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# Total laparoscopic subtotal gastrectomy with transvaginal specimen extraction is feasible in advanced gastric cancer



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## ABSTRACT

**PURPOSE:** Natural orifice specimen extraction (NOSE) is an ever-evolving advanced laparoscopic technique. NOSE minimizes surgical injury, involving a low risk of wound complications, fewer incisional hernias, faster recovery and less postoperative pain. Laparoscopic gastrectomy combined with NOSE is a procedure that can potentiate the advantages of both minimal invasive techniques. We aim to demonstrate the feasibility of laparoscopic subtotal gastrectomy with transvaginal specimen extraction in advanced gastric cancer.

**CASE:** A 72-year-old woman with a 2 cm adenocarcinoma in gastric antrum was treated by laparoscopic subtotal gastrectomy and lymph node dissection. A totally laparoscopic Roux-en-Y gastrojejunostomy was constructed. Specimen was extracted through the posterior fornix of vagina without difficulty. Histopathology confirmed pT3pN0 tumor. After a 10-month follow-up the patient was asymptomatic and getting adjuvant chemoradiotherapy.

**CONCLUSIONS:** Transvaginal specimen extraction after laparoscopic gastric resection for advanced gastric cancer is a feasible procedure. It is offered to selected patients and of course only to female patients. Natural orifice surgery may provide faster recovery and decrease the wound related complications which may cause a delay on postoperative adjuvant chemo-radio therapies. We have presented, as far as we know, the first human case of a transvaginal extraction of an advanced gastric cancer after laparoscopic gastrectomy.

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## 1. Introduction

Laparoscopic gastrectomy for gastric cancer has been accepted mainly in the Far East. Previous studies reported its satisfactory oncological results in patients with early gastric cancer [1]. Recently, the feasibility of laparoscopic gastrectomy in advanced gastric cancer has been reported as well [2]. Laparoscopic gastrectomy combined with natural orifice specimen extraction (NOSE) may potentiate the advantages of two minimal invasive techniques. NOSE is an ever-evolving advanced laparoscopic technique that minimizes surgical injury, involving a low risk of wound complications, fewer incisional hernias, faster recovery and less postoperative pain [3–5]. We aim to demonstrate the feasibility of laparoscopic subtotal gastrectomy with transvaginal specimen extraction in advanced gastric cancer.

## 2. Case and technique

A 72-year-old woman was referred to our department after gastroscopy and biopsy, which showed a 2 cm in diameter ulcer-



Fig. 1. Computed tomography of the tumor at the antrum.

ous mass in the gastric antrum (adenocarcinoma). She had no previous history of surgery. Body mass index was 29 kg/m<sup>2</sup> and ASA (American Society of Anesthesiology) score was II (because of hypertension). Tumor markers (CEA, CA 19–9) and routine laboratory tests were within the normal ranges. Contrast enhanced computed tomography showed no distant metastasis, no significantly enlarged perigastric lymph nodes but only a thickening on the distal gastric wall (Fig. 1). Detailed information about the sur-

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gical procedure to the patient was given and informed consent was taken.

Under general anesthesia, the abdomen, pelvis, and vaginal canal were disinfected with povidone iodine. In the reverse Trendelenburg position with the legs apart, five trocars were inserted. Inspection of abdominal viscera demonstrated no metastasis and there was a tumoral protrusion at the antral serosa. After placement of a Nathanson liver retractor for left liver elevation, the gastrectomy was started with the mobilization of the greater curvature along the transverse colon by harmonic scalpel (Ethicon Endo-Surgery Inc., Cincinnati, OH, USA). Left gastric vessels were identified after opening the bursa omentalis. The greater curvature was mobilized till to splenic hilum for complete omentectomy. The infra-pyloric lymph nodes were dissected toward the duodenum and the distal gastric vessels (right gastroepiploic and right gastric) were transected by Ligasure (ForceTriad, Covidien, Boulder, CO, USA). After cutting the duodenum by endoscopic 60 mm stapler (EndoGIA, Covidien, Mansfield, MA, USA), the roots of left gastric vessels were exposed and left gastric vein was divided with Ligasure. Intact left gastric artery was used to expose the other branches of the celiac truncus. The lymph node dissection was continued along the hepatic and splenic arteries. The left gastric artery was divided near to its root after double clips and Ligasure sealing. The dissection was moved to esophagocardiac junction at lesser curvature and these lymph nodes were included to the resection specimen. The stomach was divided with 60 mm endoscopic staplers in a tranverse plane 5 cm below to esophagogastric junction. A retrocolic Roux-en-Y reconstruction (20–60 cm) was performed by laparoscopic 60 mm linear stapler and common hole of the stapling legs were closed with 3/0 polypropylene suture intracorporeally. Side-to-side jejunostomy was fashioned by endoscopic stapler again and the common hole was closed intracorporeally as well.

Gastrojejunostomy was controlled with methylene blue test. The specimen was placed in a retrieval bag. Transvaginal specimen extraction technique was performed as described before [6]. Briefly, a 3 cm length transverse transvaginal posterior colpotomy was performed under laparoscopic control and the colpotomy incision was enlarged bluntly with fingers. The specimen was grasped with an ovary clamp through the vaginal incision and it was pulled into the vagina. The specimen was delivered through the vagina in a snakelike fashion (Figs. 2 and 3). The colpotomy was then closed with a running absorbable suture. An abdominal drain was used.

The operating time was 360 min. The blood loss was 100 mL. The patient was allowed to drink fluids and a soft oral diet on the first postoperative day. An ileus occurred on day two but resolved by conservative treatment on day four. The drain was removed on

the 4th postoperative day. The patient was discharged on postoperative day seven. The histological analysis showed tumor free margins, 56 pieces of tumor negative lymph nodes which indicate a pT3pN0 lesion and the patient was referred to medical oncology department. The patient got chemotherapy for four times and radiotherapy as well. After ten months follow-up, the patient had no vaginal discharge or pain, tolerated normal diet, and had normal bowel movements.

### 3. Discussion

Particularly for advanced gastric cancer patients, rapid postoperative convalescence is crucial. Patients with advanced cancers usually require postoperative adjuvant chemo-radiotherapy and the prolonged postoperative period due to morbidities can cause a delay on the postoperative adjuvant therapies. When compared to open surgery, laparoscopic surgery has a clear advantage with less postoperative morbidities and particularly on wound related complications [7,8]. Laparoscopic-assisted, hand-assisted and total laparoscopic gastrectomies have all been described in the surgical management of gastric cancer [9,10]. Despite the good results obtained by these procedures, an abdominal wall incision (a mini-laparotomy) is always required to retrieve the specimen. Natural orifice surgery allows laparoscopic resections only through 5–12 mm trocar orifices on the abdominal wall without any abdominal incisions or extensions.

Here, we have presented a totally laparoscopic subtotal gastrectomy with lymph node dissection and transvaginal specimen extraction for an advanced gastric cancer. There are four potential natural orifice extraction routes for an abdominal specimen; transanal, transurethral, transoral and transvaginal [11]. Transanal extraction of a specimen except colorectal origin has not been reported yet because of the risk of infection and intestinal leak [12,13]. Transurethral route is not feasible for extraction of a gastrectomy material. Transoral way can be suitable for some gastrectomy specimens [14]. We have experienced in our clinic that a sleeve gastrectomy material could be removed without any difficulty through the esophagus by the help of an endoscope. Possibly, an early gastric cancer can be removed by the same way. However, the transoral route is limited to small specimens because of risk of esophageal damage. In our country most of the patients with gastric cancers are stage III or more when they are diagnosed. So,

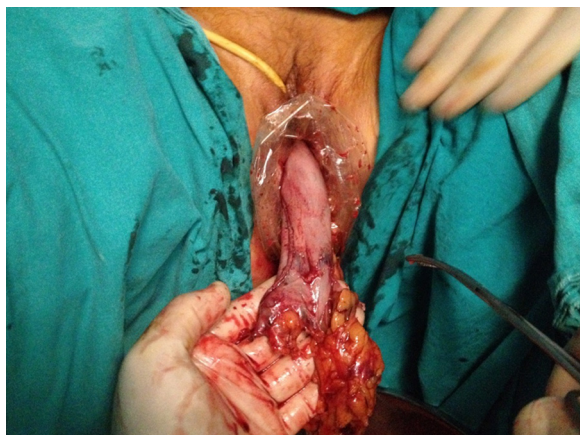


Fig. 2. Transvaginal extraction of the gastrectomy specimen.

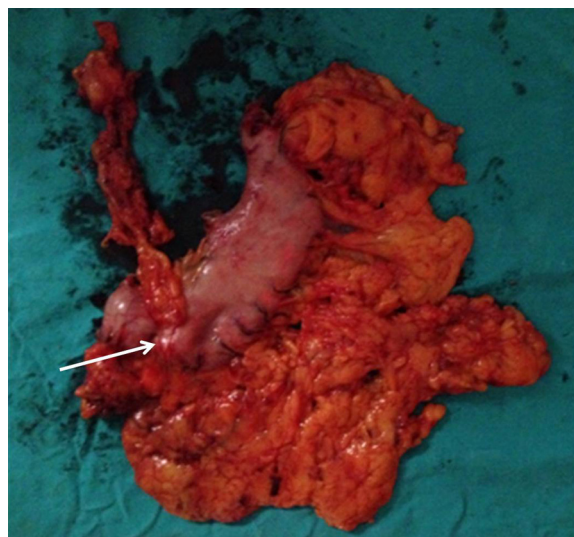


Fig. 3. Subtotal gastrectomy, total omentectomy and lymph node dissection specimen of the transvaginally extracted advanced gastric cancer.

most of our patients with gastric cancer cannot be a candidate for transoral specimen extraction [15,16]. Previously, an Italian study [17] described a transoral specimen extraction in a patient with a large gastric stromal tumor by using the morcellation, however it is unsuitable for a gastric cancer specimen. Consequently, transvaginal route seems to be more suitable for specimen extraction in advanced gastric cancer. Although transvaginal extraction following partial gastrectomy has been reported in patients with gastric submucosal tumors and early gastric cancers [18], this is the first case in an advanced gastric cancer.

The technical difficulties in this type of laparoscopic surgery are the establishment of intracorporeal anastomosis, dissection of adequate lymph nodes and incompatibility between the size of specimen and posterior fornix of vagina. Some of these difficulties can be overcome by increasing the laparoscopic experience. Patient selection is important and limitations of the procedure can be adverted as male gender, unacceptance of patient, unsuitable vaginal access and large masses. The maximum size of a specimen that can pass through the vagina is not well studied. Recently, we systematically reviewed the transvaginal extraction of right hemicolectomy materials in the literature and observed that up to 8 cm tumors could be removed through the posterior fornix of the vagina [19]. In our own experience, a 12 cm diameter right hemicolectomy specimen was removed through the vagina after an intracorporeal size reduction to 9 cm [20].

To make a more clear comment about the oncological outcomes of this new technique for advanced gastric cancer, the necessity of a longer follow-up is inevitable. However, it is expected that the transvaginal route may not carry any additional risks for the oncological results over conventional laparoscopic gastric cancer surgery, in which the specimen is removed trans-abdominally. When the same preventive procedures for the oncological principles are carried out during the specimen extraction, the oncological outcomes of the transvaginal and transabdominal extraction methods can be expected to be identical [19].

#### 4. Conclusion

Transvaginal specimen extraction after laparoscopic gastric resection can be a feasible procedure in some patients with advanced gastric carcinoma. We have presented, as far as we know, the first human case of a transvaginal extraction of an advanced gastric cancer after laparoscopic gastrectomy.

#### Conflict of interest

Cuneyt Kayaalp and other co-authors have no conflict of interest.

#### Funding

No.

#### Ethical approval

This study is registered at Inonu University Human Ethical Committee as a research. The registration identification number is 2014/33.

#### Consent

We got an informed consent from the patient and her relatives as well.

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#### Authors contribution

Fatih Sumer, Cuneyt Kayaalp and Ismail Ertugrul planned and performed the surgical procedure. Mehmet Ali Yagci and Servet Karagul helped the preparation of the manuscript.

#### Guarantor

Cuneyt Kayaalp.

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