

Neoadjuvant chemoradiotherapy followed by laparoscopic distal gastrectomy with D2 lymph node dissection for a locally advanced distal gastric cancer

Ziyu Li

Beijing Cancer Hospital

Zining Liu (✉ zining-liu96@hotmail.com)

Beijing Cancer Hospital <https://orcid.org/0000-0002-4355-6899>

Yinkui Wang

Beijing Cancer Hospital

Fei Shan

Beijing Cancer Hospital

Shuangxi Li

Beijing Cancer Hospital

Jiafu Ji

Beijing Cancer Hospital

Case report

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Abstract

Laparoscopic technique has been widely applied for early gastric cancer, with the advantages of minimal invasion and quick recovery. However, there is no report about the safety and short-term outcome of laparoscopic gastrectomy with D2 lymph node dissection for patients after neoadjuvant chemoradiotherapy. We presented the first case treated in this way. The patient was a 60-year-old man who was diagnosed with advanced distal gastric cancer. The neoadjuvant chemoradiotherapy was performed based on the regimen of GTV 50Gy/25f and CTV 45Gy/25f, as well as concurrent S-1 60mg Bid. Radiological examination determined that a partial response (PR) had been achieved by the initial therapy. Adverse events included only a myelosuppression limited to grade 2. Then laparoscopic distal gastrectomy with D2 lymph node dissection was undertaken successfully for him. The patient recovered smoothly with no postoperative complications. The postoperative pathological stage was ypT3N0M0, with necrosis rate >90%. He was still in good condition after five years follow-up.

Introduction

Since the first case of laparoscopic distal gastrectomy (LDG) was reported by Kitano in 1994 [1], laparoscopic technique has been widely applied for early gastric cancer, with the advantages of minimal invasion and quick recovery[2–4]. By now laparoscopic gastric surgery has become a preferred option for early gastric cancer. The promising outcome has promoted the application of laparoscopy in advanced gastric cancer. Although it has not reached an agreement on whether laparoscopic gastrectomy was suitable for locally advanced gastric cancer, the safety and feasibility of laparoscopic gastrectomy has been explored by a few clinical trials[5–9]. And inspiring results have been achieved by them, proving that laparoscopic gastrectomy for locally advanced gastric cancer is not inferior to that of open surgery.

Although surgery is the only curative option for gastric cancer, the mortality of patients after radical surgery remains high because of a significant number of local regional or systemic recurrences[10]. Chemoradiotherapy have been recommended as a supplement to radical surgery by the National Comprehensive Cancer Network[11]. Sometimes post-operative adjuvant chemoradiotherapy administration was restricted in patients due to surgical complications. However, the application of chemoradiotherapy before surgery can avoid the shortcoming. Meanwhile, neoadjuvant chemoradiotherapy has the advantages in avoiding unnecessary surgery by shrinking tumor size and facilitating high rate of R0 resection, with acceptable rates of acute and late toxicity[12–14].

To our knowledge, this is the first report about the safety and short-term oncological outcome of neoadjuvant chemoradiotherapy followed by laparoscopic D2 gastrectomy, to date.

Case Report

1. Pretreatment diagnosis

A 60-year-old man was presented with abdominal distension and weight loss of over 10 kg for about 6 months' duration. He was an otherwise healthy man with no remarkable medical history. On admission, the physical examination showed no signs of abdominal abnormalities. His tumor markers were normal except carcinoembryonic antigen (CEA). The serum CEA level was 3.44 ng/ ml, slightly higher than normal. His other laboratory values were within the normal limits.

The endoscopy was undertaken on May 23rd of 2013, revealing an ulcerative lesion adjacent to the gastric antrum, with dike-like bulge around the edge. Pylorus was invaded by the lesion and became incomplete obstruction. (Fig. 1) The pathology of endoscopic biopsy confirmed poorly differentiated adenocarcinoma, with the Lauren type of intestine- type. Enhanced abdominal computed tomography (CT) (2013-5-29) indicated that the wall of the antrum was thickened with significant enhancement. The maximum thickness was 21 mm (Fig. 2). The surface of serosa was fuzzy, but the border near the pancreas was still clear. Multiple enlarged lymph nodes were found in the greater and lesser gastric curvature, the diameter of the largest one was 7 mm. No distant metastasis was detected by pelvis or chest CT. The patient was diagnosed as gastric antrum carcinoma, Borrmann type III, with lymph nodes metastases.

2. Neoadjuvant chemoradiotherapy and evaluation

Based on the previous imaging detection, clinical stage was confirmed as cT4aNxM0 III. According to the NCCN guideline for gastric cancer, neoadjuvant chemoradiotherapy followed by D2 gastrectomy was recommended by multidisciplinary team (MDT). The neoadjuvant chemoradiotherapy was given to a total dose of GTV 50 Gy, CTV 45 Gy, in 25 fractions, 5 times a week, with concurrent S-1 60 mg Bid, from 2013/6/17 to 2013/7/16. The neoadjuvant chemoradiotherapy was well tolerated with no severe adverse events. The adverse events were as follows: bone marrow suppression II°, digestive tract reaction I°, fatigue I°. For incomplete obstruction, enteral nutrition was recommended for him. So the nutrition status of the patient was improved gradually during the neoadjuvant chemoradiotherapy.

Enhanced abdominal CT was performed to evaluate the response of neoadjuvant chemoradiotherapy at the time rightly (2013/7/12) and six weeks (2013/9/2) after neoadjuvant chemoradiotherapy, respectively (Fig. 3). Based on the imaging evaluation after preoperative chemoradiotherapy, a promising partial response (PR) was considered by MDT. Endoscopic ultrasound (EUS) was also applied to evaluate the response of neoadjuvant chemoradiotherapy, (2013/9/9) (Fig. 4) indicating the ulcerative lesion adjacent to the gastric antrum with pyloric stenosis. The lesion was reflected as hypoechoic signal under EUS, invading the whole layer, partly to the serosa. The maximum thickness was 1.09 cm. A hypoechoic nodule beside the antrum, measuring about 2.05*1.3 cm in size, was also detected. So it was restaged as uT4aN1M0 after neoadjuvant chemoradiotherapy.

3. Surgery and postoperative recovery

Open distal gastrectomy with D2 lymph node dissection was planned for the patient. However, the patient was so eager to receive minimally invasive surgery that he refused the open surgery. In our experience that neoadjuvant chemotherapy did not increase the complications of radical gastrectomy[15].

Considering that our center was experienced in laparoscopic D2 gastrectomy for locally advanced gastric cancer, we decided to undertake the laparoscopic D2 gastrectomy for the patient. The patient received laparoscopy-assisted distal gastrectomy with D2 lymph node dissection and Billroth II anastomosis successfully on 2013/10/10. The whole procedure of surgery was recorded by video. The operation lasted for 240 minutes. The blood loss was 100 ml. The first flatus time was three days after the operation. Upper gastrointestinal radiography was performed seven days after the operation, indicating that gastric peristalsis was well with no anastomosis leakage. Then the patient was allowed to intake liquid diet. Postoperative hospital-stay was 12 days with no postoperative complications.

4. Postoperative histology

Postoperative pathological evaluation was completed seven days after surgery. Small groups of cancer cells were reported to be detected outside of the muscularis propria, accompanied by the formation of extracellular mucus pools, and surrounded by fibrosis and chronic inflammatory cells (Fig. 5). All of the above were in accord with the response to chemoradiotherapy, and the necrosis rate was > 90%. No vascular embolus or perineuronal invasion was detected. No metastases were found in lymph nodes (0/31. Fibrosis was detected in some lymph nodes, considered as change post neoadjuvant chemoradiotherapy). No cancer cell was detected in the gastric stump or the duodenal stump. Therefore, the pathological stage was ypT3N0M0.

5. Postoperative follow-up

One month after the operation, the patient was back to the clinic for follow-up. The enhanced abdominal CT and all the laboratory values showed that the patient was generally in good condition. The postoperative adjuvant chemotherapy was conducted for him. Five years after the surgery, the patient was still in good condition, with no recurrence or metastasis.

Discussion

The number of lymph node dissection is regarded as the most objective indicator to evaluate the quality of D2 operation for advanced gastric cancer patients. Zhao Y et al [16] once reported a retrospective study of 659 patients who were treated by laparoscopic or open gastrectomy. They found that the average number of lymph node dissection in the laparoscopic gastrectomy and open gastrectomy group were 33.2 and 32.8, respectively. There was no significant difference between two groups. Meanwhile, the average time for the laparoscopic gastrectomy and open gastrectomy procedures did not differ significantly (211 ± 56 vs 204 ± 41 min), but bleeding during the operation in the laparoscopic group were significantly less than that in the open group (128 ± 85 vs 301 ± 156 ml, $p < 0.001$). Similar results were published by Pugliese et al [17] and Hwang et al [18]. The number of lymph node dissection was 31 in this case, which was comparable to the average number of lymph node dissection by laparoscopic or

open gastrectomy. The blood loss was 100 ml, similar to that of laparoscopic gastrectomy for advanced gastric cancer. But the operation time was 240 minutes in our case, higher than that of previous reports. Based on our experience, as the effects of chemoradiotherapy, the severe fibrosis around stomach made the surgery more difficult and delicate. That was the reason why the operation time of the patient treated by neoadjuvant chemoradiotherapy was longer than those who did not. However, with the amplification effect of laparoscopy, laparoscopic gastrectomy was safe and feasible for advanced gastric patients who was treated by neoadjuvant chemoradiotherapy in experienced department. Besides that, it would not increase the postoperative complications.

An issue that needs to be addressed is that our case was attempted by a gastrointestinal expert familiar with laparoscopic distal gastrectomy for locally advanced gastric cancer, and intensive care unit backup was arranged preoperatively.

Although the patient in our department recovered smoothly with no postoperative complications, whether neoadjuvant chemoradiotherapy followed by laparoscopic gastrectomy will increase the postoperative complications or not are still under controversies. And the most frequent complications for gastric cancer patients after neoadjuvant chemoradiotherapy were reported as nonspecific surgical complications[19].

Conclusion

Neoadjuvant chemoradiotherapy followed by laparoscopic distal gastrectomy with D2 lymph node dissection was safe and effective for present patient. However, whether laparoscopic gastrectomy can be recommended as an initial treatment for advanced distal gastric cancer after neoadjuvant chemoradiotherapy, well-designed prospective trials are still needed to proof.

Declarations

Abbreviation

GTV: Gross tumor response; CTV: Clinical tumor response; PR: Partial response; LDG: Laparoscopic distal gastrectomy; CEA: Carcinoembryonic antigen; CT: Computed tomography; NCCN: National Comprehensive Cancer Network; MDT: Multidisciplinary team; EUS: Endoscopic ultrasound

Conflict of interest:

The author declares that he has no conflict of interest.

Human rights statement and informed consent

Informed consent was obtained from the patient before neoadjuvant chemoradiotherapy.

Acknowledgement:

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Ethical Approval and Consent to participate

This study is approved by institutional Ethics committee. Informed consent was obtained from the patient for the publication of this case report and any accompanying imaging and pathological data.

Consent for publication

Informed consent was obtained from the patient before neoadjuvant chemoradiotherapy.

Availability of supporting data

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The author declares that he has no conflict of interest.

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Authors' contributions

Z.Y.L, J.F.J and Z.N.L determined the preoperative regimen and performed the operation. The postoperative follow-up was done by Y.K.W, S.X.L and F.S. Z.N.L and Y.K.W collected patient data, performed image processing and composed manuscript. Z.Y.L revised and provided recommendation for the manuscript. All authors read and approved the final manuscript.

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Authors' information

1. Key laboratory of Carcinogenesis and Translational Research (Ministry of Education), Department of Gastrointestinal Surgery, Peking University Cancer Hospital & Institute, Beijing 100142, China

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Figures

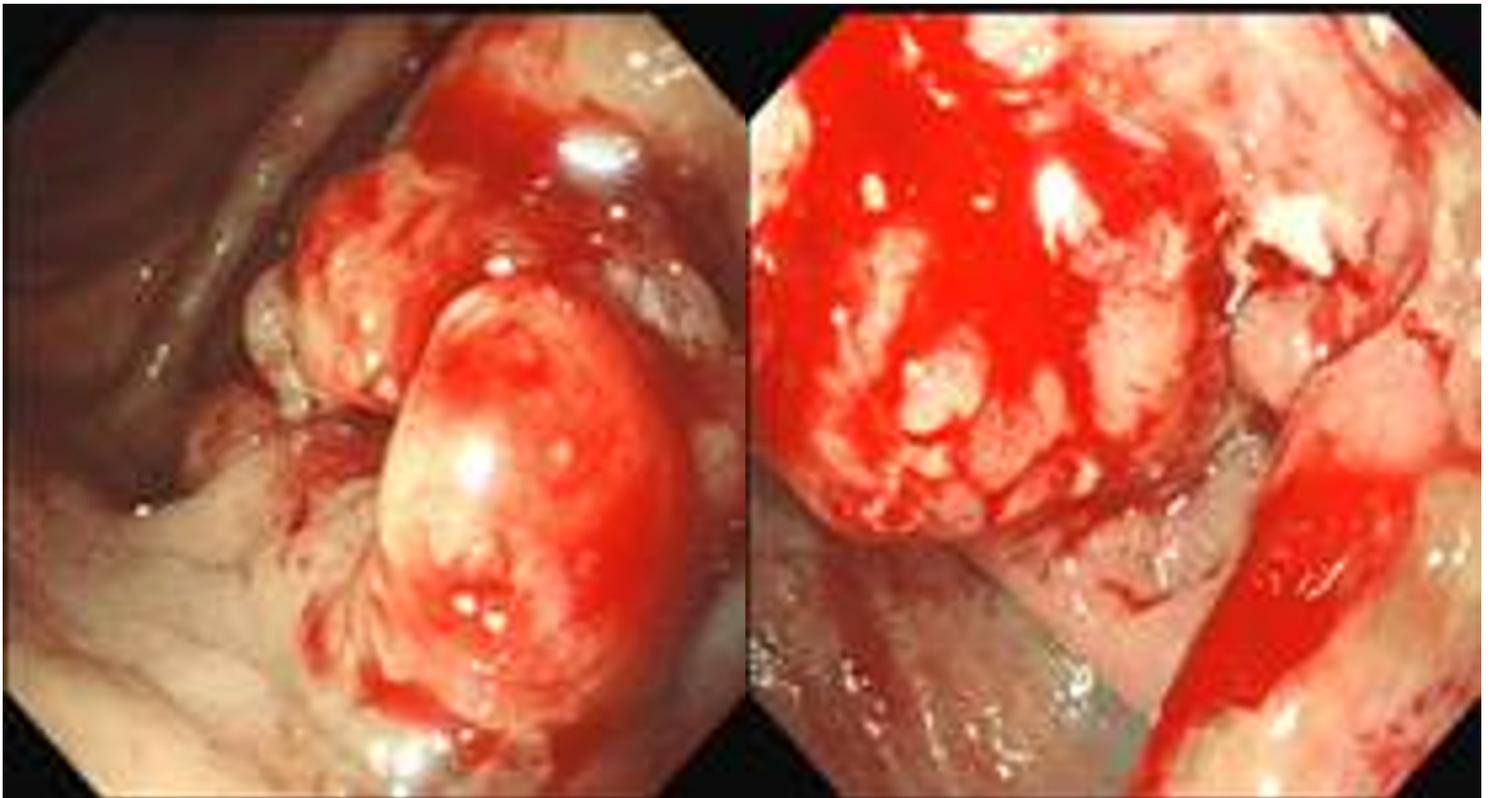


Figure 1

Gastrointestinal fiberscope before chemoradiotherapy showed an ulcerative lesion located surrounding the gastric antrum with ulceration causing stenosis.

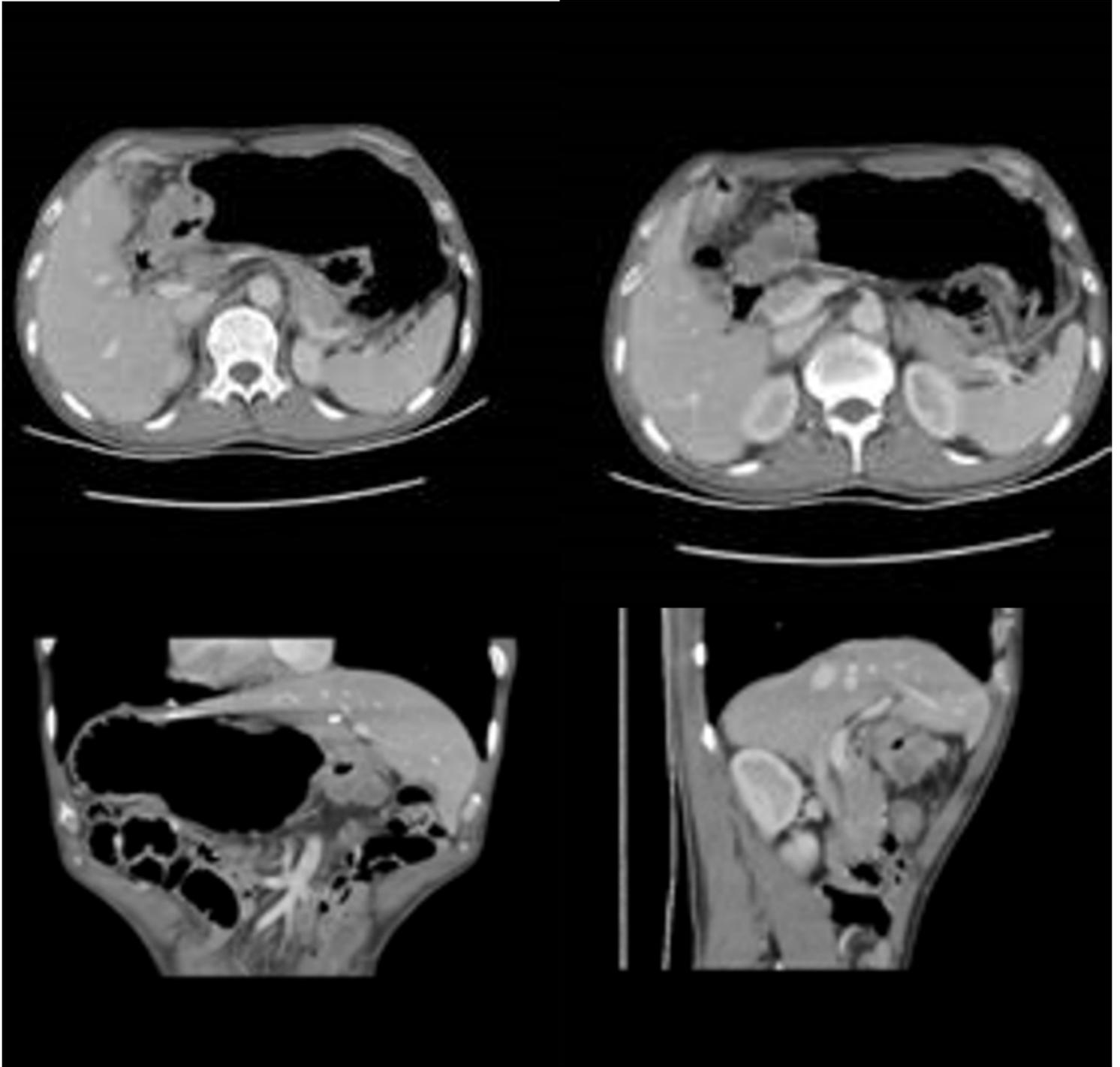


Figure 2

Enhanced abdominal CT indicated that the wall of the antrum was thickened with significant enhancement. The surface of serosa was fuzzy, but the border near the pancreas was still clear. Multiple enlarged lymph nodes were found in the greater and less gastric curvature.

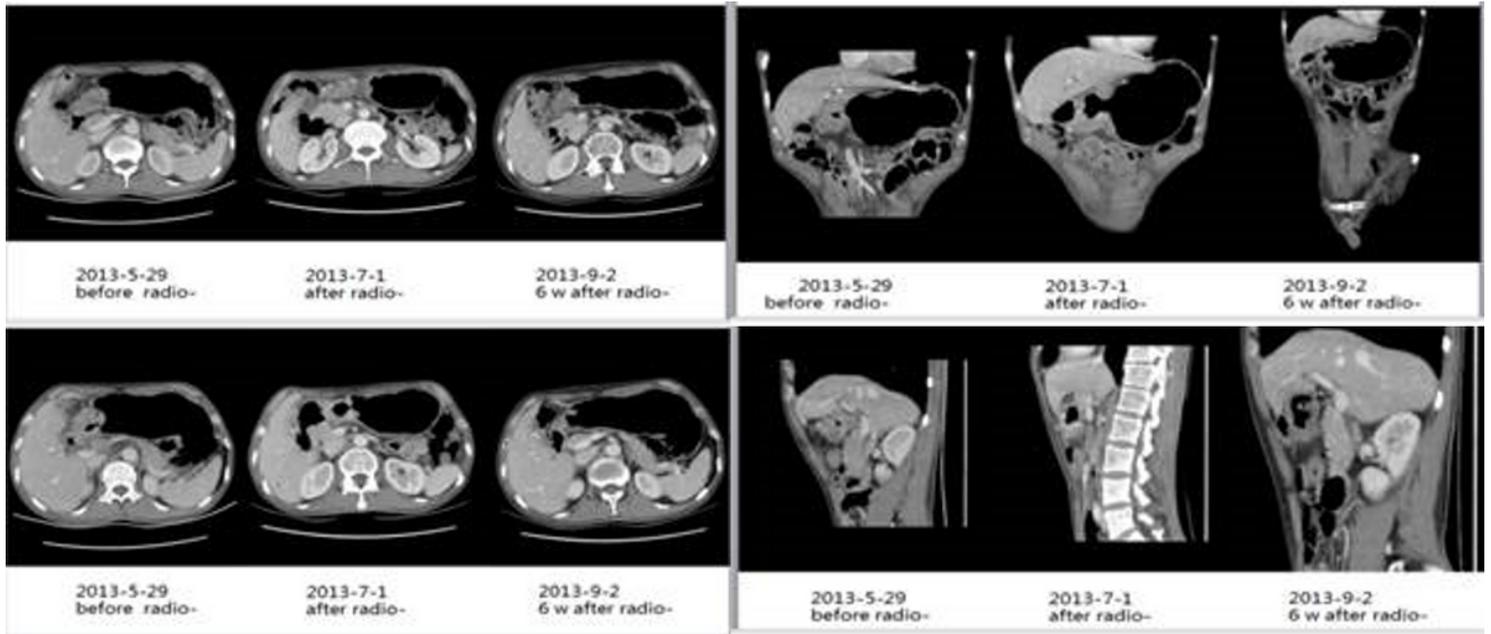


Figure 3

Enhanced abdominal CT performed at the time righty and six weeks after neoadjuvant chemoradiotherapy respectively to evaluate the response to neoadjuvant chemoradiotherapy. At the first time, the maximum thickness changed from 21mm to 12 mm (shrinking 42.9%) with lymph nodes in the great curvature shrinking so obviously that they couldn't be clearly detected in the CT, but the surface of serosa was still fuzzy. The CT six weeks after neoadjuvant chemotherapy indicated the changing from 12mm to 10mm (shrinking 16.7%) with no obviously enlarged lymph nodes around the stomach, retroperitoneal or pelvic.

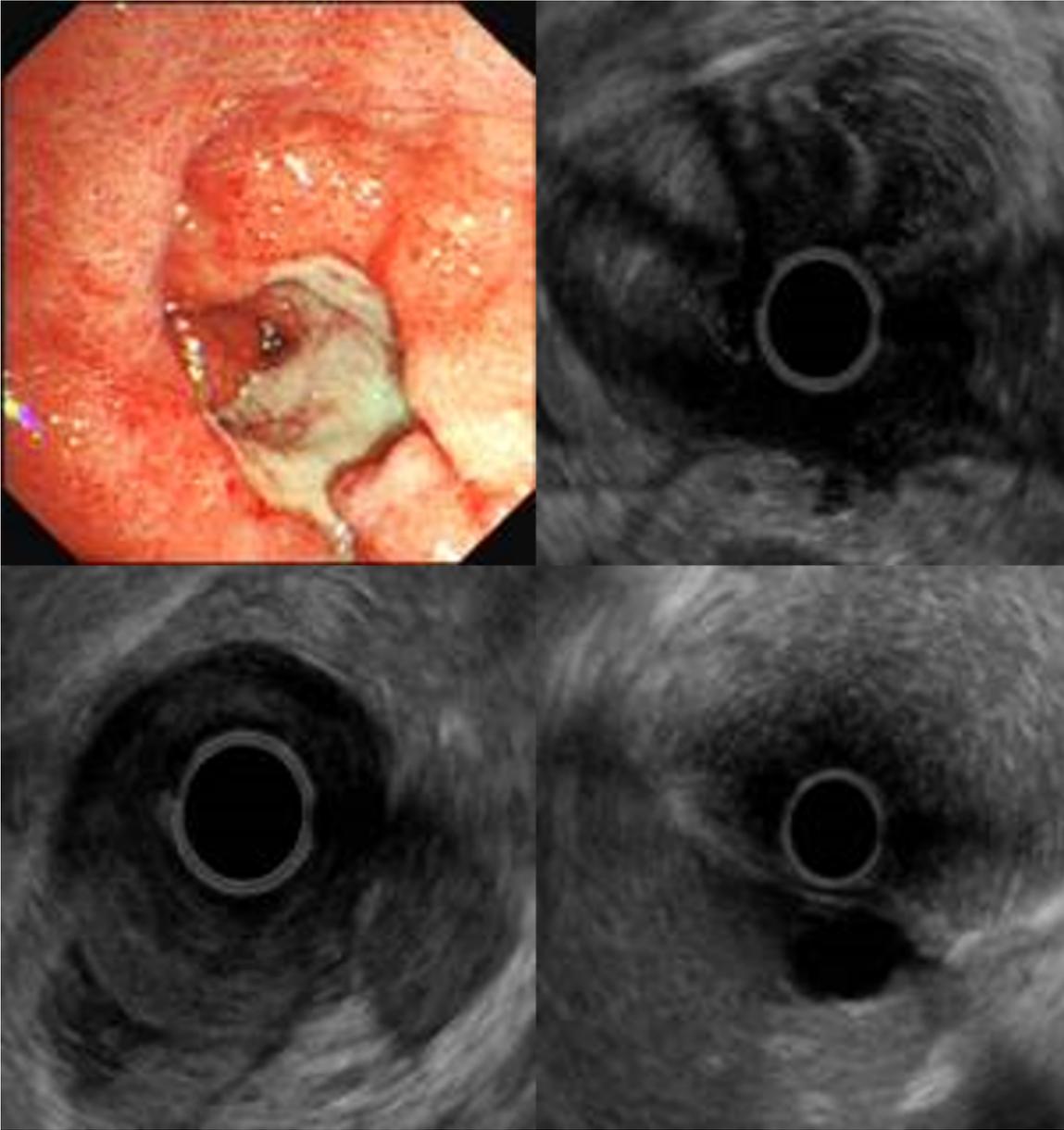


Figure 4

EUS was also applied to evaluate the response to neoadjuvant chemoradiotherapy, indicating the ulcerative lesion located surrounding the gastric antrum with pyloric stenosis.

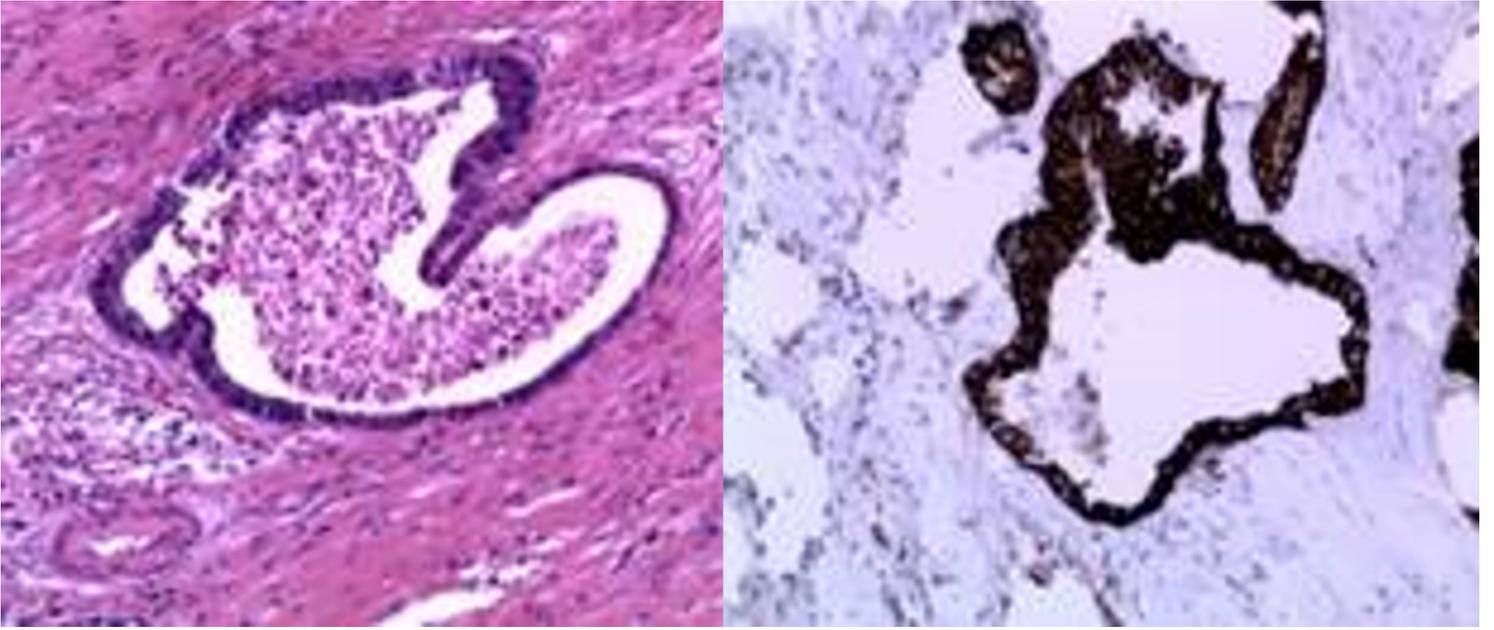


Figure 5

Postoperative pathological evaluation showed that the pathological stage after neoadjuvant chemoradiotherapy was T3N0M0, with necrosis rate >90%.