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CASE REPORT

Successful treatment of recurrent rectal implantation metastasis of ovarian cancer by natural orifice specimen extraction surgery: a case report

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Abstract: We first describe the application of natural orifice specimen extraction surgery in the treatment of a rectal implantation metastasis tumor from ovarian cancer. One patient diagnosed with recurrent rectal implantation metastasis 1 year after the removal of ovarian cancer successfully underwent transanal specimen extraction via laparoscopic rectectomy without an abdominal incision at the National Cancer Center/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College in March 2017. The operation time was 118 minutes, and the intraoperative blood loss was 5 mL. The specimen was extracted via the anus during the operation, and the resection margin was negative. The patient recovered well without complications. Anal function was normal, and the stoma and abdominal incision were well healed after 1 month of follow-up. This study supports the idea that the application of natural orifice specimen extraction surgery for rectal implantation metastasis from ovarian cancer is safe and feasible and can achieve satisfactory outcomes.

Keywords: minimally invasive surgery, colorectal neoplasms ,natural orifice specimen extraction surgery, laparoscopic surgery

Introduction

Ovarian cancer has four different types of spread: peritoneal implantation, lymphatic, direct, and hematogenous. The most common forms of dissemination are peritoneal implantation and lymphatic drainage.[1] The incidence of colorectal implantation metastases is as high as 30%–39% in advanced stage ovarian cancer.[2] Therefore, the resection of colorectal implantation metastases is an important component of tumor reductive surgery in the treatment of ovarian cancer. Natural orifice specimen extraction surgery (NOSES), considered a prequel of natural orifice transluminal endoscopic surgery (NOTES), eliminates morbidity and postoperative pain related to the extraction surgical site and has been applied in the treatment of selected patients with colorectal carcinoma.[3,4] Here, we present a case of recurrent rectal implantation metastasis 1 year after the removal of ovarian cancer where the patient successfully underwent transanal specimen extraction via laparoscopic rectectomy without an abdominal incision. The patient involved in this study gave her written informed consent authorizing the use and disclosure of the details and accompanying images published.

Case report

Medical history and examination

A 57-year-old woman was diagnosed with ovarian cancer and underwent laparoscopic extensive total hysterectomy, ovariectomy, pelvic lymphadenectomy, periaortic lymph node biopsy, omentectomy, and appendectomy in December 2015. Operative exploration

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showed mild ascites in the pelvic cavity. The right ovary had adhered to the right fallopian tube and presented as an 8×7×6 cm^3 irregular mass. Some cystic neoplasms covered the mass and adhered to the rectum closely. A 3×2×2 cm^3 cauliflower-like mass was found at the surface of the rectum after separation of the right ovary and fallopian tube. All the aforementioned masses were removed completely. Postoperative pathology showed right ovarian high-grade serous adenocarcinoma, and the tumor had invaded the serosal layer of the fallopian tube. No lymph node metastases were detected. The patient then received six cycles of chemotherapy with paclitaxel and cisplatin, with the last cycle completed on April 28, 2016. She had no follow-up issues until February 2017, when blood tests showed an increased CA12-5 tumor marker with a level of 44.81 U/mL. As a result, the patient underwent positron emission tomography/computed tomography (PET/CT). A 2.8×2.8 cm^2 nodule with increased glucose uptake was found at the right front site of the upper rectum, and this nodule clung to the right wall of the rectum; the maximum standard uptake value was 16.8. No other signs of recurrence or metastasis were detected. A 2.9×2.6 cm^2 hypoechoic solid tumor with abundant blood flow signal was observed behind the bladder via abdominal ultrasound (Figure 1). Preoperative pelvic magnetic resonance imaging showed that a 3.1×2.6 cm^2 nodule at the right front wall of the upper rectum with a blurred outer edge and a well-defined inner edge had invaded the rectum with a slightly high T2weighted image/fat suppression signal and a low diffusion-weighed imaging signal (Figure 2). The lesion also showed significantly circular enhancement. The patient had no previous history of an abnormality in this region. No discrete mass was observed on vagino-recto-abdominal examination.

Surgery and pathology

The patient underwent transanal specimen extraction via laparoscopic rectectomy without an abdominal incision on March 14, 2017.

Preoperative preparation

From 2 pm to 6 pm on the day prior to surgery, 70 mg of polyethylene glycol Macrogol per 1 L of water was given to the patient four times (1 L per hour).

Trocar placement

Under general anesthesia, the patient was placed in the Trendelenburg position. A 12-mm observation port was inserted under the umbilicus, and then three ports were placed after the establishment of pneumoperitoneum. One 12-mm diameter port was placed in the right lower abdomen, one 5-mm port was placed in the right paraumbilicus, and a 5-mm port was placed in the left lower abdomen (Figure 3).

Excision of tumor

Operative exploration showed mild ascites and no deposits in the pelvic cavity. No abnormality was detected in the liver,

Figure 1 Abdominal ultrasound showed a 2.9×2.6 cm^2 hypoechoic solid tumor with abundant blood flow signal.

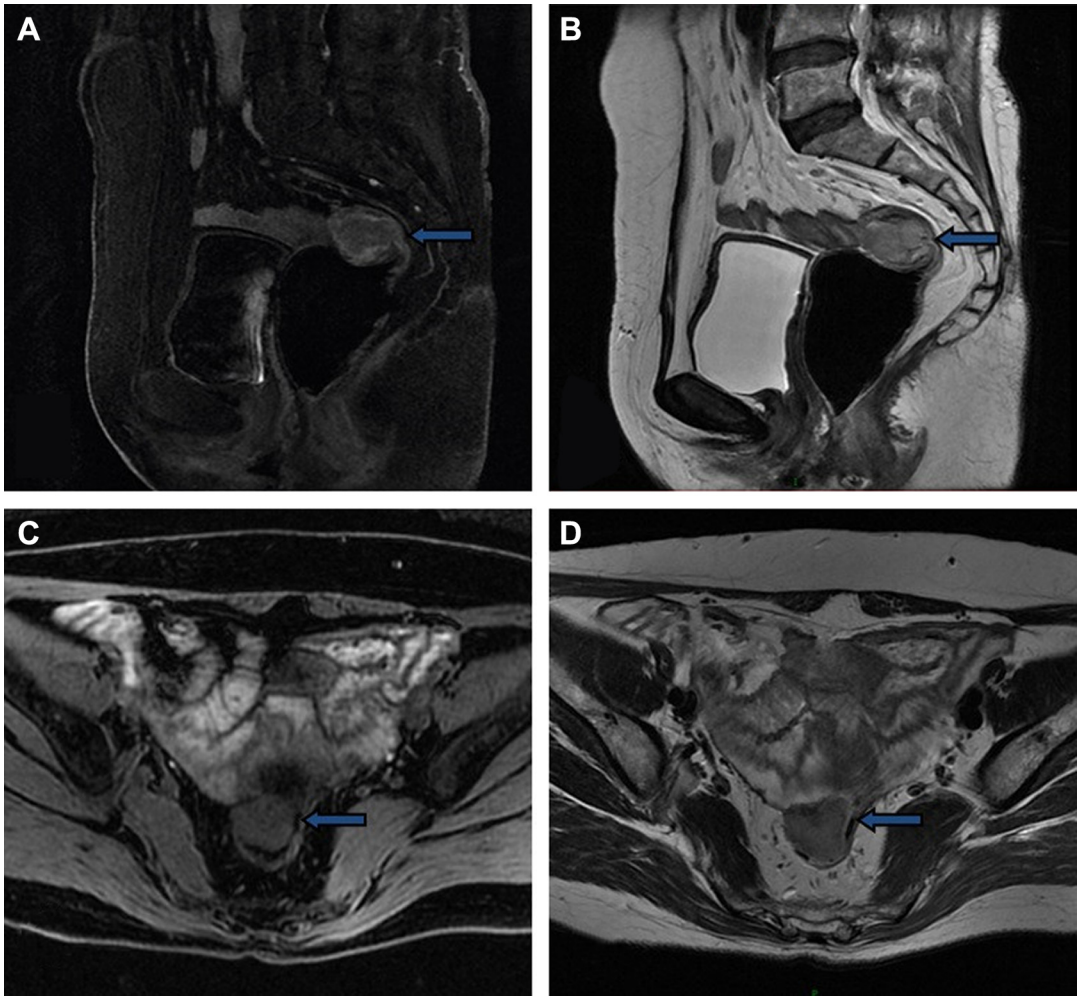

Figure 2 Pelvic magnetic resonance imaging showed that a 3.1×2.6 cm^2 nodule (blue arrows) had invaded the rectum.
Notes: (**A**) T1 weighted image with sagittal view; (**B**) T2 weighted image with sagittal view; (**C**) T1 weighted image with axial view; (**D**) T2 weighted image with axial view.

gallbladder, pancreas, or spleen. The mass (with a diameter of 4 cm) was located at the right front wall of the middle rectum and had invaded the gut cavity (Figure 4A). A cytological examination of the pelvic lavage fluid and a biopsy examination of the remaining omentum and pelvic lateral peritoneum were performed prior to total mesorectal excision. The sigmoid mesocolon and mesorectum were dissected along the inner side of the ureters by harmonic scalpel. The inferior mesenteric artery was ligated distal to the origin of the ascending branch of the left colic artery with Hem-o-lock, and the inferior mesenteric vein was ligated at the corresponding site. Intestines were dissected at 3 cm from the distal margin of the tumor and 3 cm from the proximal margin of the tumor via harmonic scalpel (Figure 4B and C).

Specimen extraction and digestive tract reconstruction

After copious rectal stump irrigation by iodophor diluent, the distal rectum was dissected circularly 2 cm from the distal margin of the tumor by a harmonic scalpel and the broken ends were sterilized by iodophor gauze (Figure 4D). A sterile protector was introduced into the peritoneal cavity via trocar and then extracted through the rectal stump before the specimen was extracted and obtained for further pathological evaluation. The transected bowel was pulled out in continuity via the anus using sponge forceps (Figure 4E). The distal circular stapling device anvil was fixed extracorporeally with a purse-string suture (Figure 4F). The colon was then repositioned into the abdomen through the rectal stump (Figure 4G). Next, the rectal stump was closed (Figure 4H), the proximal anvil of the circular stapling device in the rectum was opened, and a straight end-to-end circular anastomosis was performed (Figure 4I). Finally, one drainage tube was placed in the pelvic cavity surrounding the anastomosis site, and another transanal drainage tube was placed at the proximal site of the anastomosis in the rectal stump.

Surgical and pathological outcome

The patient successfully underwent transanal specimen extraction via laparoscopic rectectomy without an abdominal

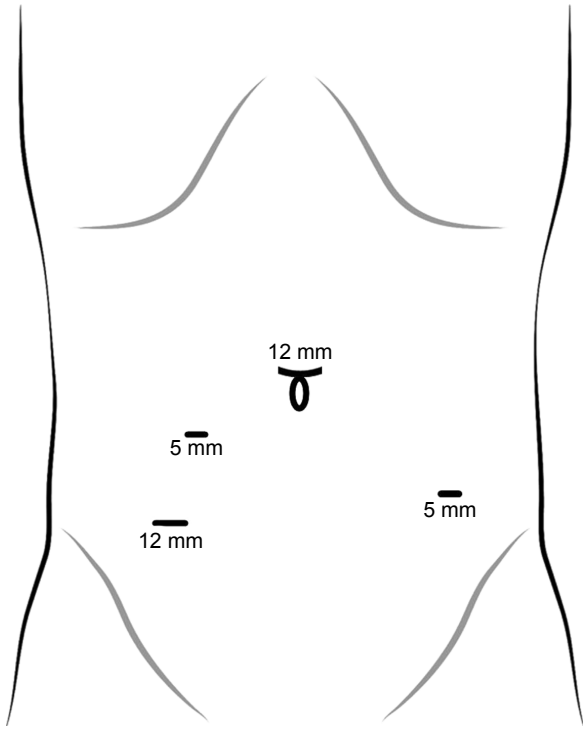

Figure 3 Trocar placement and the size of the trocars.

incision or conversion to laparotomy. The operation time was 118 minutes, and intraoperative blood loss was 5 mL. The time to ambulation was 1 day after surgery, and the time to first flatus was 50 hours after surgery. The patient recovered smoothly, and postoperative pain was minimal. The transanal drainage tube was removed 7 days after surgery, and the peritoneal drainage tube was removed 10 days after surgery. Postoperative pathology revealed poorly differentiated adenocarcinoma measuring 5×3.5×2.2 cm^3 invading from the rectal serosa into the submucosa (Figure 5A and B). The tumor cells were arranged in nests, and vessel invasion was present (Figure 6A). The tumor was classified as an implantation metastasis from ovarian serous carcinoma on the basis of medical history and immunochemistry. There was no invasion of the remaining omentum or pelvic lateral peritoneum. No tumor cells were detected in the pelvic lavage fluid, and the resection margins were free of tumor. Among the 14 lymph nodes removed, none contained metastatic cancer. The immunochemical staining (Figure 6B–D) was AE1/AE3(3+), CA125(3+), CK7(3+), P16(3+), WT1(3+), PAX2(3+), PAX8(1+), CK5&6(−), CR(−), MC(−), P63(−), CDX2(−), and CK20(−).

Follow-up

During hospitalization, the surgeon assessed the patient's recovery state during daily rounds. Follow-up after discharge was performed by telephone and outpatient visits. The last date of follow-up was April 20, 2017. The level of CA12-5 decreased to 13.69 U/mL half a month after surgery. No postoperative complications such as intraperitoneal

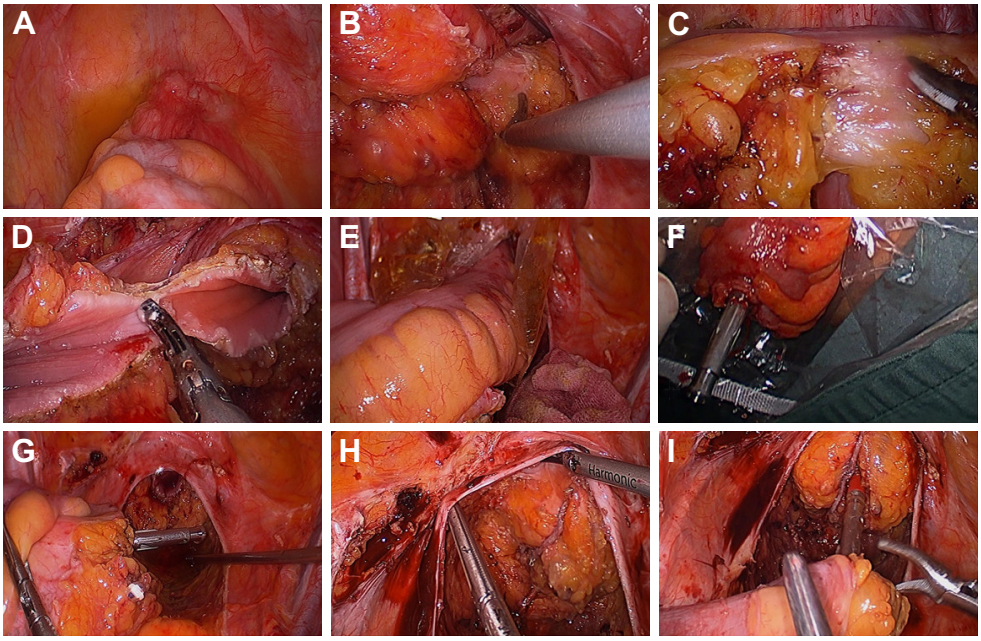

Figure 4 Transanal specimen extraction via laparoscopic rectectomy without an abdominal incision.
Notes: (**A**) The tumor was located at the right front wall of the middle rectum; (**B**) naked intestines at 3 cm from the distal margin of the tumor; (**C**) naked intestines at 3 cm from the proximal margin of the tumor; (**D**) the distal rectum was dissected circularly; (**E**) the transected bowel was pulled out via the anus; (**F**) the distal circular stapling device anvil was fixed extracorporeally; (**G**) the colon was then repositioned into the abdomen; (**H**) the rectal stump was closed; (**I**) an end-to-end circular anastomosis was performed.

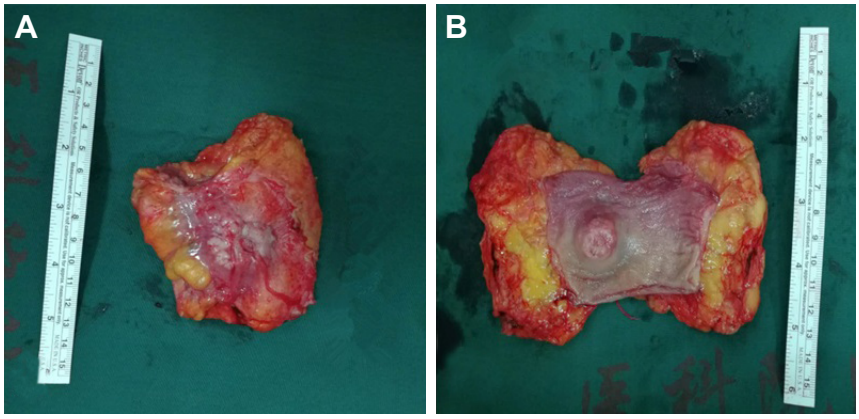

Figure 5 Macroscopic observation of rectal neoplasm.
Notes: (**A**) Rectal serous membrane. (**B**) Rectal mucosal membrane.

bleeding, digestive tract bleeding, abdominal infection, pulmonary infection, organ dysfunction, bowel obstruction, anastomotic leakage, and anastomotic stenosis occurred, and digestive function was well recovered 1 month after surgery. In addition, defecation was under satisfactory control, with well-healed anastomotic stoma and trocar ports postoperatively.

Discussion

One of the main means of spread of ovarian cancer is peritoneal implantation metastasis. The standard treatment of this disease is maximal removal of resectable primary and metastatic lesions even when complete gross resection is not feasible,[5] because satisfactory surgical cytoreduction is considered to be a significant predictor for prognosis in patients

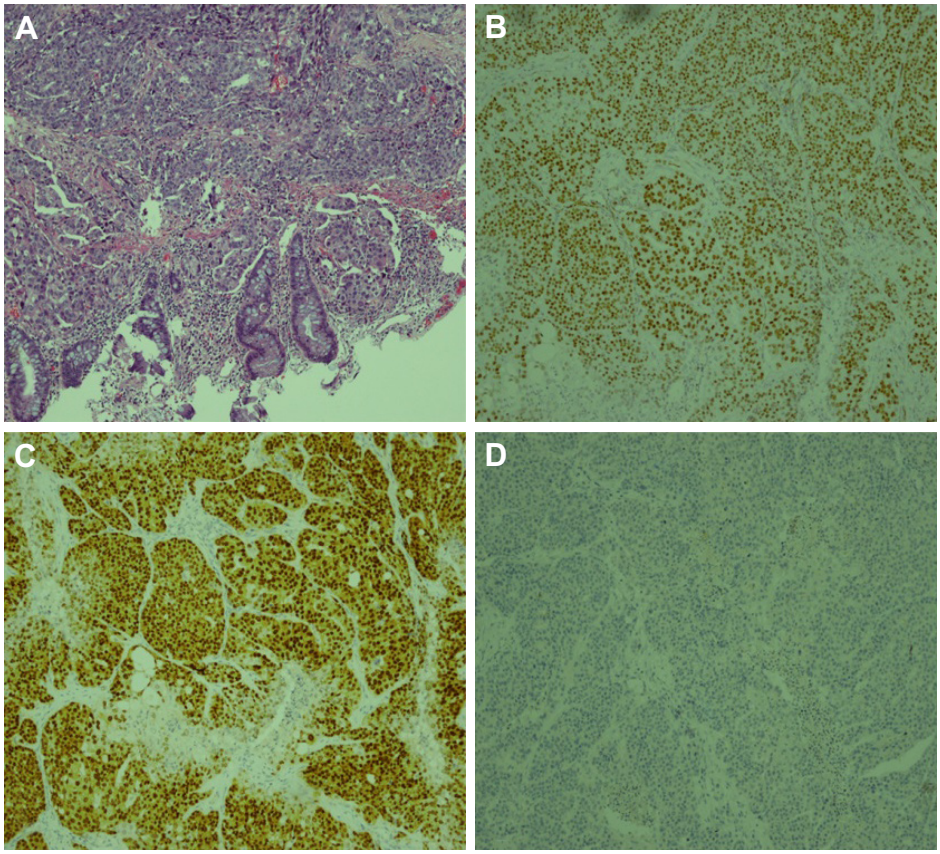

Figure 6 Microscopic observation and immunochemistry of rectal neoplasm.
Notes: (**A**) Microphotography shows poorly differentiated cells of adenocarcinoma arranged in nests, with vessel invasion (Hematoxylin-Eosin G×100); (**B**) the immunochemistry showed that cells were WT1(3+); (**C**) the immunochemistry showed that cells were PAX2(3+); (**D**) the immunochemistry showed that cells were CDX2(–).

with the disease.[6] In this case, a solitary nodule invading the rectum with increased glucose uptake was detected by PET/CT, suspicious for implantation metastasis from ovarian cancer. As a result, surgical resection was the most optimal treatment option.

NOSES combines the scarless idea of NOTES with the operating advantage of laparoscopic surgery, creating a bridge between routine laparoscopic colorectal surgery and NOTES.[7] In addition to better cosmetic results,[3] the absence of an abdominal incision leads to less postoperative pain, early return of gastrointestinal function, and early ambulation. Moreover, NOSES precludes surgical site infection and incisional hernia.[8–10]

Although many studies have reported primary colorectal carcinoma treated by NOSES,[3,4,7–12] the application of NOSES in the treatment of rectal implantation metastasis of ovarian cancer has not been described. We successfully performed transanal specimen extraction via laparoscopic rectectomy without an abdominal incision in this patient with recurrent rectal implantation from ovarian cancer. In addition, the specimen was extracted from the rectal stump completely with negative resection margins. No intraoperative and postoperative complications occurred in this patient, and the postoperative pain was minimal. Therefore, NOSES is a safe and feasible option in the treatment of rectal implantation metastasis from ovarian cancer. However, the use of NOSES is highly dependent on the patient's clinical condition and is suitable only for small, solitary resectable metastatic tumors. In addition, experienced laparoscopic operational skills, tacit surgical cooperation, adequate preoperative bowel preparation, and aseptic and nontumor intraoperative techniques are strictly required. We have previously reported on our experience with NOSES in the treatment of primary colorectal cancer.[13] We also minimized the risk of contamination by using adequate bowel preparation with polyethylene glycol Macrogol and by performing a distal rectal washout before removing the surgical specimen via the rectum.

Conclusion

Our study supports the idea that NOSES for rectal implantation metastasis from ovarian cancer is safe and feasible and obtains a satisfactory cosmetic result with less invasiveness in well-selected patients. With the growing popularity of laparoscopic surgery, we believe that NOSES will be increasingly applied in colorectal disease, benefiting more patients.

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Author contributions

HS collected the data and drafted the manuscript; HZ designed the study and helped revise the manuscript; BL collected the surgical specimens; WR participated in the discussions of the postoperative pathology; MB, ZZ, XW, and QL conceived the study and participated in its coordination; PW participated in the data interpretation. All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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