Laparoscopy-Assisted Transvaginal Total Exenteration for Locally Advanced Cervical Cancer with Bladder Invasion after Radiotherapy

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ABSTRACT

When invasive cervical cancer involves the urinary bladder or rectum, exenteration can be curative treatment. However, this operation, particularly by an open approach, carries significant morbidity, both physically and psychologically. Laparoscopic surgery has been documented to be a reasonable alternative to the open counterpart for a variety of pelvic operative procedures, including such advanced procedures as laparoscopy-assisted vaginal hysterectomy, total laparoscopic hysterectomy, and laparoscopy radical hysterectomy. With improving surgical technology and increasing surgical experience, exenteration is a logical extension of current laparoscopic practice. However, it raises skepticism regarding the feasibility and justification for the complicated surgery. We herein describe our experience in a patient undergoing total exenteration assisted by laparoscopic technology for advanced recurrent cervical cancer after extensive radiotherapy. Transperitoneal laparoscopic total exenteration with uretersigmoidostomy and end-sigmoidostomy was accomplished in 6 hours. The whole specimen was removed en bloc transvaginally. The patient tolerated the procedure well. The only complication was a wound infection 50 days postoperatively that was controlled with debridement and antibiotics. No episodes of pyelonephritis occurred. After 1 year of follow-up, the patient is free of cancer by imaging studies and lives without associated morbidity of this extensive palliative operation except the care of the sigmoid colostomy.

INTRODUCTION

LAPAROSCOPIC SURGERY has been proved as a less-invasive modality for patients requiring almost all existing procedures (e.g., reference 1). Its advantages including less operative trauma and faster recovery as long as the operation is not too complicated.2 Whether total pelvic exenteration for the treatment of locally advanced cervical cancer is suitable for a laparoscopic approach remains unknown. The operation would be particularly difficult when the operative field has been irradiated. Open total exenteration is associated with high morbidity and a long period of recovery.3,4 Although laparoscopy-assisted transvaginal hysterectomy has become a common procedure for benign disease,5 the transvaginal approach for pelvic oncologic surgery never gained wide acceptance because of the difficulty of lymphadenectomy, control of the superior pedicle, and urinary diversion.6 However, experience gained in this field and recent advancements in laparoscopic instruments have made radical oncologic operations more appealing.7,8 Extension of the laparoscopic method for reducing the morbidity of total pelvic exenteration is quite natural. Herein, we describe the initial experience of total exenteration for locally advanced cervical cancer using a combined transvaginal and laparoscopic approach. Surgical details and guidelines learned from this case are discussed.
CASE REPORT

A 66-year-old woman had been found to have cervical epidermoid carcinoma, stage II, 4 years earlier. She received radiotherapy to a dose of 5940 cGy when the diagnosis was initially made. Radiation cystitis with repeated hemorrhage and pyelonephritis secondary to ureteral obstruction occurred, and antegrade pyelography showed a left lower-ureteral stricture with hydrenephrosis and much blood clot in the urinary bladder (Fig. 1). Antegrade double-J tube insertion was performed to relieve the obstruction. However, hematuria persisted for 1 year, which necessitated hospitalization several times. In addition, the tumor was found by CT and MRI to have invaded the urinary bladder and rectum (Fig. 2). Because of the intractable hematuria, palliative exenteration of the involved organs, including the urinary bladder and rectum, was considered. She received laparoscopic radical cystectomy, hysterectomy, and abdominal peritoneal resection. Bilateral ureterosigmoidostomy and end-sigmoidostomy were performed for urinary and fecal diversion, respectively.

Surgical procedure

The patient was placed in the lithotomy position with the hips slightly flexed and abducted, keeping the buttocks at the edge of the table. Transperitoneal laparoscopy with 15-mm Hg pneumoperitoneum was established. Five trocars were used, including one umbilical port for telescope and two ports at each side of the lower abdomen (Fig. 3). The dissection of the pelvic organs was performed with the assistance of an internal bladder retractor.9

The uterus was mobilized first. Using the internal bladder retractor, the bladder and uterus were retracted up and laterally to stretch the ureters and the superior and inferior vascular pedicles of the bladder. The vascular pedicles were mobilized, and the vessels were coagulated and divided by a bipolar electrosurgical coagulator (Ligasure®; Tyco, New Haven, CT, USA). The ureters were then exposed and dissected down to the level of ureterovesical junction. The ureters were transected at the vesical junction after proximal dissection to the level of the upper ureter, a few centimeters above the iliac vessels. Anterior dissection of the bladder neck and urethra was facilitated by displacing the urinary bladder posteriorly using the internal bladder retractor. After the whole urinary bladder and uterus had been mobilized completely, the fascia and ligaments attached to rectum were easily dissected with the Ligasure along the presacral layer, until the rectum was mobilized to the level of anus. The sigmoid colon was transected with an Endo-GIA stapler (3.5 mm × 3 cm; Tyco, Norwalk, CT). The right ureter was maneuvered through a 1 × 1-cm mesenteric window in the left lower abdomen. The ureters were anastomosed to the sigmoid colon extracorporeally via a trocar extension wound located in the left lower-abdominal quadrant (Fig. 4). The end sigmoidostomy was established on the left lower abdomen.

In the meanwhile, a transvaginal approach to open the paracervical area and parametrium was performed by another surgical team to deliver the whole specimen outside the abdominal cavity. The specimen, including the urinary bladder, urethra, ovaries, uterus, cervix, and anorectum, was removed via the opening of the vestibule. The wounds were closed layer by layer, with two drain tubes placed in the peritoneal cavity.

Results

The total operative time was 6 hours, and the blood loss was 200 mL. The patient tolerated the procedure well. The postoperative hospital stay was protracted (19 days) by a urinary tract infection. An episode of wound infection surrounding the stoma occurred 50 days postoperatively and was controlled with de-
bridement and antibiotics. The patient was followed regularly after the operation at intervals of 3 months. At the follow-up 1 year postoperatively, no evidence of recurrence or hydronephrosis was noted on CT scan. No further urinary tract infections occurred.

DISCUSSION

The advantages of laparoscopic surgery may be appreciated by shorter hospital stay, decreased morbidity, and shorter convalescence periods compared with open laparoscopy for equivalent surgical procedures. In the last decade, advancements in laparoscopic techniques and instruments made the application of laparoscopic surgery more popular and widespread. Many complex surgical procedures that traditionally were performed by open laparotomy have been now accomplished laparoscopically, and application of laparoscopic surgery is no longer limited to simple procedures. In the past, the role of laparoscopy in pelvic exenteration was adjunctive, for the assessment of surgical feasibility to lower the number of unnecessary laparotomies. Recently, with improvements in laparoscopic instrumentation, the role gradually changed to the extent of accomplishing complicated and mutilating operations, such as total exenteration, totally.

Total exenteration is a very extensive operation with a high rate of serious complications and a tumor recurrence rate of 40% to 60%. The standard procedure for total exenteration in women with advanced pelvic malignancy includes a bilateral pelvic lymph-node dissection and an en bloc removal of the uterus, cervix, bladder, urethra, and anorectum with urinary and stool diversion. Traditional surgical techniques include midline umbilicopubic laparoscopy, stomas for urinary and stool diversion, transvaginal removal of the external urethral meatus together with the vaginal wall and anorectum. The application of laparoscopic techniques to this operation is quite reasonable to avoid midline umbilicopubic laparotomy, particularly for patients who have received radiotherapy.

Transvaginal radical cystectomy has been described for many years, although in textbooks of urologic surgery, a transvaginal approach is recommended only for the oldest and obese patients in poor condition. Because of the difficulties in lymph-node dissection, control of the superior pedicle, and urinary diversion, the techniques have not been widely accepted. However, laparoscopy-assisted transvaginal hysterectomy has shown a definitive advantage in postoperative recovery in comparison with the abdominal approach. Laparoscopic pelvic lymph-node dissection has been mature enough to remove representative lymph nodes, and perivesical vascular pedicles can be controlled in the scenario of the pelvic laparoscopic set-up.
Furthermore, Kozminsky and Partamian\textsuperscript{13} demonstrated laparoscopic ileal-loop conduit creation, which is performed outside the abdomen using one or two small laparotomies. The feasibility of laparoscopic radical cystectomy has been confirmed.\textsuperscript{14} In 1995, Puppo and associates\textsuperscript{6} accomplished transvaginal radical cystectomy with the assistance of a laparoscope. Their results showed that the combined transvaginal and laparoscopic approach fulfills the criteria for radical oncologic surgery as well as does open surgery. We followed the same oncologic criteria in this case of total exenteration. The dissection place was adjacent to the presacral layer, and we were surprised to find that this plane is loose compared with other areas in the irradiated pelvis. Laparoscopic dissection of the fibrotic and irradiated area was easy in this case, partly because the operative field was distended under pneumoperitoneum. The abundant presacral vasculature may, in other situations, prevent the total obliteration on this plane after extensive radiotherapy.

In general, separate diversion of stool and urine is a better option, in view of the desirability of preventing pyelonephritis, hydronephrosis, hyperchloremic acidosis, and the sometimes-rapid onset of renal failure that can occur in the presence of a single ureterosigmoidostomy.\textsuperscript{15} On the other hand, it takes longer to isolate another loop of ileum and requires another stoma on the abdomen. Although the type of urinary diversion did not cause postoperative morbidity,\textsuperscript{4} the combined diversion may have contributed to the para-ostomy wound infection 50 days postoperatively.

The two trocar wounds on the left lower abdomen were extended to facilitate performance of the bilateral ureterosigmoidostomy extracorporeally.\textsuperscript{13} The end-sigmoidostomy was established in the left lower abdomen. A second operative team, chiefly a gynecologist, performed the transvaginal procedure simultaneously. Thus, the surgical time was short, 6 hours. The operative time should be comparable to that of open exenteration.

Dense fibrotic pelvic tissue further increases the difficulty of dissection. We found the newly developed bipolar electro surgical coagulator (Ligasure) to be a reliable tool to dissect the paravesical space and to control the vesical vasculature. The cystectomy was accomplished without the need for an Endo-GIA or clipping. This fast and effective hemostatic tool avoided unnecessary instrument exchange and decreased the blood loss, which totaled only 200 mL. Although the instrument offered an easy method for the current laparoscopic operation, thorough training in laparoscopic techniques, such as suture ligature, to control bleeding vessels deep on the pelvic wall is important.

**CONCLUSION**

Increasing surgeon experience and improving technology has challenged the limits of laparoscopy. Combined laparoscopic and transvaginal total exenteration with bilateral ureterosigmoidostomy and end-sigmoidostomy is a feasible and reasonable minimally invasive surgical procedure for palliation in patients with locally recurrent pelvic malignancies after extensive radiotherapy.

**REFERENCES**


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