

Case Report

Combined Laparoscopic and Transperineal Endoscopic Pelvic Tumor Resection with Sacrectomy for Locally Recurrent Rectal Cancer

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Abstract

Pelvic tumor resection with sacrectomy for locally recurrent rectal cancer is a challenging operation with a high complication rate and poor prognosis. We report a case of pelvic tumor resection with sacrectomy by transperineal endoscopy following laparoscopic dissection for locally recurrent rectal cancer. A 70-year-old man underwent laparoscopic abdominoperineal resection for rectal cancer and was diagnosed with local pelvic recurrence on follow-up computed tomography (CT) three years postoperatively. As the recurrence was in contact with the front of the sacrum, we concluded that distal sacrectomy was necessary to ensure a surgical margin. We safely performed combined laparoscopic and transperineal endoscopic pelvic tumor resection with sacrectomy by exposing the surface of the sacrum from both abdominal and transperineal approach. The operative time was 200 minutes, with minimal blood loss. There was no tumor exposure on the surgically dissected surface, and the patient was discharged without complications 14 days postoperatively. Transperineal endoscopy may be useful for pelvic tumor resection with sacrectomy for locally recurrent rectal cancer.

Keywords

locally recurrent rectal cancer, pelvic tumor resection, distal sacrectomy, transperineal endoscopy

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Introduction

Operations for locally recurrent rectal cancer are difficult because of adhesions, fibrotic changes, and landmark loss due to previous operations[1]. In addition, operations for locally recurrent rectal cancer often require combined resection of surrounding organs to ensure a resection margin, and it is reported that sacral resection is necessary for one-third to half of pelvic recurrence after rectal cancer[2,3]. Pelvic tumor resection with sacrectomy is a challenging operation and has a high complication rate. Intraoperative complications include bleeding and damage to surrounding organs, and postoperative complications include perineal wound breakdown and pelvic abscess[4-6]; thus, there is room for

improvement in the operative method. There have been no reports of pelvic tumor resection with sacrectomy by transperineal endoscopic operation for locally recurrent rectal cancer, and its safety and efficacy are unknown. We report a case of transperineal endoscopic pelvic tumor resection with sacrectomy following laparoscopic dissection for locally recurrent rectal cancer.

Case Report

A 70-year-old man developed rectal cancer and underwent laparoscopic abdominoperineal resection at a general hospital. Pathology demonstrated pT3N1 with positive radial margins on the bilateral rectal walls, and the patient received

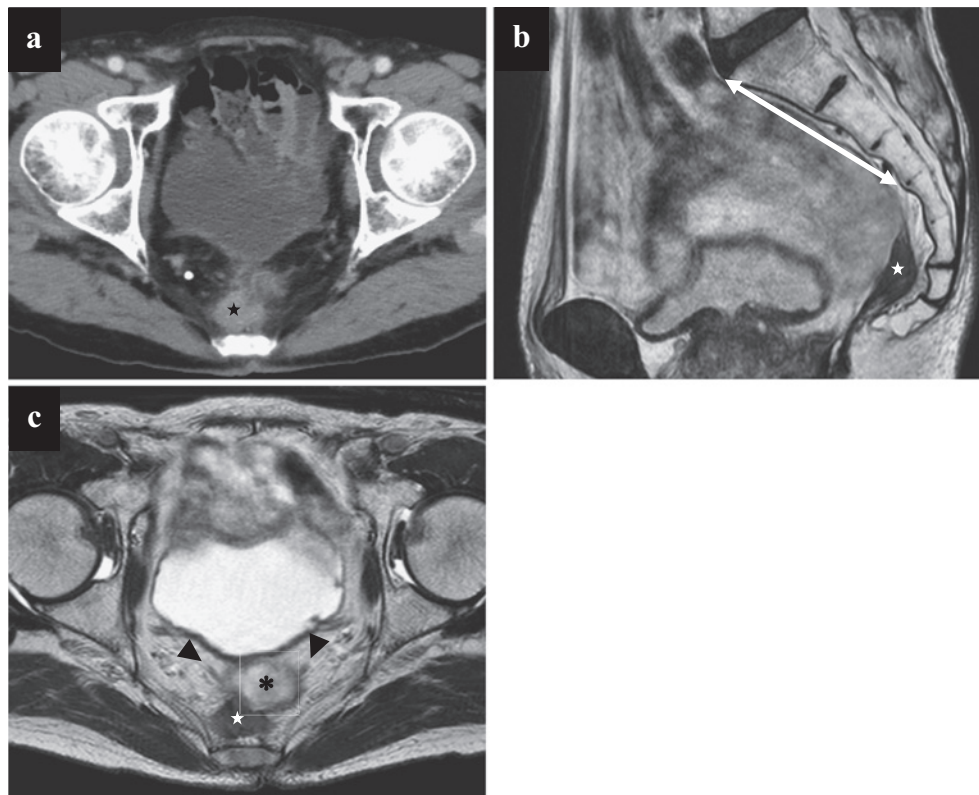


Figure 1. Image findings.

- a) Abdominal computed tomography revealed an irregular mass in the pelvis with a contrast effect of 20 mm in size (black star).
- b) Magnetic resonance T2-weighted imaging revealed a low-signal mass close to the fourth and fifth sacral vertebrae and coccyx (white star). The distance from the sacral promontory to the fourth sacral vertebra was 75 mm (white double-headed arrow).
- c) Magnetic resonance T2-weighted imaging indicated tumor infiltration (white star) into the small intestine (black asterisk) but no infiltration of other organs, including the seminal ducts (black arrowheads).

eight cycles of adjuvant chemotherapy with capecitabine. The patient experienced recurrence with a solitary liver metastasis 6 months postoperatively, and chemotherapy with mFOLFOX6 plus bevacizumab was initiated. Computed tomography (CT) examination indicated that the liver metastasis temporarily disappeared after 15 cycles of chemotherapy but then reappeared; thus, the patient underwent laparoscopic partial hepatectomy for the metastatic tumor 2.5 years after the initial operation. The metastatic liver tumor was resected without any histopathological remnants, and the patient was followed up without chemotherapy. However, the patient was diagnosed with local pelvic recurrence on follow-up CT 3 years after the first operation and was referred to our university hospital.

On abdominal examination, the patient had a stoma in the lower left abdomen and port scars at the umbilicus, left and right flanks, and left and right lower abdomen due to the previous operation. The patient also had a skin incision at

the perineum. Abdominal CT and magnetic resonance imaging (MRI) revealed a 20-mm lesion in contact with the front of the fourth and fifth sacral vertebrae and coccyx (Figure 1 a, b). In addition, MRI suggested infiltration of the tumor into the small intestine, without infiltration of other organs (Figure 1c). Positron emission tomography/CT revealed no other metastases.

The pelvic tumor was expected to invade the sacrum from the fourth to fifth vertebral level and the coccyx, and we decided to transect the distal sacrum and coccyx with the pelvic tumor to ensure a surgical margin. We chose a combination of laparoscopic and transperineal endoscopic procedures as the approach and performed laparoscopic and transperineal procedures in this order. The patient was placed in the lithotomy position as close to the caudal side of the operating table as possible to facilitate transperineal operation. Ports were inserted into the umbilicus, left and right flanks, and left and right lower abdomen, and the laparoscopic pro-

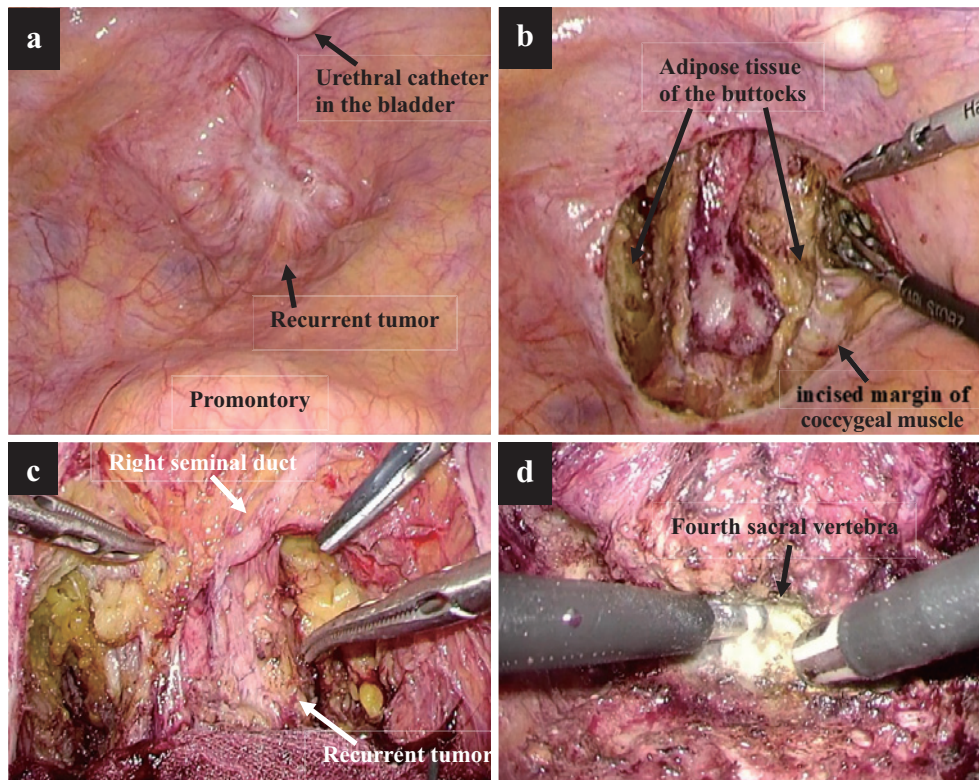


Figure 2. Laparoscopic findings.

- The recurrent tumor was found in front of the distal sacrum. The tumor did not adhere to the anterior tissue but adhered to the distal sacrum.
- The retroperitoneum around the tumor was incised with a margin. The coccygeal muscles on both sides of the tumor were incised, and the adipose tissue of the buttocks was exposed.
- The tumor was suspected to have invaded the right seminal duct.
- The fourth sacral vertebra was incised with an electric cautery device.

cedure was initiated. The pelvic tumor was located in front of the distal sacrum. It invaded to the retroperitoneum, but not to the intra-abdominal organs such as the small intestine (Figure 2a). The retroperitoneum around the pelvic tumor was circumferentially incised to ensure a 5- to 10-mm margin, and the bilateral sides of the tumor were dissected until the buttocks adipose tissue was exposed (Figure 2b). Next, on the dorsal side, we identified the fourth sacral vertebra based on the distance from the sacral promontory measured by preoperative sagittal MRI (Figure 1b), and the anterior surface and bilateral outline of the fourth sacral vertebra were exposed. Finally, the anterior side of the tumor was dissected. At that time, the right seminal duct adhered to the tumor and was resected (Figure 2c). At the caudal side of the seminal duct, the scar tissue dorsal to the prostate was carefully dissected from both sides; finally, buttocks adipose tissue was exposed in the anterior side of the tumor. The fourth sacrum was then incised until mobility was obtained (Figure 2d). Next, the transperineal endoscopic procedure was started; at that time, both lower limbs of the patient were raised as much as possible to improve the perineal

view. The skin around the perineal wound of the first operation was circumferentially incised, the GelPOINT® Path was attached to the incised perineum (Figure 3a, b), and the transperineal operation began. During the transperineal operation, a laparoscopic guide was always provided to confirm the appropriate incised line. First, the ventral and bilateral sides of the tumor were dissected and communicated with the abdominal cavity (Figure 3c). Subsequently, the dorsal side of the tumor was dissected. The coccyx was identified and used as a landmark (Figure 3d), and the dorsal side of the coccyx and sacrum were dissected. The sacral incision line was identified by the laparoscopic traction of the tumor to the ventral side (Figure 3e), the fourth sacral vertebra was incised, and the specimen was removed. The operative time was 200 minutes, with minimal bleeding. There were no adverse events during the operation.

The tumor was not macroscopically exposed on the surgically dissected surface of the resected specimen (Figure 4a). The tumor was confirmed to be an adenocarcinoma, which was consistent with the primary tumor. Microscopically, the right side of the tumor was close to the surgically dissected

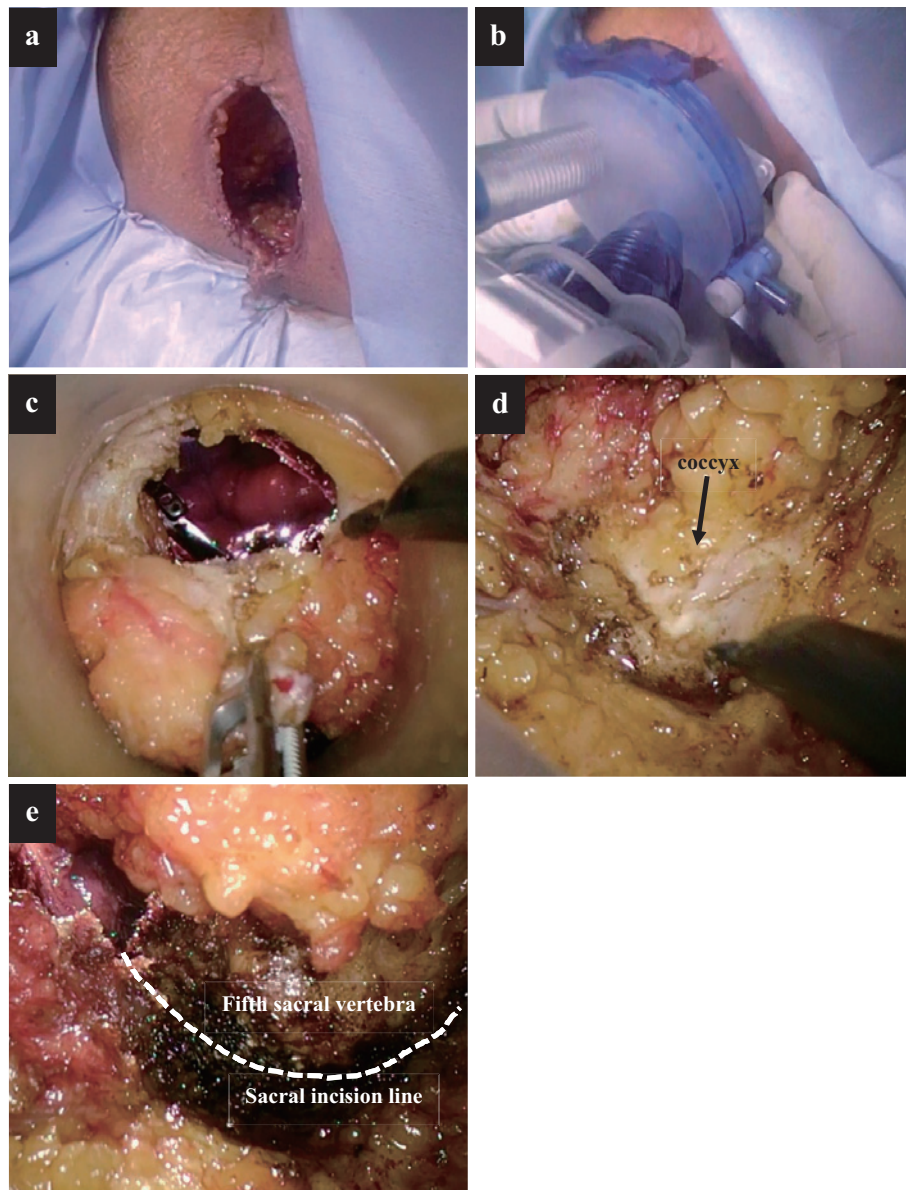


Figure 3. Transperineal endoscopic findings.

- a, b) The skin around the previous perineal wound was circumferentially incised, and a transanal access platform was attached to the incised perineum.
- c) Under laparoscopic guidance, the ventral and bilateral aspects of the tumor were incised and allowed to communicate with the abdominal cavity.
- d) The dorsal side of the tumor was dissected, and the coccyx was identified.
- e) Laparoscopic operation ventrally pulled the tumor and identified the sacral incision line.

surface, but the radial margin was negative. The tumor showed perineural infiltration but did not invade the coccyx, sacrum, or right seminal duct. The patient was discharged without complications 14 days after the surgery. The patient visited the outpatient 1 month after the surgery. There were no adverse events after discharge (Figure 4b).

Discussion

We experienced a case of transperineal endoscopic pelvic tumor resection with sacrectomy following laparoscopic dissection for locally recurrent rectal cancer. Pelvic tumor resection with sacrectomy has traditionally been performed either via the abdominal perineal approach with open perineal manipulation or the abdominal sacral approach. In the former approach, securing the operative view during

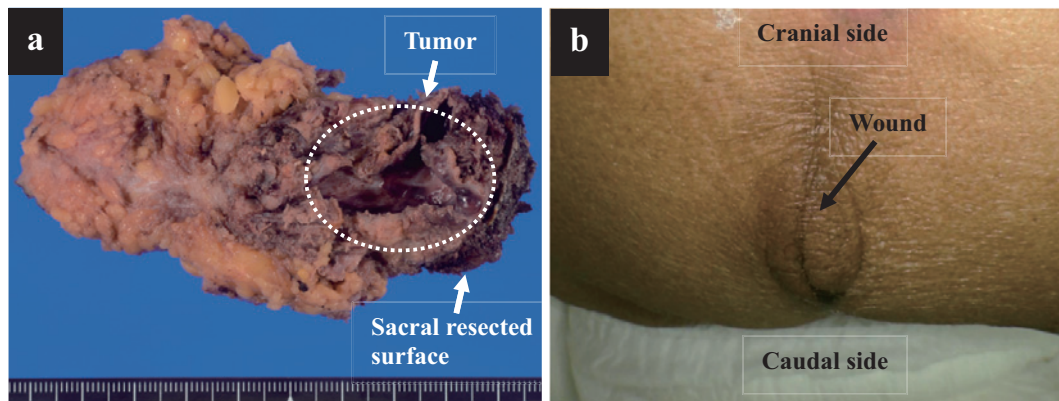


Figure 4. Macroscopic view of the resected specimen and perineal wound.

- a) The tumor was not macroscopically exposed on the surgically dissected surface of the resected specimen.
 b) The perineal wound one month postoperatively was small and had no signs of infection.

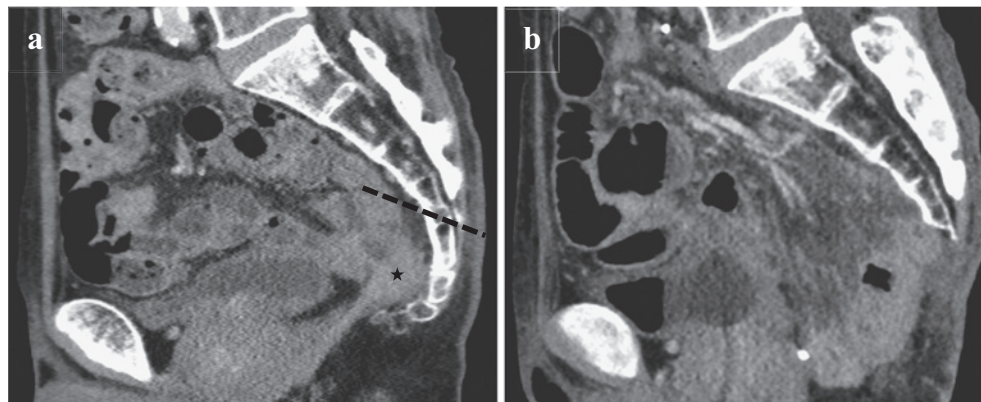


Figure 5. Preoperative and postoperative computed tomography (CT) findings.

- a) Preoperative CT findings. The black star was the recurrent tumor. From this image, the dotted line was planned as the line of incision of the sacrum.
 b) Postoperative CT findings. The sacrum was incised at the planned line.

perineal manipulation is difficult. In the latter approach, the large buttock wound increases the risk of wound-related adverse events, and intraoperative repositioning is necessary[4-6]. The transperineal endoscopic approach overcomes these challenges and is a promising method for pelvic tumor resection with sacrectomy.

The operation for locally recurrent rectal cancer is difficult because of adhesions, fibrotic changes, and landmark loss due to the previous operation[1]. The abdominal perineal approach with open perineal manipulation for cases requiring combined sacral resection is difficult because of the poor operative view during transperineal manipulation. However, in the present case, a good operative view was secured by viewing from both the abdominal and perineal sides during the transperineal manipulation. This could reduce the risk of intraoperative bleeding and damage to surrounding organs. In fact, in this case, the amount of intraoperative bleeding was low, and the operation was completed

without any intraoperative complications. Furthermore, securing a good view during operation enables resection at oncologically appropriate cutting line and helps achieve R0 resection. R0 resection is the most important factor in obtaining a good prognosis for locally recurrent rectal cancers because the survival time after reoperation is reported to be 28-98, 12-50, and 6-17 months for R0, R1, and R2 resections, respectively[7]. Since the current operation was performed under a good view, we were able to incise the sacrum at the formally planned location envisioned by preoperative CT (Figure 5), which could contribute to oncologically appropriate resection and have the potential to improve the prognosis. Additionally, this approach had educational merit because every person who attended the operation could learn the anatomical details through the operation.

Pelvic tumor resection with sacrectomy for locally recurrent rectal cancer has a high complication rate. Complications include wound infection, wound breakdown, flap ne-

crisis, pelvic abscess, ileus, and pneumonia, among which complications related to the wound are the most frequent[3,4]. Irradiation of the pelvis is often performed as part of the treatment of locally recurrent rectal cancer, and irradiation of the buttock skin at that time is the major cause of wound-related complications[3,4,8]. In addition, the large buttock incision in the abdominal sacral approach is one of the factors of wound-related complications. This transperineal endoscopic approach can reduce the size of the perineum wound and may reduce wound-related complication. In fact, in this case, operation was possible with a small incision as shown in Figure 4b, and no wound-related complications postoperatively occurred. This transperineal endoscopic approach is also superior to the abdominal sacral approach as intraoperative repositioning is not required. This helps avoid adverse events that may occur during intraoperative repositioning and reduce the operative time.

Transanal total mesorectal excision (TME) was first reported by Sylla et al. in 2010[9] and rapidly spread in Europe. A randomized controlled trial comparing laparoscopic TME and transanal TME was performed, and it was shown that the TME completion rates were equivalent in both, and transanal TME was superior in ensuring the circumferential resection margin[10]. Transanal TME may be oncologically superior to traditional TME and is becoming more prevalent worldwide. The current case also underwent a transperineal procedure, with the history of a pelvic operation; however, resection was possible without exposing the tumor on the dissected surface. Transanal or transperineal endoscopic surgery has the potential to improve the quality of operations requiring pelvic manipulation and is expected to spread in the future.

However, to popularize transanal or transperineal endoscopic surgery, there are some problems to be solved. Penna et al. reported that organ damage was caused in 1.5% and urethral damage in 0.7% in 720 transanal TME cases[11], and the specific anatomical understanding is required when introducing transanal TME. In the current case, the anterior margin was carefully confirmed at the dorsal side of the prostate away from the urethra during the intraperitoneal procedure and avoided damaging the urethra in the perineal procedure. Furthermore, Larsen et al. reported multifocal local recurrence cases after transanal TME. The cause is considered to be an incomplete purse-string suture of the rectum on the distal side of the tumor[12]. However, Roodbeen SX et al. has reported that a multifocal pattern of local recurrence was observed in none on the patients in multicentric large cohort study[13], and this matter is controversial. In the current case, the risk of the tumor exposure was the same as the ordinary laparoscopic procedure because the tumor was located behind the retroperitoneum.

Transperineal endoscopic pelvic tumor resection with sacrectomy following laparoscopic dissection for locally recur-

rent rectal cancer could be a safe procedure, could achieve an appropriate cutting line, and may be oncologically feasible. Transperineal endoscopic surgery may be a good option for pelvic tumor resection with sacrectomy for locally recurrent rectal cancer.

Conflicts of Interest

There are no conflicts of interest.

Author Contributions

H.M. and S.H. conceived of the presented idea. T.Y., S.H., H.M., and K.I. performed the operation. H.M. wrote the manuscript with support from N.I.. All authors discussed the text content and contributed to the final manuscript. A.T. gave the final approval for the version to be published.

Approval by Institutional Review Board (IRB)

There is no approval code because of case report without medical intervention summarizing no more than nine cases.

Consent

We obtained the consent of the patient for the publication of this case report.

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