Cas Report

Totally Laparoscopic Total Gastrectomy with Transvaginal Specimen Extraction in Gastric Cancer: A Report of 4 Cases

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Abstract

Although natural-orifice specimen extraction is increasingly performed, no report of total gastrectomy with transvaginal specimen extraction has yet been published. This is the first report to apply this procedure to treat gastric cancer. We applied this procedure to four postmenopausal female patients who previously underwent vaginal delivery. They underwent laparoscopic total gastrectomy and D1+ lymph node dissection for gastric cancer. After posterior colpotomy was performed, an Alexis bundle wound protector with a cap was placed to expand and protect the vaginal incision. The resected specimens were retrieved via the vaginal route. Reconstruction was performed using the intracorporeal Roux-en-Y method. Totally laparoscopic total gastrectomy with transvaginal specimen extraction was successfully accomplished in all patients. No patient developed complications associated with this procedure. We achieved good cosmetic outcomes and patients experienced little pain. Totally laparoscopic total gastrectomy with transvaginal specimen extraction may be safe and feasible in a selected group of patients with gastric cancer.

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Introduction

Laparoscopic gastrectomy is widely performed for the surgical management of gastric cancer. Several reports have shown that laparoscopic gastrectomy improves postoperative recovery and, seemingly, does not jeopardize survival compared with open surgery for early gastric cancer.¹⁻⁵ Recently, anastomosis in laparoscopic gastrectomy has shifted from extracorporeal to intracorporeal; no mini-laparotomy is required to anastomose the bowel.⁶,⁷ Therefore, during laparoscopic gastrectomy with intracorporeal anastomosis, the largest extent of abdominal wall destruction is caused by specimen extraction.

Natural-orifice specimen extraction (NOSE), which does not require mini-laparotomy, has been developed to decrease the incidence of surgical wound complications.⁶,⁷ Transvaginal NOSE is performed extensively because this procedure has already been established in gynecology.⁸⁻¹⁰ However, to date, total gastrectomy with transvaginal specimen extraction (TVSE) has not been reported. Herein, we report our use of this procedure in four patients with gastric cancer.

Materials and Methods

Patients

The indications for totally laparoscopic total gastrectomy (TLTG) with TVSE were as follows: (i) postmenopausal female patients who previously underwent vaginal delivery; (ii) tumor size <40 mm; (iii) no
serosal exposure; (v) cN0 or cN1 status; (vi) no obesity (body mass index <25 kg/m²); and (vi) no evidence of vaginal narrowing or adhesion on gynecological evaluation. This procedure was applied to four patients between July 2013 and December 2014 (Table 1).

**Technique**

The patient was placed in the lithotomy position under general anesthesia, and an umbilical camera port, two 10-mm ports, and two 5-mm ports were placed (Fig. 1). Laparoscopic total gastrectomy and D1+ lymph node dissection were performed as suggested by the Japanese classification of gastric cancer, as many reports have described previously. The esophagus and duodenum were transected using a linear stapler. After the patient was placed in the Trendelenburg position, a posterior colpotomy was performed using an ultrasonic scalpel under transvaginal guidance. An Alexis bundle wound protector with a cap (Alexis Laparoscopic System with Kii Fios First Entry; Applied Medical, Rancho Santa Margarita, CA, USA) was carefully inserted into the abdominal cavity, transvaginally through the posterior colpotomy (Fig. 2A). The white ring of the system was covered with the cap to maintain the pneumoperitoneum (Fig. 2B). A grasping forceps was inserted into the abdominal cavity through the cap, the specimen entering the pelvic cavity was grasped (Fig. 2C) and gently removed via the vaginal route (Fig. 2D). After we confirmed that the pathological surgical margin of the specimen was secure, the pneumoperitoneum was re-created and the patient placed in a position allowing reconstruction.

Reconstruction was performed using the intracorporeal Roux-en-Y method described by Ebihara et al. After anastomosis was accomplished, the abdominal and pelvic cavities were irrigated with 2 L of saline. In the Trendelenburg position, the Alexis bundle wound protector was removed transvaginally. The incision of the posterior colpotomy was closed with a 3-0 polyglyconate barbed suture (V-Loc™ 90 Absorbable Wound Closure Device; Covidien, Mansfield, MA, USA) either transvaginally or intraperitoneally. Two drainage tubes were usually inserted through the left- and right-side port incisions at the anastomotic region of the esophagojejunostomy.

**Results**

For four patients (mean age, 65.5 years; mean body mass index, 21.1 kg/m²), TLG with TVSE was completed successfully (Table 1). The mean operating time was 417 min (range: 358–470 min). The median blood loss was 165 mL (range: 10–300 mL). The mean number of retrieved lymph nodes was 26 (range: 10–40).

No intraoperative complication, including vaginal site complications, occurred in any patient. All patients were able to walk on postoperative day 1. They experienced little abdominal pain; particularly, they did not complain of vaginal pain. Unfortunately, one patient had a pancreatic fistula. After drainage, the fistula healed.

The patients underwent follow-up for 8–24 months. There is no evidence of metastasis to date.
Discussion

Laparoscopic surgical approaches have shifted from multiport surgery with extracorporeal anastomosis to reduced- or single-port surgery with intracorporeal anastomosis. Moreover, NOSE is now increasingly used to reduce the morbidity associated with abdominal wall destruction. Compared with transabdominal specimen extraction, NOSE reduces postoperative pain, improves patient recovery, and affords positive long-term outcomes in terms of both cosmesis and incisional hernia rates.\textsuperscript{6,7,15–17} Transvaginal NOSE using a posterior colpotomy can be performed very safely via NOSE, although this approach is obviously only applicable in female patients. This approach is extensively used during gynecological laparoscopic procedures.\textsuperscript{8–10} Although the peritoneal cavity is entered by deliberately opening the vagina, a posterior colpotomy is safe and does not lead to surgical site infections, dyspareunia, or vaginal sensations; nor does it affect pregnancy rates.\textsuperscript{19–23} Furthermore, to ensure safety, we use TVSE to treat postmenopausal females only.

This is the first report to apply laparoscopic total gastrectomy with TVSE. In colorectal cancer, many studies have reported the use of laparoscopic colectomy with TVSE.\textsuperscript{9,24} However, in gastric cancer studies, only one report of subtotal gastrectomy with TVSE has been described by Jeong et al.\textsuperscript{25} Although many surgeons might consider that a total gastrectomy specimen is rather large, TVSE was performed without difficulties because the stomach is easily deformable, and gastric accessory fat containing lymph nodes is not a high-volume mass upon D1+ lymph node dissection. In addition, the vagina is elastic, and TVSE has the possible advantage of allowing extraction of large specimens; both right- and left-sided colonic resections with TVSE have been reported.\textsuperscript{8,26}

Oncological safety must be assured during TVSE to treat gastric cancer. We chose patients with no serosal exposure, and of cN0 or cN1 status, because of the potential risk of metastasis after performing this procedure. McKenzie et al. reported that the risk of pelvic tumor seeding during the procedure is no higher than that associated with transabdominal extraction if appropriate oncological principles were followed.\textsuperscript{7} Some surgeons have recommended the use of a protective barrier or a specimen bag to reduce the incidence of metastasis.\textsuperscript{6,7} We use an Alexis bundle wound protector, which has been employed in laparoscopic colectomy with TVSE,\textsuperscript{24} to protect the vagina, as is performed during transabdominal extraction.

In conclusion, we believe that TLTG with TVSE is safe and feasible in a limited number of patients. Many studies of TVSE had small patient samples. Further studies using larger sample sizes are necessary.

Fig. 2 Transvaginal approach and specimen extraction.
(A) An Alexis bundle wound protector with a cap was carefully inserted into the abdominal cavity, transvaginally through the posterior colpotomy.
(B) The white ring of the Alexis bundle wound protector was covered with a cap to maintain the pneumoperitoneum.
(C) A grasping forceps was inserted into the abdominal cavity through the cap, and the specimen was grasped with the cap (white arrow). (D) The specimen was gently removed together with the cap.
to define the tumor size and extent of obesity in patients for whom TVSE is appropriate. Furthermore, TVSE should be confirmed as an oncologically acceptable procedure in future.

**Disclosure statement**

There was no conflict of interest that has affected the results of this study. The institutional ethics committee approved this study.

**References**