



Diagnosis of Gastric Cancer in the Excluded Stomach After RYGB by Jejunogastrostomy Using a LAMS

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ABSTRACT

For patients after bariatric surgery, diagnosis of gastric cancer is a challenge. We present a patient after Roux-en-Y gastric bypass with upper abdominal pain and abnormal computed tomography scan with diffuse wall thickening of the gastric antrum. Various biopsy techniques have been described, with surgical (laparoscopic) exploration being the most common. We were able to successfully diagnose gastric cancer in the excluded stomach by biopsy using a jejunogastrostomy, which proved to be safe and effective.

INTRODUCTION

Gastric cancer is a widespread tumor, and although the worldwide incidence has decreased significantly in recent decades, the prognosis at the time of the diagnosis is still poor. For patients after bariatric surgery, diagnosis is an additional challenge. This case report demonstrates a novel method to examine the excluded stomach after Roux-en-Y gastric (RYGB) bypass operation.

CASE REPORT

A 56-year-old woman presented with upper abdominal pain, nausea, and diarrhea in our emergency department. Over the past 6 months, she developed loss of appetite and an unintentional weight loss of 9 kg. Her medical history was significant for alcoholic liver disease, depression, and osteoporosis. She received Swedish adjustable gastric banding for morbid obesity 19 years ago, which was converted into a RYGB 16 years ago. The physical examination revealed epigastric tenderness. There was no evidence of upper or lower gastrointestinal bleeding. Laboratory findings showed elevated lipase of 187 U/L and slightly elevated cholestatic and inflammatory parameters. Anemia was not present. Computed tomography scan revealed a liquid-filled excluded stomach with diffuse wall thickening of the gastric antrum with contrast medium uptake, which was suggestive of gastric tumor.

The patient underwent gastroscopy and colonoscopy, both of which showed no abnormalities. We could not reach the duodenum or the excluded stomach by double-balloon enteroscopy to obtain biopsies of the gastric wall thickening. Therefore, we decided to use a novel method, whereby a jejunogastrostomy was created and biopsies were taken from the excluded stomach endoscopically. Under endoscopic ultrasound guidance, we created a fistula between the jejunum and the excluded stomach using a direct puncture with a Hot AXIOS stent and electrocautery-enhanced delivery system (Boston Scientific, Marlborough, MA), and we installed a 20 mm fully covered and self-expanding lumen-apposing metal stent (LAMS). The excluded stomach was already liquid-filled (Figure 1); therefore, no fluid was injected before puncture. Three days later, the excluded stomach was intubated via the LAMS with a gastroscope (Figure 2). The distal antrum was superficially ulcerated (Figure 3). Biopsies were taken of the ulcerated regions and confirmed a poorly differentiated ulcerating adenocarcinoma of the stomach with signet cell differentiation. Gastrectomy of the excluded stomach with lymphadenectomy and LAMS removal was performed, whereby the excluded stomach was separated from the descending part of the duodenum. The patient underwent neoadjuvant and adjuvant chemotherapy, each with 4 cycles of FLOT (fluorouracil, folinic acid, oxaliplatin, docetaxel).

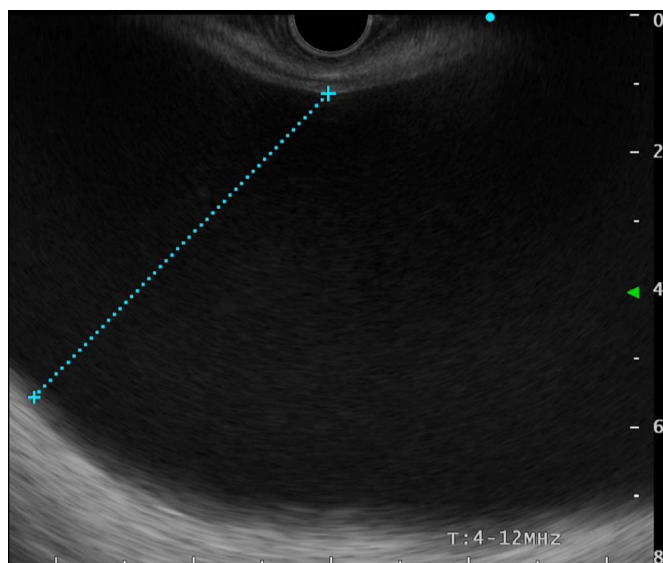


Figure 1. Endosonography of the excluded stomach, which is filled with liquid.

DISCUSSION

At the time of diagnosis of gastric cancer, the prognosis is often very poor because early stages present themselves with unspecific symptoms such as diffuse abdominal discomfort. Fortunately, the incidence has declined significantly in recent decades (regarding the United States and Europe). Reasons for this could be the reduction of risk factors and better diagnostics. Nevertheless, an increase in the absolute number of new annual cases is observed—mainly because of an aging population.¹ The prevalence of obesity is rising worldwide, and the World Health Organization² estimated in 2016 that 39% of all adults are overweight,

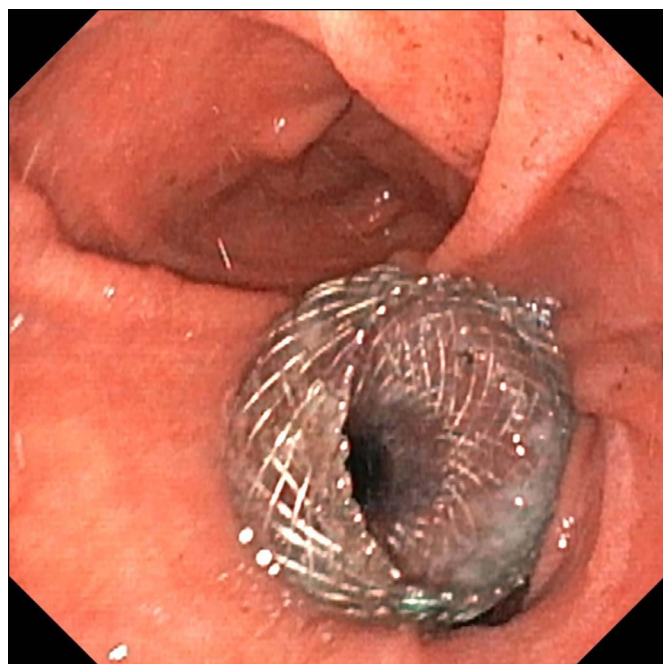


Figure 2. Jejunogastrostomy created using a LAMS. LAMS, lumen-apposing metal stent.

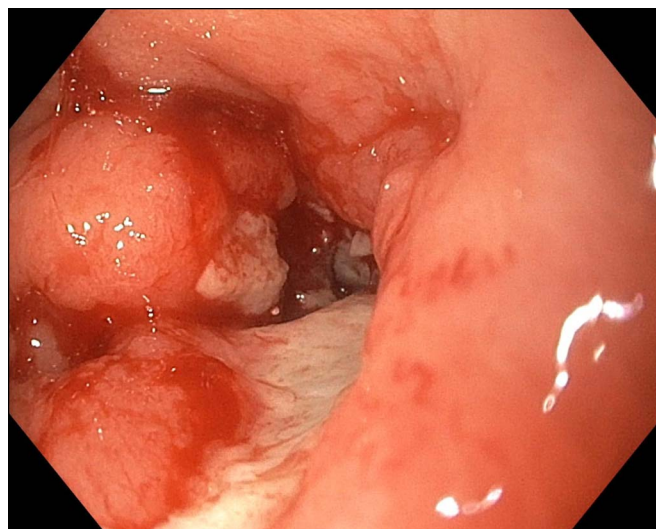


Figure 3. Lesions suspicious for carcinoma in the excluded stomach.

and 13% are obese. Accordingly, the demand for bariatric surgery also increases. In the United States alone more than 200,000 bariatric procedures performed annually—trend rising.³

Gastric cancer in the excluded stomach after RYGB is rare, and less than 2 dozen cases have been published. An investigation at the Surgical Department of São José de Avai in Brazil revealed an incidence of 1 case in 3,047 patients undergoing bariatric surgery between 1999 and 2014.⁴ Risk factors of gastric cancer include various endogenous (eg, genetic predispositions) and exogenous (eating behavior and noxae) factors.^{5,6} An additional avoidable cause is infection with *Helicobacter pylori*. This is a reason for recommending preoperative screening using esophagogastroduodenoscopy to rule out a bacterial infection or dysplasia. In our patient, it was not clear whether such screening had taken place. However, the patient had a history of nicotine and alcohol abuse.

Owing to the bariatric changes in the gastrointestinal anatomy, diagnosis is a particular challenge. In patients with RYGB, only the pouch of the stomach can be examined endoscopically using conventional esophagogastroduodenoscopy until one reaches the alimentary limb. Various techniques have been described to reach the excluded areas such as the residual stomach or the duodenum. The most common invasive method with 10 cases was surgical (laparoscopic) exploration.^{5,7-14} There were also 2 cases of percutaneous endoscopy by gastrostomy^{4,15} and 1 fine needle puncture.⁶ On the other hand, endoscopic examinations such as retrograde endoscopy¹⁶ and jejunogastrostomy¹⁷ are mentioned much less frequently with only 1 case each and 2 cases by double-balloon enteroscopy.^{6,18}

After an unsuccessful double-balloon enteroscopy, we decided to perform a minimally invasive examination to reach the excluded stomach by jejunogastrostomy and take biopsies. We decided against a gastrogastrostomy because of limited accessibility. Hot AXIOS is a stent and electrocautery-enhanced

delivery system with which a fully covered and self-expanding lumen-apposing metal stent can be inserted to form a fistula. The technique was originally developed for transgastric or transduodenal endoscopic-ultrasonography-guided drainage of pancreatic fluid collections such as pseudocysts or walled-off pancreatic necrosis and obstructed bile ducts (eg, choledochoduodenostomy after failed endoscopic retrograde cholangiopancreatography (ERCP). For example, patients with RYGB may have enteroscopy-assisted ERCP (e-ERCP) and gastrogastrostomy with endoscopic ultrasound endosonography-guided stent placement, which can be used for ERCP. Bukhari et al¹⁹ showed that the latter is superior to e-ERCP in technical success and procedure duration. This approach proved to be safe and effective.^{20,21} We evaluated alternative techniques for obtaining biopsies. An enlarged lymph node was not accessible by fine-needle aspiration or fine-needle biopsy because of anatomical reasons, and the wall thickening of the stomach was not reachable for puncture because of dorsal wall thickening and the long puncture distance.

In conclusion, it is important to monitor patients with gastric bypass who present with unusual gastrointestinal symptoms because gastric cancer is a possible diagnosis even after gastric bypass. In addition to various endoscopic procedures, jejunogastrostomy is another minimally invasive, effective, and safe alternative.

DISCLOSURES

Author contributions: L. Schneider wrote the manuscript. A. Kröger edited the manuscript. C. Gubler and F. O. The revised the manuscript for intellectual content and approved the manuscript. F. O. The is the article guarantor.

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