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Case report

“Contain before transection, contain before manual morcellation” with a tissue pouch in laparoendoscopic single-site subtotal hysterectomy

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ABSTRACT

This work proposes a modified method for removing the uterine body in laparoendoscopic single-site subtotal hysterectomy based on the principle of “contain before transection, and contain before manual morcellation,” using a surgical tissue pouch (LapSac, Cook Inc., Bloomington, IN, USA). The main advantage of this method is a low likelihood of a bag rupture during manual morcellation which minimizes the potential risk of iatrogenic parasitic myoma and/or cancer cell dissemination. This method also benefits from lower cost, less surgical time, and “containing before transection” makes the shifting of uterine specimens in the laparoendoscopic single-site more feasible. The limitations of this method, and potential means of overcoming them, are also discussed. Potentially, this method of “contain before transection, contain before manual morcellation” can be applied to other organ tissue removal in laparoscopic surgeries but more cases must be studied to confirm its safety and feasibility.

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Introduction

In the past decade, power morcellator has been widely used in laparoscopic surgery to facilitate specimen removal,¹ and it has reduced limitations associated with minimally invasive surgery. However, the United States Food and Drug Administration has questioned the safety of using a power morcellator to remove uterine leiomyoma owing to the risk of cancer dissemination and upstaging in intraperitoneal occult malignancies,² and suggested using a specimen bag to contain unsuspected uterine tumors when power morcellation is necessary.³ As well as the dissemination of occult uterine malignancies, iatrogenic or parasitic myomas related to power morcellator use have been reported,⁴ causing gynecologic surgeons to change their approaches to hysterectomies and myomectomies. Recently, many studies have focused on techniques for safe specimen removal of unsuspected uterine tumors.^{5,6}

Manual morcellation using a scalpel to fragment a surgical specimen into small pieces has been used for years especially in laparoendoscopic single-site surgery (LESS). The risk of vascular and bowel injury is lower in manual morcellation than in the power morcellation.⁷ To remove a specimen in LESS, manual morcellation is more effective than power morcellation because of the small surgical field, loss of angulation, and lack of an extra hand. However, manual morcellation is still associated with the possibility of the spreading of tumor cells if the specimens are not well contained.

This case report describes a modified method of specimen removal using a tissue pouch and manual morcellation to minimize unexpected cell/tissue dissemination in LESS subtotal hysterectomy.

Case Report

A 37-year-old multipara presented with dysmenorrhea and menorrhagia ongoing for 3 months. Physical examination revealed bilateral pale conjunctiva. Pelvic vaginal examination showed no visible cervical lesion. Transvaginal ultrasonography revealed an enlarged uterus with adenomyomas and thick irregular

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endometrium (11.3 mm). The laboratory examination revealed anemia with low hemoglobin (7.1 g/dL). Hysteroscopy revealed uneven endometrium. Dilation and curettage were performed and the pathology report was negative for malignancy. The patient underwent LESS subtotal hysterectomy and bilateral salpingectomy based on the principles of “contain before transection and contain before manual morcellation.”

Preparations of the tissue pouch

The LapSac surgical tissue pouch (COOK Medical Incorporated, Bloomington, IN, USA) was used to contain the body of the uterus before supracervical transection. To facilitate containment during surgery, Vicryl sutures were placed at four separate points on the edges of the pouch (Figure 1A). A plastic ruler (an accessory of a sterilized marker pen) was cut in half and sutured at both angles of the pouch so that it would open in the abdominal cavity (Figure 1B).

Operative procedures

When the patient was under general anesthesia, a uterine elevator was inserted. The single port setting was used as described in the literature.⁸ In this modified method, four trocars were used for the camera, the cutting loop (26183 MB, KARL STORZ, Tuttlingen, Germany), and two graspers (Figure 1C). Supracervical

hysterectomy was conducted involving transecting the round, ovarian, and broad ligaments with Ligasure (Valleylab Inc., Boulder, CO, USA) and opening the peritoneum at the utero-vesical junction. The bilateral uterine artery at each side of the cervix was identified by dissection and transected following coagulation with Ligasure. The pouch was then inserted into the abdominal cavity via the single port hole (Figure 1D). A grasper was utilized to move the opening of the pouch near the uterus (Figure 2A). A cutting loop was used to loop the uterus at the supracervical level (Figure 2B). Two graspers were used to contain the uterine body into the pouch, from the fundus to the lower segment of uterus (Figure 2C). It is necessary that the uterine elevator is removed and to ensure that no bowels or other organs are trapped by the cutting loop. A 70–80-watt cutting energy was applied for cervical transection. The pouch was simply closed by pulling up the drawstring (Figure 2D) and pulling up to the single port site (Figure 3A). The opening of the pouch was reopened and shortened by wrapping outward (Figure 3B), and the body of the uterus was cut into one or more long strip(s) (Figure 3C). All the tissue fluids from the cutting were contained in the pouch (Figure 3D).

Discussion

The surgical tissue pouch that was used in this report had several characteristics that made it very suitable for removing a

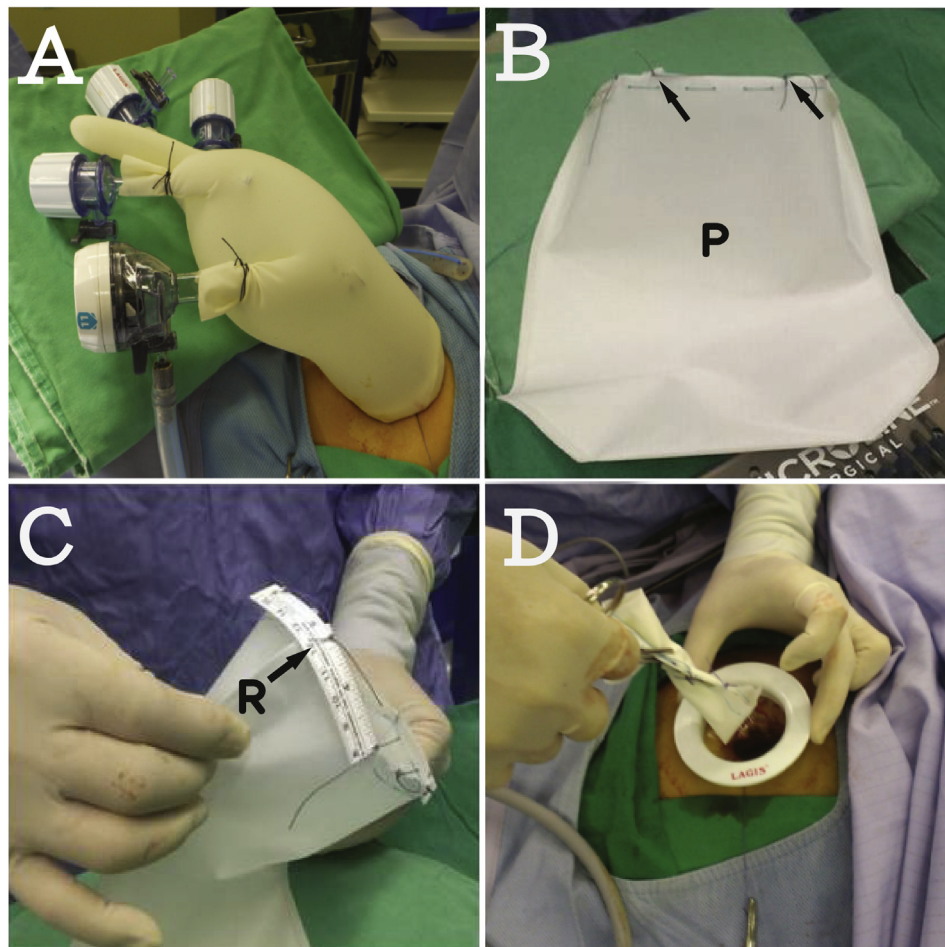


Figure 1. (A) Four sutures of 0 Vicryl were placed at the edges of the pouch (P). The sutures were cut 1.5 cm from the knots (black arrows). (B) Half of a plastic ruler (R) was sutured at the edges of the P with three sutures, so that the pouch would open itself in the abdomen. The middle suture was at the angle of the P (red arrowhead). (C) A laparoendoscopic single-site surgery port setting that comprises a wound retractor (Wr) and four trocars each inserted in the fingers of a surgical glove. (D) Using a pean, the pouch was clamped and inserted into the abdominal cavity.

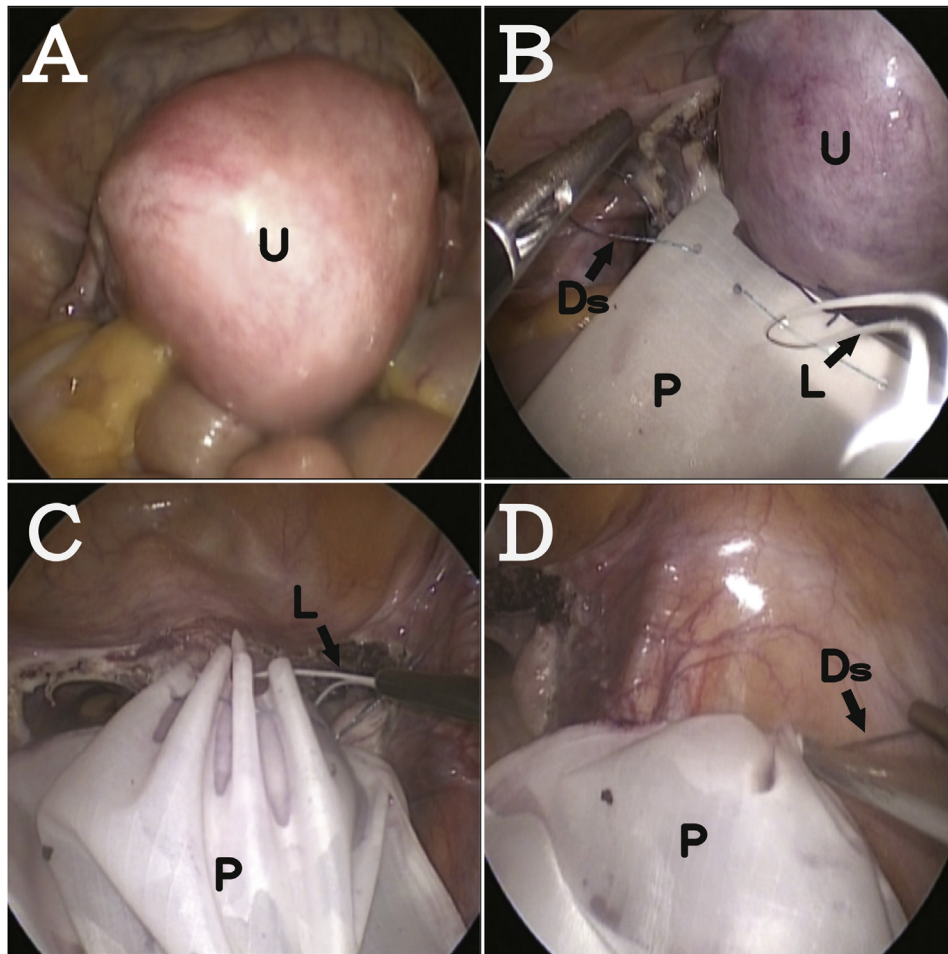


Figure 2. (A) Grasper was utilized to move the tissue pouch (P) near the uterus (U). Put a cutting loop (L) into the abdomen. (B) The cervix was looped with the cutting L and the P was moved near the enlarged U by graspers. (C) The uterine body was contained with the P after looping the cervix with the cutting L. (D) The opening of the pouch was closed by pulling up the drawstring (Ds).

specimen by manual morcellation in LESS surgery. Firstly, it consisted of a nylon bag and a polyurethane inner layer, which was watertight and relatively resistant to tearing and cutting. During manual morcellation, a blade was utilized to cut the specimen into narrow strips; no pouch perforation was observed and all of the fluid was contained in the pouch, minimizing the risk of dissemination of potential inflammatory tissue or cancer cells. Secondly, the polypropylene drawstring at the opening of the tissue pouch can be tightened up using a Hemoclip (Ligamax, Somerville, MA, USA) to prevent the specimen from falling out of the pouch during the delivery of the specimen to the single port site. Thirdly, at the opening edges of the bag, small protruding pieces facilitated grasping and moving of the pouch. Finally, the surgical tissue pouches are available in different sizes; the largest has an opening diameter of 20 cm and is suitable for a huge uterus.

More recently, Akdemir et al⁹ reported a similar technique, which involved an insufflated surgical glove for enclosed power morcellation in multiport laparoscopic surgery. Goggins et al¹⁰ also used power morcellation within an insufflated bag in the laparoscopic or robotic multiport technique. No complications or bag perforation was noted. The method of specimen removal proposed herein does not require any special tool other than a knife and a tissue pouch, so it is less costly than power morcellation and other methods. The manual morcellation in this reported case is simple,

fast, and safe because it was performed with direct visual cutting when the specimen was safely contained in the tissue pouch. Myomatous fragments may be formed during power morcellation without containment and left behind unintentionally. This reported method prevents this problem and reduces surgical time, because no time is required to find such myomatous fragments after morcellation.

“Containing before cervical transection” can also reduce surgical time, especially with a large uterus because containment of a suspended uterus body is always easier than containment of a movable uterus after cervical transection, especially in LESS. However, this procedure may be difficult to perform, depending on the uterine size, and safety is of concern. Accordingly, for a uterine with a width or an anterior–posterior diameter more than 10 cm, the use of a flexible grasper and an additional port is strongly recommended. Surgeons have to carefully performing adhesiolysis to make the cervical surroundings free for containment. The patient must be in the steep Trendelenburg position before cervical transection, so that the bowels are shifted by the gravity toward the head site. In a large uterus, a screw can be used to create a better operative field. Tightening the opening of the pouch by pulling the drawstring and fixing it with a Hemoclip, as shown in Figure 2C, also markedly improves the operative field. In addition, with a 5-mm, 30° laparoscopic camera, checking whether bowels are looped by the cutting loop at the

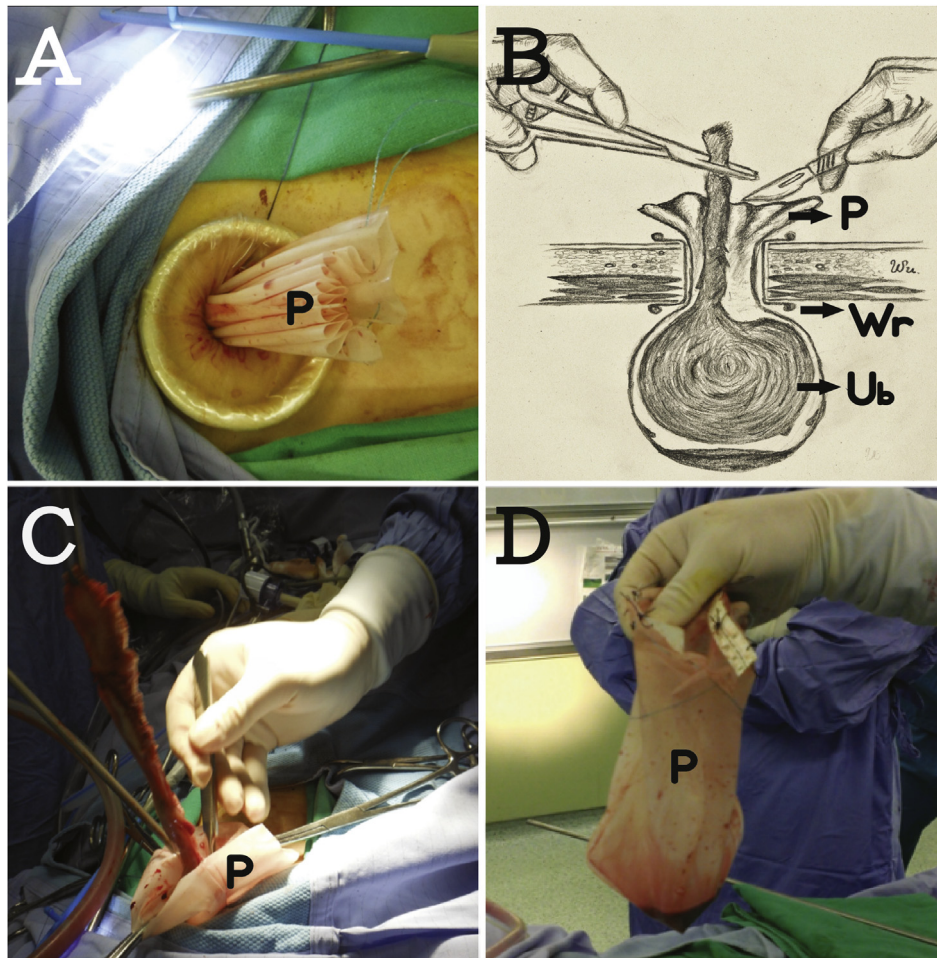


Figure 3. (A) Transfer of tissue pouch (P) to the opening of the single port and its being pulled out of abdominal cavity. (B) Schematic drawing of the “contain the uterine body (Ub) before manual morcellation” with the P. (C) Cut Ub into one or more long stripes under well contained status. (D) All the tissue fluids from the cutting were contained in the pouch.

bilateral side of the cervix or in the *cul-de-sac* is not difficult. Placing sutures at the edges of the pouch (Figure 1A) and fixing the plastic ruler at both angles of the pouch (Figure 1B) can keep the pouch opening and facilitate its manipulation. Accurate preoperative measurement of the size of the uterus must be made and a pouch with an opening that is at least 5 cm larger than the width or anterior–posterior diameter of the uterus should be used.

In conclusion, this reported case of LESS subtotal hysterectomy demonstrates a modified method of specimen removal using a surgical tissue pouch to contain the uterine body before cervical transection and before manual morcellation. The pouch utilized herein is associated with a low likelihood of bag perforation following manual morcellation that minimizes the risk of spreading potential cancer cells or iatrogenic parasitic myoma, and provides a shorter surgical time at a lower cost. This method is potentially useful in other laparoscopic surgeries such as in the cases of isolated tumors with undetermined histology, but more cases must be studied to verify its safety and feasibility in the future.

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