



Laparoendoscopic single-site hysterectomy in Cuba: a novel technique with new medical instruments

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Abstract: Hysterectomy is a frequent non-obstetrical surgical technique. The main benefits of laparoscopic hysterectomy are less hospital stay and complications, and better surgical results. The aim of this video is to describe a new technique of laparoendoscopic single-site surgery for totally laparoscopic hysterectomy using a laparoscope with a work channel and modified conventional laparoscopic instruments. A 47-year-old female with uterine fibroid underwent laparoendoscopic single-site hysterectomy. The procedure was performed using a laparoscope with a work channel, standard laparoscopic instruments, and modified conventional laparoscopic instruments adapted for these procedures. After general anesthesia, a 10–11-mm trocar was then placed through a vertical umbilical incision. The Clermont Ferrand uterine manipulator was then placed. The procedure was similar to multiport total laparoscopic hysterectomy. Alternative use of bipolar electrocoagulation and scissors was made to gain entry to the cavity by the work channel. Divisions were made in the round ligaments, tube pedicles, and utero-ovarian ligaments by means of bipolar electrocautery. The upper junction of the vesicouterine peritoneal fold was distinguished as a white line and was dissected. Then, dissection of the posterior peritoneum and both uterosacral ligaments was performed. The uterine vessels were dissected safely with bipolar electrocautery. The vagina was opened using a monopolar L-hook over the sealed device. The uterus was removed through the vagina. The vaginal cuff was sutured laparoscopically (only with a needle holder), with one 0 polyglycolic acid suture, using a curved 26–30-mm needle introduced through the vagina and tied extracorporeally through the vagina. A new retraction system for the vagina, designed by the current authors work team, was used. After controlling the bleeding, the laparoscope and the trocar were removed, and the umbilical fascia and subcutaneous tissue were closed. The uterus weight was 300g, operative time was 82 minutes and blood loss was 54 mL. The postoperative hospital stay was less than one day. No morbidity. This technique proposed seems to be a feasible and safe approach and without the disadvantages of loss of triangulation and clashing of instruments, compared with other laparoendoscopic single-site hysterectomy techniques.

Keywords: Laparoscopic hysterectomy; total laparoscopic hysterectomy; laparoendoscopic single-site surgery; minimally invasive surgery; gynecology

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Introduction

Hysterectomies are one of the most common surgical procedures worldwide. Following the Caesarean section, it is the second common gynecological surgery in women at

reproductive age (1,2).

For many years, hysterectomy was done via laparotomy or vaginal access (3). To reduce surgical invasion to a minimum, laparoscopic hysterectomy as a less invasive procedure is

developed. Reich (4) in 1989 and Pelosi *et al.* (5) in 1991 reported the first multiport laparoscopic hysterectomy and single-port laparoscopic hysterectomy respectively.

The main benefits of laparoscopic hysterectomy are less hospital stay and complications, and better surgical results (1,6).

Since the introduction of laparoscopic-assisted vaginal hysterectomy (LAVH) at our Hospital in 1994, it became the standard treatment for symptomatic uterine fibroids. When we acquired growing expertise, we began performing totally laparoscopic hysterectomy and laparoendoscopic single-site (LESS) hysterectomy in 1998 and 2010 respectively.

The aim of this video is to describe a new LESS technique for totally laparoscopic hysterectomy (TLH) at the National Center for Minimally Invasive Surgery in Havana, Cuba.

Operative technique

We report a LESS for TLH by means of an operative laparoscope and modified conventional laparoscopic instruments (*Video 1*).

To perform the procedure we utilized a 10–11 mm trocar, an operative laparoscope (0 degrees, 10 mm, with a 5–6 mm working channel), a Clermont Ferrand uterine manipulator, bipolar forceps, prototype of laparoscopic instruments and a new retraction system for vagina.

All procedures performed in studies involving human participants were in accordance with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this study and any accompanying images.

Surgical technique

We gave the patient a prophylactic antibiotic while inducing general anesthesia. Vaginal pumping was performed and a urinary catheter was inserted. Patient was placed on the operating table in a modified lithotomy position Surgeon is situated on the left side while first assistant stands between legs. The operative laparoscope was inserted through a vertical umbilical incision and the abdominal and pelvic organs were inspected.

After dilating the cervix (Hegar number 8), intrauterine manipulator is inserted under direct vision.

Surgical technique steps

(I) *Cauterization and transection of the round ligament:* We

used a bipolar electrocoagulation and scissors. The retroperitoneal space is visualized after cutting the round ligament.

- (II) *Cauterization of the tube and the ovarian ligament:* Pedicles and ligaments were coagulated. When adnexectomy was required, we used to retraction the adnexal the same retraction system for the anterior vaginal.
- (III) *Dissection of anterior broad ligament peritoneum:* The anterior broad ligament peritoneum was dissected.
- (IV) *Rejection of the bladder:* After the vesicouterine fold was identified, the bladder was rejected.
- (V) *Dissection of uterosacral ligaments:* Posterior peritoneum was cut and both uterosacral ligaments were dissected.
- (VI) *Dissection and cutting of the uterine vessels:* We used bipolar coagulation for the treatment of uterine vessels.
- (VII) *Opening of vaginal vault and extraction of the uterine specimen:* Vagina was opened by bipolar electrocautery and a monopolar L-hook over the sealed device. After that, the uterus was removed.
- (VIII) *Retraction for vagina (Option 1):* We used a forceps through the vagina to retract the anterior vaginal wall in *the midline*.
- (IX) *Retraction system for vagina (Option 2):* We used a new retraction system to retract anterior vaginal wall.
- (X) *Closure of vaginal vault:* Vaginal vault was sutured laparoscopically using one hand and 0 polyglycolic acid suture.

Retraction system for vagina was released. Suture was tied extracorporeally through the vagina.

Hemostasis was controlled before removing the laparoscope and the trocar.

Postoperative care

After the patient recovered from anesthesia, the urinary catheter was removed. Patient was started with liquid diet 6 hours after surgery and discharged on first postoperative day.

Medical follow-ups were made at 15 days, then at 45 days to visualize the suture of the vaginal vault via speculum.

Results

Patient is a 47-year-old woman with symptomatic uterine fibroid underwent LESS hysterectomy. The uterus weight was 300 g, operation time was 82 minutes and operative blood loss was 54 mL. Length of stay was less than 24 hours.

There was No morbidity.

Comments

Our hospital has the most experience for Minimally Invasive techniques in Cuba. Minimally invasive gynecological team has accomplished over 5,300 endoscopic gynecological procedures, 3,100 TLH and 200 LESS hysterectomies.

LESS-TLH has been proven to be an excellent technique with advantages such as better cosmetic outcomes, less pain, less sepsis and the likelihood of incisional hernias is lower (7-9).

Many studies reported LESS-TLH procedures that utilized multichannel single-incision devices through which the instruments and laparoscope were introduced. Other studies have described the use of many conventional ports inserted by one umbilical incision (7-12).

LESS surgery has a problem with the restraints on instrument manipulation, retraction, and triangulation limits. The collision between the instruments, the instruments with the laparoscope and light cable with the operator's hands occurs because laparoscope and the surgical instrument are positioned in parallel to each other (13). LESS-TLH technique in this study solved those disadvantages.

The operative time was not modified with the suture using one hand and tying it extracorporeally through vagina. This technique has been described for other single-incision laparoscopic surgeries (14). Laparoscopic closure is safer, faster and easier to perform when the technique is standardized which coincides with other reports (15-18).

The vaginal cuff was sutured laparoscopically because laparoscopic approach permits better control of the anterior vaginal wall and the bladder than vaginal approach. We used this close for all laparoscopic hysterectomy (multiport and single port) and several publications show that for vaginal cuff closure, laparoscopic suture is a safe and less time-consuming procedure (compared the vaginal route) and the cuff-related complications are similar in the two groups (15-19).

LESS-TLH proposal is a procedure with the advantages of providing constant vision of the instruments in the operative field and reducing costs (incurred by new devices available today).

Nevertheless, to standardize this technique, some skills must be mastered. First, refers to the need of handling overall optics with the inserted instrument, thus achieving optimal dissection with simultaneous and coordinated movement of the laparoscope laterally and the instruments coaxially. Other elements are related to the work angle of the instruments for dissection regarding the organ. The technique forces the

surgeon to use both hands at the same time.

Researchers reported the good outcomes using a laparoscope with a work channel in LESS procedure (20).

In conclusion, LESS-TLH technique proposal may be generalized because it is a standardized technique as well as a feasible and safe approach that compared other LESS-TLH techniques.

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