

Two-port access laparoscopic radical hysterectomy: First clinical report

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Recently, laparoscopic radical hysterectomy has been established as a feasible alternative to an open radical procedure. Current trials are aimed at further reducing the postoperative morbidity so new schemes of laparoscopic surgery, such as embryonic natural orifice transumbilical endoscopic surgery are being developed. We introduce our two-port access laparoscopic radical hysterectomy technique using a single multi-channel port and 5-mm ancillary port. Our two-port technique seems to be minimally invasive with a decrease in morbidity and offers cosmetic benefits with less visible scars. Two-port access laparoscopic radical hysterectomy with a pelvic and paraaortic lymph node dissection in selected gynecologic cancer patients may be feasible for experienced laparoscopic surgeons.

Key words: Two-port access, Laparoscopic radical hysterectomy, Minimally invasive surgery

Introduction

Radical hysterectomy is one of the well-identified surgical procedures in the field of gynecologic oncology. It is recommended for patients with cervical cancer stage IA1 to IIA, and also performed in selected patients with stage II endometrial carcinoma, and upper vaginal carcinoma. In 1990, Canis and colleagues reported the first laparoscopic radical hysterectomy,¹ and Spirotus et al.² described the technique classified as the laparoscopic type III radical hysterectomy with paraaortic and pelvic lymph node dissection. Recently, laparoscopic radical hysterectomy has been established as a feasible alternative to an open radical procedure. The advances of laparoscopic surgery include decreased blood loss, less postoperative pain, decreased skin infection or her-

nias, decreased abdominal adhesion formation, shorter hospital stay, faster recovery, and better cosmesis. Furthermore, many surgeons have tried to reduce the number and size of ports in laparoscopic surgery for reducing morbidity and better cosmetic outcome.

Based on these considerations, we tried to perform radical hysterectomy with minimal skin incisions. We introduce our two-port access (TPA) laparoscopic radical hysterectomy technique using a single multi-channel port and 5-mm ancillary port with conventional laparoscopic instruments. This is our first experience of using the TPA laparoscopic radical hysterectomy technique with bilateral salpingo-oophorectomy, pelvic, and paraaortic lymph node dissection in a 50-year-old patient with stage IIb endometrial cancer extending to the endocervical stroma.

Case Report

A 50-year-old woman visited our institution due to squamous cell carcinoma of the uterine cervix on Pap smear. The patient was asymptomatic and did not experience abdominal pain, loss of weight, or menstrual irregularity in the previous 6 months. She had been on medication for ulcer-

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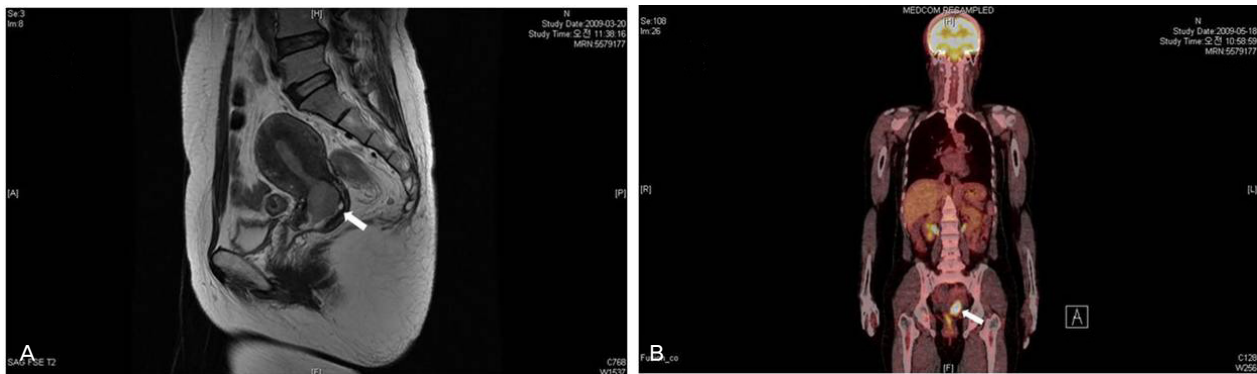


Fig. 1. (A) Magnetic resonance image demonstrates about 3 cm endocervical mass (arrow). (B) F-18 fludeoxyglucose positron emission tomography/computed tomography shows that FDG uptake was in the uterine cervix and lower body (arrow).

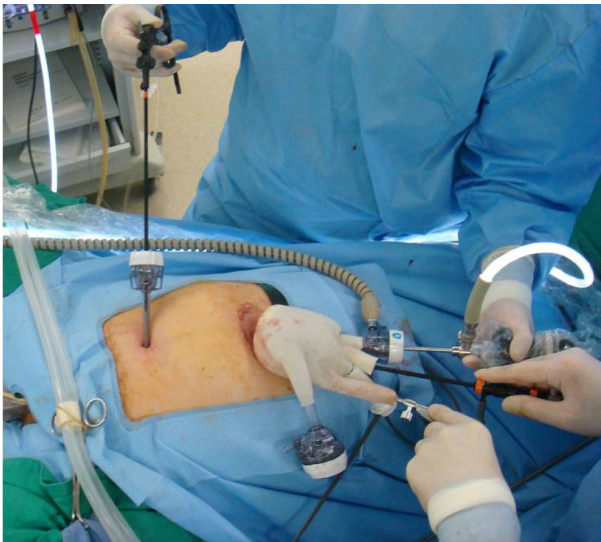


Fig. 2. External view during a two-port access laparoscopic radical hysterectomy.

ative colitis for 3 years. She had no surgical history or family history. There was no malignant exocervical lesion on colposcopic examination and cervical biopsy. So endocervical curettage was performed and the result was invasive endometrioid adenocarcinoma. Magnetic resonance imaging and F-18 fludeoxyglucose positron emission tomography/computed tomography also showed a 3 cm sized tumor arising from the endocervix (Fig. 1). The serum CA125 was 81.5 U/mL. Other laboratory tests showed no specific abnormality. Her height, weight, and body mass index were 155 cm, 56.5 kg, and 23.5 kg/m², respectively. Based on results of these imaging studies and pelvic examination, the patient was diagnosed as stage Ib1 cervical cancer. Therefore, TPA laparoscopic radical hysterectomy with bilateral salpingo-oophorectomy, pelvic, and paraaortic lymph node dissection was performed. The operative time

was 360 minutes and estimated blood loss was 300 mL. There were no perioperative complications except for subcutaneous emphysema. The number of pelvic and paraaortic lymph nodes obtained was 16 and 10, respectively. The final pathologic diagnosis was stage IIb G1 endometrial cancer extending to the endocervical stroma without lymph node metastasis. The patient was discharged on postoperative day 10 without complication.

1. Surgical Techniques

1) Patient preparation

The patient received prophylactic antibiotics 30 minutes before the operation. She was placed in the lithotomy position and general endotracheal tube anesthesia was achieved. An 18F-Foley catheter was inserted to drain the bladder.

2) Two-port system using single multi-channel port

After clamping the periumbilical skin with a towel clip and elevating the skin, a 5 mm vertical linear incision was made within the umbilicus and a 5 mm trocar was inserted through the umbilical incision. The abdomen was insufflated to 12 mmHg with CO₂ gas and a 5-mm, 30-degree laparoscope was inserted through the trocar. After careful inspection of the pelvic cavity, the trocar was removed and the Alexis[®] wound retractor (Applied Medical, CA, USA) was inserted into the peritoneal cavity through the umbilicus after extending the incision to 15 mm length. A wrist portion of the 7½ surgical gloves was fixed with wound retractor. After making a hole at the tip of the fingers, a 5-mm and 11-mm Trocar and a 5-mm trocar-threaded cannula and seal (Applied medical, CA, USA) were inserted into the fingers of the glove. Through the 5-mm trocar, the laparoscope was inserted. An 11-mm trocar was used for insertion of the

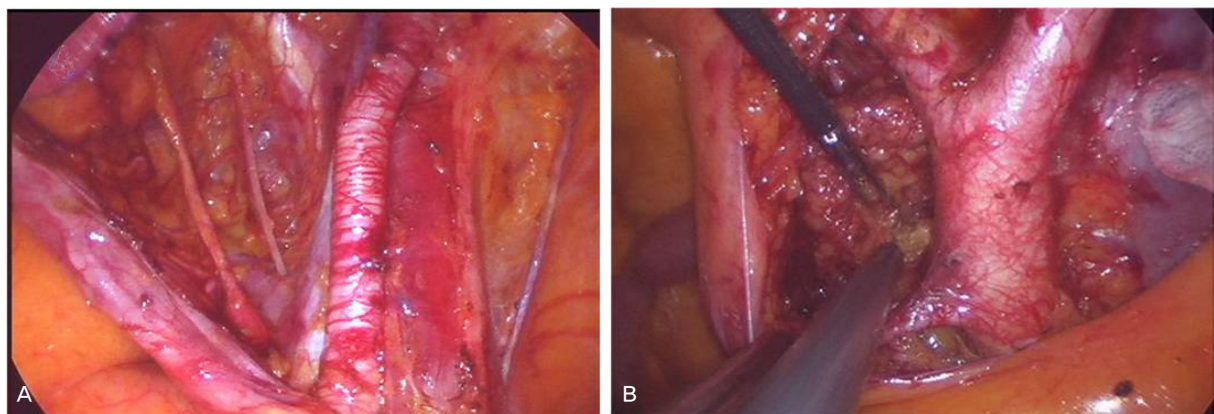


Fig. 3. Intraoperative view (A) pelvic lymph node dissection, (B) paraaortic lymph node dissection.



Fig. 4. The gross appearance of the resected uterus with parametrial tissue. The dotted circle indicates the endocervical mass.

10-mm LigaSure™ system (Valleylab, Boulder, CO, USA) and 1-0 Vicryl. Additionally an ancillary 5-mm trocar was inserted at the suprasymphysis pubis and was used by an assistant (Fig. 2). A RUMI uterine manipulator and KOH colpotomizer system without uterine tip (Cooper Surgical Inc., Trumbull, CT, USA) was used to minimize trauma on the tumor and associated tumor cell spillage into the vaginal cavity,

3) Laparoscopic radical hysterectomy with lymph node dissection

Peritoneal washing was performed before the radical hysterectomy. The lateral peritoneum on each side was opened, and pararectal and paravesical spaces were developed. Bilateral pelvic lymph node dissection was performed as usual manner. The operator used a curved biopsy forceps on the left hand and a monopolar L-hook or

Harmonic scalpel (Ethicon Endo-surgery, Ohio, USA) on the right hand through the multi-channel port while assistant tented the peritoneum or retracted the vessels through the ancillary port (Fig. 3A). The specimen was placed in an endo-bag and removed through the umbilical port. After adequate ligation of the round ligament on each side, the ligaments were transected in both sides. Bilateral infundibulopelvic ligaments were ligated and dissected with the LigaSure™ system. The anterior leaf of the broad ligament was separated from the underlying connective tissue in a curved fashion, dividing the peritoneum on the anterior uterine surface above the bladder fold. The bladder and the attached peritoneal flap were bluntly dissected off the lower uterine segment. The base of the bladder was released from the cervix and upper vagina. The posterior leaf of the broad ligament was then divided. The ureter was separated from fascial bundles of the broad ligament, dissecting the uterine arteries on each side. The uterine artery was skeletonized and dissected with a Harmonic scalpel. The peritoneum over the posterior aspect of the uterus was incised and the pre-rectal space was bluntly dissected. The uterosacral ligaments were divided at the mid portion with a Harmonic scalpel. The ureter was dissected down along its insertion to the bladder. After sufficiently dissecting each ureter from the cardinal ligaments to about 4cm below the lower cervical limit, the resection of the vagina was achieved with a Harmonic scalpel at about more than 2 cm below the cervix on the anterior and posterior. Then the uterus was removed vaginally (Fig. 4). We performed the closure of vaginal cuff intracorporeally with a 1-0 Vicryl continuous running suture. After adequate bleeding control, paraaortic lymph node dissection was performed (Fig. 3B). The peritoneal incision extended from the aortic bifurcation up to the trans-

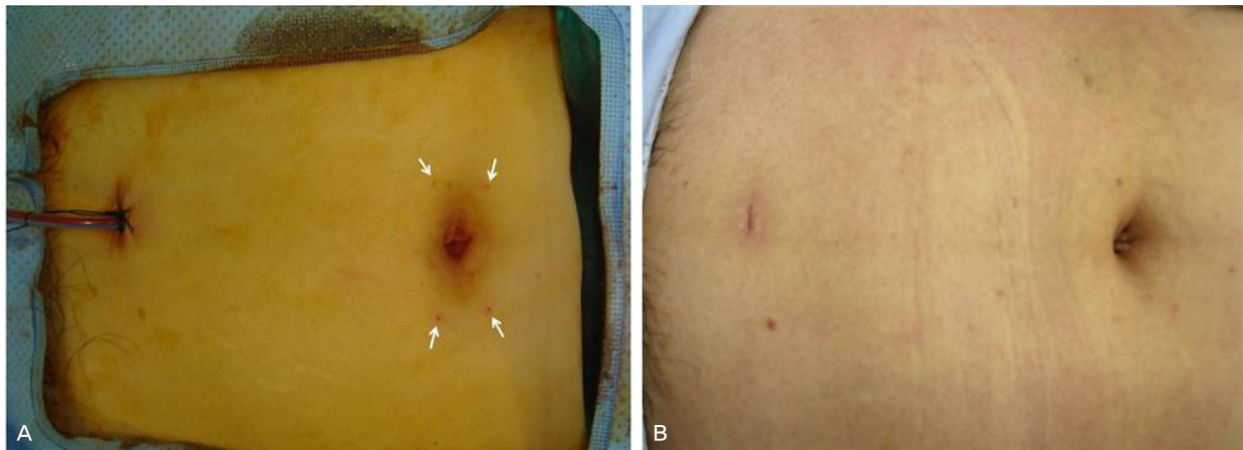


Fig. 5. Postoperative photograph of abdominal skin incision; (A) view immediately after surgery; small arrows indicate clamping marks of towel clip. (B) view after 6 weeks postoperatively.

verse duodenum. After the inferior mesenteric artery and bilateral ureters were isolated, lymphatic tissues on the para-aortic, paracaval and presacral space were carefully dissected. After bleeding was controlled, a drainage bag was inserted through 5-mm port at the suprapubic area and the laparoscope and wound retractor were removed. The umbilical incision was closed with the 2-0 Vicryl suture (Fig. 5A).

Discussion

Since the introduction of the idea of “minimal access surgery” in the early 1990s, numerous studies have reported various endoscopic techniques.³ Two recent innovations are being developed: one is the natural orifice transluminal endoscopic surgery (NOTES) and the other is the transumbilical endoscopic surgery (TUES). NOTES reaches the target organ by inserting the endoscope through a natural orifice, including mouth, anus, vagina, urethra, and involves an intentional puncture in one of the viscera to access the intraperitoneal cavity. After Kalloo et al. had published the technique of perioral transgastric peritoneoscopy in 2004, NOTES has progressed into clinical studies.⁴ TUES is a single-port access (SPA) surgery approach to the umbilicus, an embryologic natural orifice.⁵ SPA surgery, single-port laparoscopy,⁶ one-port umbilical surgery, natural orifice transumbilical surgery,⁷ laparoendoscopic single-site surgery,⁸ and embryonic natural orifice transumbilical endoscopic surgery⁹ are the other names of this technique. Different from NOTES, TUES has some advantages with respect to having no morbidity associated with the leakage of visceral

content, easier closure of the umbilical orifice incision, and easier insertion of the additional ancillary trocar. While NOTES is experimental, TUES seems to be more practical. In addition to the advantages of laparoscopic surgery, such as the reduction of blood loss, post-operative pain and infection, recovery interval, and hospital stay,¹⁰ both TUES and NOTES have better cosmetic benefits as it significantly reduces the presence of scars.

TUES has been rapidly accepted in most surgery departments and has been performed in patients with gynecologic cancer. To our knowledge, there have been a few published reports of SPA staging laparoscopy, but no single-port radical hysterectomy in patients with gynecologic cancer. According to previous reports of SPA staging laparoscopy, they used robotics or specific devices including an articulating laparoscope and instruments and multi-channel ports. Also, umbilical scars remained over 2 cm in length and exceeded the size of the umbilical fold, thus they were no longer “scarless” surgeries. Therefore, we developed a new surgical technique of a two-port system laparoscopic radical hysterectomy technique. The TPA system consisted of a single multi-channel port system in the umbilicus which had already been introduced by our surgical team,¹¹ and an ancillary 5-mm trocar at the suprapubic area. The TPA system has potential of better cosmetic results. The 1.5 cm intra-umbilical incision was concealed within the umbilicus and the 5 mm suprapubic incision was covered by pubic hair after healing (Fig. 5B). Some other potential advantages of our surgical technique over the previous laparoscopy are a possible decrease in morbidity related to visceral and vascular injuries during trocar placement and decreased risks in sub-

cutaneous tumor implantation as well as decreased post-operative pain, wound infection, and hernia formation. This procedure was successfully performed without major complications. The number of lymph nodes resected in our study was 26, and this number is sufficient compared to the results of other studies with a conventional laparoscopic or robotic approach. On the other hand, it took quite a little long time to complete this surgery, because many actions of our TPA system were performed through single-port in the umbilicus. There were some technical problems, including a crush between instruments limiting some procedures and making operation time a little long. This problem could be managed with increasing experiences of SPA surgery and development of instruments for SPA surgery. To avoid crushing between instruments, we introduced 5-mm curved toothed biopsy forceps with light handle as a grasper and slim trocars. Due to the single multi-channel port designed by us, we could use many instruments at the same time without limitation.

In conclusion, TPA laparoscopic radical hysterectomy with a pelvic and paraaortic lymph node dissection may be feasible for selected patients with gynecologic cancers in need of radical hysterectomy. Our TPA system seems to be minimally invasive technique with a decrease in morbidity and offers cosmetic benefits with less visible scars. Additional reports of further evaluation for this technique will be needed.

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