



Transcatheter Left Gastric Artery and Gastroduodenal Artery Infusion Chemotherapy Combined with Systemic Chemotherapy as Preoperative Neoadjuvant Chemotherapy for Locally Advanced Gastric Cancer: A Case Report

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Abstract

We report a 64-year-old Chinese male with locally advanced gastric adenocarcinoma achieving a significant reduction of tumor after neoadjuvant chemotherapy with transcatheter left gastric artery and gastroduodenal artery infusion chemotherapy combined with systemic chemotherapy, which showed promising efficacy and acceptable toxicity. He underwent esophagogastroduodenoscopy (EGD) in June 2022, which revealed a 3-cm space-occupying lesion on the gastric antrum, and the antral biopsy showed "adenocarcinoma". Further clinical examinations include upper gastrointestinal iodine angiography and computed tomography staged his cancer as T3N2M0. He received 2 cycles of neoadjuvant chemotherapy without severe toxicities. Subsequently, he successfully received laparoscopic-assisted distal gastrectomy with extended D2 lymph node dissections. The role of transcatheter left gastric artery and gastroduodenal artery infusion chemotherapy as a part of perioperative neoadjuvant chemotherapy in locally advanced gastric cancer is worth further investigation.

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Keywords: Locally Advanced Gastric Adenocarcinoma (LAGC); Neoadjuvant chemotherapy; Transcatheter artery infusion chemotherapy; Laparoscopic-assisted distal gastrectomy.

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Introduction

Despite a comparatively low incidence, gastric cancer remains the leading cause of cancer death worldwide [1]. Surgery is the main treatment for Locally Advanced Gastric Cancer (LAGC), and neoadjuvant chemotherapy (NAC) has shown attractive prospects [2]. Surgery yields significant survival benefits after NAC in patients with LAGC [3]. Moreover, Laparoscopic-Assisted Distal Gastrectomy (LADG) has been widely used for the treatment of LAGC. Compared with open distal gastrectomy, LADG offers better postoperative safety and acceptable tolerance of neoadjuvant chemotherapy [4]. Furthermore, NAC as a prophylactic therapy was found to improve the prognosis of patients with LAGC by downstaging the tumor and eliminating micrometastases which can prevent residual cancer cell growth.^[5] Meanwhile, NAC increased the R0 resection rate in patients with LAGC. The R0 resection rate after NAC was 81.9%, compared with 66.7% with surgery alone, and the neoadjuvant group had fewer lymph node metastases [6].

Case report

A 64-year-old Chinese male underwent Esophagogastroduodenoscopy (EGD) in June 2022, which revealed a 3-cm space-occupying lesion on the gastric antrum, and biopsy showed "adenocarcinoma". (Figure 1) Irregular filling defect images were seen in the gastric antrum by upper gastrointestinal iodine angiography, and gastric cancer was considered. (Figure 2) Computed Tomography (CT) of chest, abdomen and pelvis scan did not reveal any distant metastasis. The clinical staging was T3N2M0, and the patient was recommended to receive neoadjuvant chemotherapy before definitive surgery. The patient agreed to receive 2 cycles of the transcatheter left gastric artery and gastroduodenal artery infusion chemotherapy combined with systemic chemotherapy after he was fully informed about the related benefits and risks and signed informed consent.

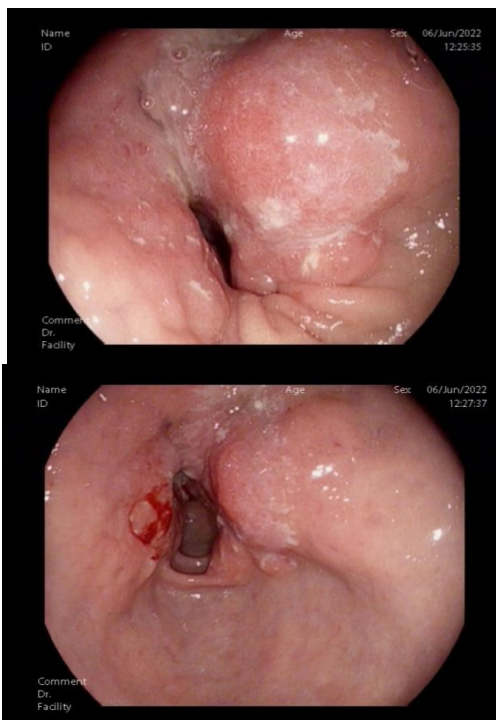


Figure 1: EGD A space-occupying lesion was seen on the lesser curvature, anterior and posterior walls, and part of the greater curvature of the gastric antrum, resulting in stenosis of the gastric antrum, about 3.0 cm in length, involving the lesser curvature of the anterior pyloric region, the surrounding mucosa is rough and hyperemia, contact bleeding.

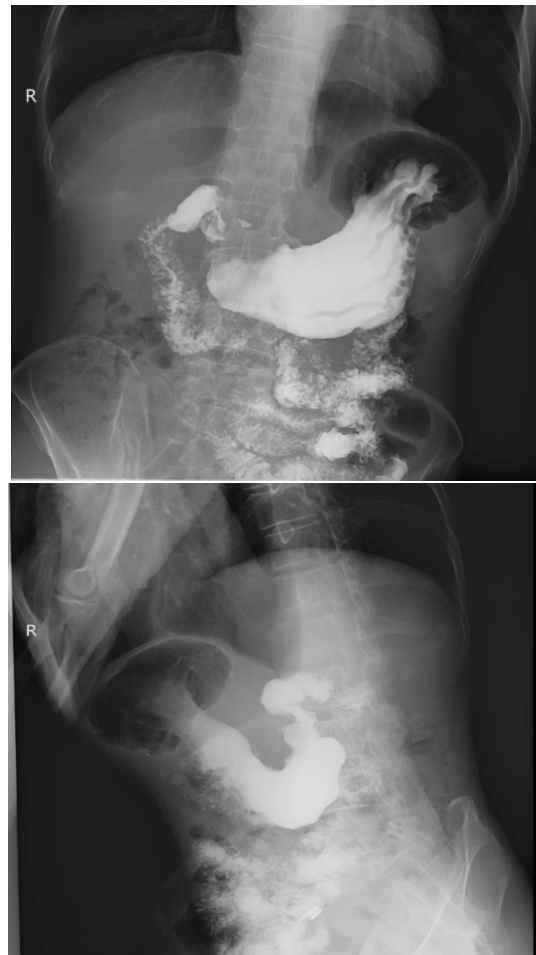


Figure 2: Upper gastrointestinal iodine angiography Irregular filling defect images were seen in the gastric antrum, the mucosa was rigid and disorder and the gastric antrum cavity was narrow, and gastric cancer was considered.

Brief operation process of the transcatheter left gastric artery and gastroduodenal artery infusion chemotherapy (Figure 3).

1. The patient is placed in a supine position, and the towel is routinely disinfected. The right femoral artery was taken as the puncture point. After successful local anesthesia with 10 ml of 1% lidocaine, the right femoral artery was punctured by the Seldinger puncture technique, a 5F sheath was placed, and a 5-F RL catheter was placed through the sheath, and angiography was performed on the celiac trunk, showing the left gastric artery and gastroduodenal artery, no clear tumor staining in the arterial phase, no slender and tortuous branch blood vessels of the tumor.
2. The target vessel of the left gastric artery was superselected with an Apter microcatheter to confirm the location of angiography, and 50 mg of oxaliplatin injection, 250 mg of fluorouracil injection, and 50 mg of calcium folinate for injection were given for arterial infusion therapy.
3. Exit the catheter, super select gastroduodenal arteriography, and perform arterial infusion therapy with oxaliplatin injection of 50mg, fluorouracil injection of 250mg, and leucovorin injection of 50mg, After the transcatheter left gastric artery and gastroduodenal artery infusion chemotherapy, he received systemic chemotherapy (FOLFOX:Oxaliplatin 85mg/m² IV d1; calcium folinate 400mg/m² iv d1; fluorouracil 2400mg/m² iv 48h) without severe toxicities.

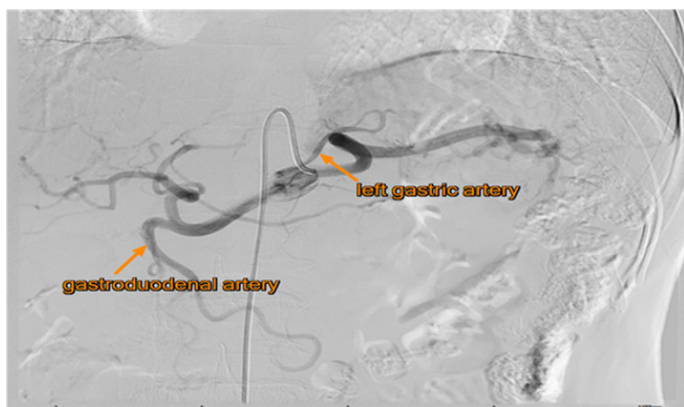


Figure 3: Transcatheter left gastric artery, gastro duodenal artery infusion chemotherapy.

This patient received 2 cycles of neoadjuvant chemotherapy (systemic chemotherapy after transcatheter left gastric artery and gastroduodenal artery infusion chemotherapy every circle) without severe toxicities. Afterward, he received laparoscopic-assisted distal gastrectomy with extended D2 lymph node dissections showing a significant reduction of the tumor (**Figure 4&5**). The tissue structure around the gastric antrum became more demarcated after neoadjuvant chemotherapy, which is more conducive to laparoscopic complete tumor resection.

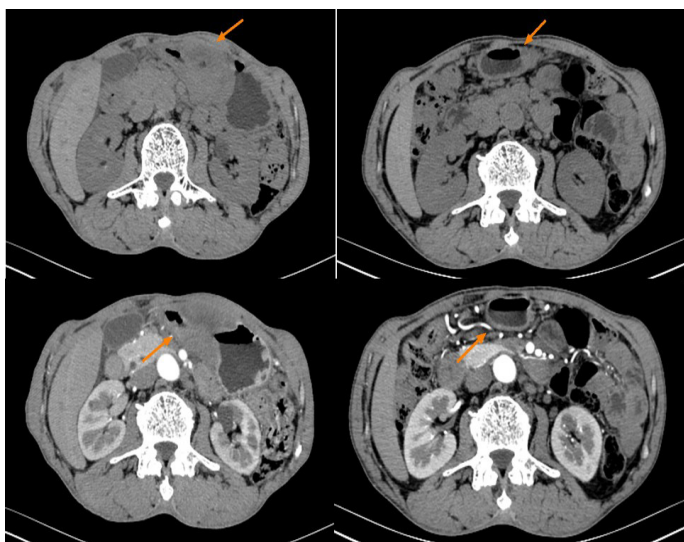


Figure 4: Computed tomography (CT) scan of abdomen Left image shows before infusion chemotherapy, Local gastric wall thickening in the gastric antrum, and it is mostly considered as a tumor lesion. The right image shows after infusion chemotherapy. The scope of the lesion was reduced compared with the previous one, and the degree of thickening was significantly reduced.

Discussion

There are currently three central issues about NAC in LAGC including “3W”, as “what kind of combination is more effective and safer, who are potentially benefited from the NAC, and why does the NAC work or not”. The combination of neoadjuvant chemotherapy has been exploited in more and more valuable research, such as apatinib combined with S-1 and oxaliplatin (SOX) is safe and effective as neoadjuvant therapy for LAGC [7]. More critically, a considerable proportion of gastric cancer patients cannot benefit from NAC, mainly due to the lack of biomarkers for patient selection and prognosis prediction. A recent study showed that patients with high microsatellite instability (MSI-H) may be resistant to NAC, and other candidate biomarkers such as tumor mutational burden (TMB-H) were associated

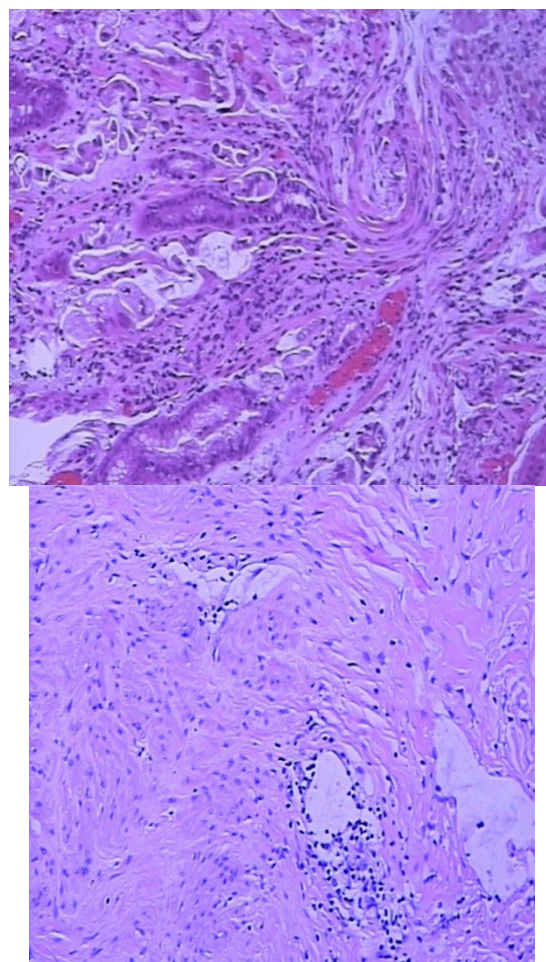


Figure 5: Biopsy. The left image illustrates gastric antrum biopsy (HE staining) before neoadjuvant chemotherapy, and the right image shows pathological biopsy of the post-operative specimen after neoadjuvant chemotherapy. Significant reduction in tumor cells after neoadjuvant chemotherapy.

with better DFS [8]. Moreover, exploring the drug resistance mechanisms related to NAC has gradually gained attention. By comparing responsive and non-responsive tumors and samples before and after treatment, it was found that C10orf71 mutation was associated with treatment resistance, and neoadjuvant chemotherapy also reshaped the tumor immune microenvironment [9]. Further basic and clinical studies of the mechanisms of micrometastasis and the microenvironment of the tumor are necessary in the future. Differently, how to accurately deliver the anti-cancer drug to the location of the tumor is our focus, this case report found that transcatheter arterial infusion chemotherapy combined with systemic chemotherapy is effective as NAC in LAGC, and provides novel perspectives for developing precise neoadjuvant treatment regimens. Large randomized clinical trials are required to confirm these findings.

Conflict of interest: No

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