menorrhagia, stress incontinence	Medical treatment	92	120 gms
3	42	2/2	111 lbs	5'3"	Pain, dyspareunia, metrarrhagia	Medical treatment	57	140 gms
4	32	2/1	168 lbs	5'9"	Pain, dyspareunia, menometrarrhagia	Medical treatment, D+C, laparoscopy	81	110 gms
5	65	3/3	170 lbs	5'5"	Prolapse, stress incontinence	None	108	200 gms
6	44	1/1	231 lbs	5'7"	Leiomyomata uteri, menometrarrhagia, anemia	Medical treatment	94	310 gms
7	59	5/4	129 lbs	5'2.5"	Pain, cystocele, stress incontinence	None	62	75 gms

The special laparoscopic instrumentation involved a 2-mm fiberoptic microlaparoscope (50,000-pixel scope, Imagyn Surgical), 3-mm suprapubic instruments (probe, graspers and suction/irrigation), 12-mm mechanical staplers (Articulator 35™, Imagyn Surgical) and a harmonic scalpel.

For the first six patients, the protocol involved placing a 12-mm port infraumbilically. A 10-mm rod lens scope was introduced into the 12-mm port for an initial pelvic diagnosis. As with the traditional LAVH, visualization of the pelvic adnexal structures was accomplished. Care was taken to identify the location of both ureters. The ureters were traced from the sacral promontory to their positions past the uterine arteries. At the level of 3 cm below the umbilicus and 3 cm lateral on the patient's right side, a Veress needle with a sleeve was inserted; the needle was removed, and the 2-mm minilaparoscope was inserted. The suprapubic trocar and sleeve were inserted to serve as a port for the grasping and suction/irrigation instruments as they were used to facilitate exploration of the pelvic cavity. This was followed by the severance of either the utero-ovarian ligaments or tubes or the infundibulopelvic ligament by the articulating mechanical stapling device, which was placed through the umbilical port **(Figure 1)**. The articulating stapler provided the ability to "hug" the uterus when the stapler was introduced via the umbilicus, thus avoiding utereral injury **(Figure 2)**. The infundibulopelvic, broad and round ligaments were stapled and ligated using the Articulator 35™ surgical stapler. If the ovaries were to be left in situ, then the stapling device was placed across the utero-ovarian ligament, the round ligament and uterine vessels were then cut **(Figure 3)**. The removal of the

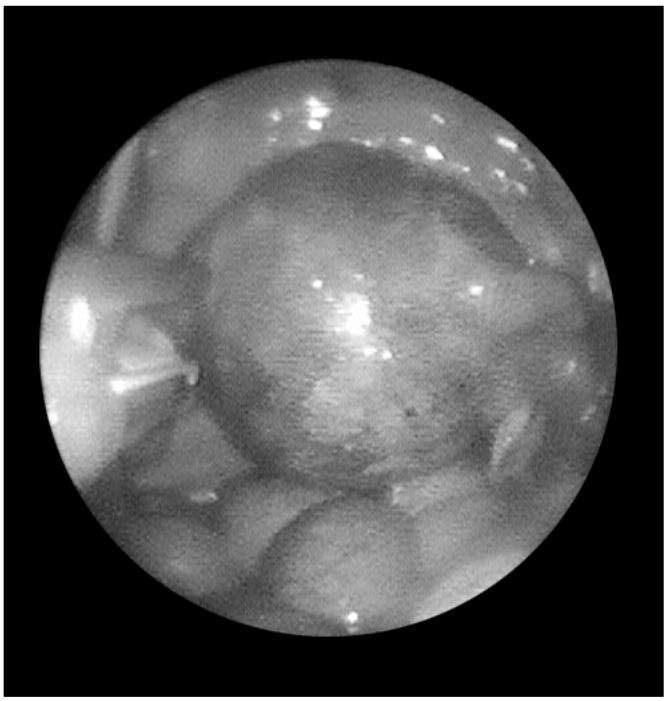

Figure 1. The articulated stapling device being placed over the left tube and utero-ovarian ligament.

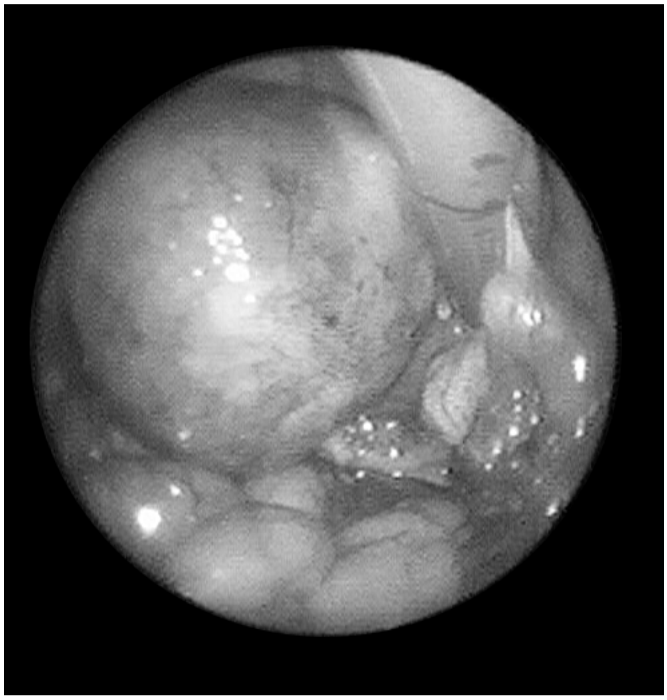

Figure 2. The articulated stapling device on the right tube and utero-ovarian ligament, ready to be fired.

Figure 3. The staple line on the right adnexa after the articulated stapling device has been fired.

uterus was then performed vaginally. The vaginal cuff was closed. The seventh patient's procedure differed in that the infraumbilical port was 5 mm, and the ligaments were cut hemostatically using the harmonic scalpel coagulating shears (5 mm). This technically more difficult procedure was performed with this new modality in an attempt to see if the visualization through the small scope was adequate. The remainder of the procedure was similar.

After the vagina was closed and any other necessary vaginal surgery was performed, the peritoneal cavity was inspected endoscopically and irrigated to insure complete hemostasis. The 12-mm umbilical port-site was closed with fascial stitches in addition to the skin closure in order to reduce the risk of postoperative hernia formation. Each patient was observed overnight and given a regular diet. Pain medications included narcotics and non-steroidal pain medications. All patients were discharged within 24 hours. A follow-up office visit was scheduled one week after discharge. No postoperative infections were noted.

The instrumentation used for the procedure differed from routine laparoscopic procedures in that the sizes of selected instruments were of smaller caliper. The smaller diameter instruments (3 mm) enable a less invasive procedure while they provided a sturdiness that was not available in preceding 2 mm instrumentation. **Table 2** shows instrumentation that may be necessary to perform this 'scarless' procedure.

Table 2.
Instrumentation for 'scarless' procedure.

3-mm Grasper (1)
2-mm monopolar electrode
2-mm high resolution (50,000 pixel) scope
10-mm rod-lens scope
12-mm articulating stapler
Uterine Manipulator
5-mm harmonic scalpel
(L.C.S. — laparoscopic coagulating shears)

RESULTS

Postoperative recovery time varied from 4 to 14 days, with most patients being "back to normal" from the procedure within one week. Several factors affecting this variability were age, the patient's home situation and other ancillary procedures performed, such as bladder sling procedures and pelvic vault reconstruction. Of the seven patients undergoing this minilaparoscopic procedure, no surgical complications were experienced. The average blood loss from the laparoscopic portion of the procedure was less than 20 cc. Minimal, if any, bleeding occurred during the procedure, so no transfusions were necessary. At eight weeks' follow-up, the patients had experienced no complications. Patients were back to full activity within one week from the laparoscopic hysterectomy (recuperation from additional procedures was slightly additive), compared to our patient average up to two weeks recuperation for the traditional LAVH.

During the study, no patients were converted to open laparotomy or the traditional laparoscopic approach for completion of their hysterectomy.

DISCUSSION

This initial series does not appear to be accompanied by a "learning curve," as this technique does not change significantly the traditional approach of the LAVH. It is not, therefore, associated with a higher potential complication rate. The major concern is with orientation. One has the position of the much smaller laparoscope lateral to the midline. A "power source" (stapling device, harmonic scalpel, electrical devices, etc.) coming through the infraumbilical port would, in certain instances, cross over the field of visualization of the laparoscope. Placing these devices through the midline port onto the uterus and ligaments, also, requires a re-orientation process. These difficulties are quickly overcome during the initial procedure. Although, theoretically, the smaller diameter laparoscopes might render the field more difficult to evaluate and not allow one to perform the surgical procedure as readily as a larger scope, the field of view appears sufficient and lucent enough for this type of endoscopic surgery. If the surgery is complex, it may be necessary to use larger diameter laparoscopes.

We estimate that over 50 percent of currently performed LAVH procedures can be completed using the above described technique. Patients prefer this approach because of the possible reduced postoperative pain and scarring that this procedure affords. Additional potential benefits of the procedure are the potential for reduced risk of port-site herniation (which is more common with traditional 12-mm lateral trocars,[11] but not unheard of with 5-mm ports). It may also diminish patient discomfort, as the numbers of punctures are fewer, and the sizes of the trocar sites are less than those performed during a usual LAVH case. This may lead to a potentially shorter recuperation time and the ability to return to normal activities quicker, partially due to decreased discomfort

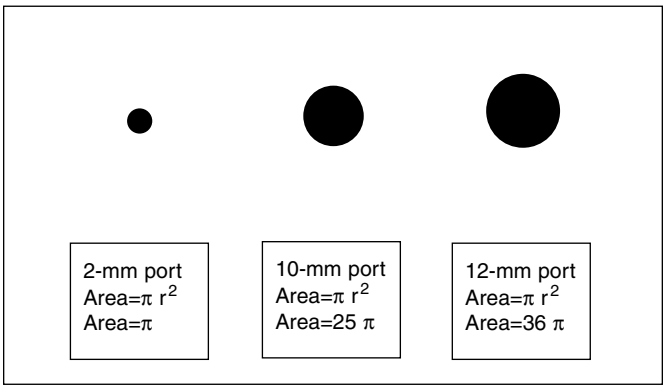

Figure 4. Comparison in area of the different port sizes.

secondary to the much smaller area of the port site **(Figure 4)**. The advantage of using a harmonic scalpel or bipolar cautery with scissors is that the port site is 5 mm. The main disadvantage with these power sources for the inexperienced operators is the concern about hemostasis. The advantages of a stapling devices is that it is quicker, it is hemostatic, and it allows the operator to feel more comfortable. The articulation involved in this device allows the stapler to hug the uterus, providing an increased security for avoiding lateral wall injury. The operating room time may also be decreased because it is not necessary to close fascia on extra 10-mm and 12-mm ports that are present laterally when performing a regular technique for a laparoscopic hysterectomy **(Table 1)**.

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