https://doi.org/10.22516/25007440.1326

Case report

Endoscopic Ultrasound–Guided Gastroenterostomy in Malignant Gastric Outlet and Biliary Obstruction

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OPEN ACCESS

Citation:
Peralta-Vera MJ, Acevedo-Toro L, Ricaurte-Ciro JC, Gutierrez AA. Endoscopic Ultrasound–Guided Gastroenterostomy in Malignant Gastric Outlet and Biliary Obstruction. Revista. colomb. Gastroenterol. 2025;40(4):506-511. https://doi.org/10.22516/25007440.1326

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Received: 23/12/2024
Accepted: 19/02/2025

Abstract

Endoscopic ultrasound–guided gastroenterostomy (EUS-GE) has emerged as an innovative, minimally invasive technique and a palliative management option for patients with malignant gastric outlet obstruction, particularly those with locally advanced gastric or pancreatic cancers. Additionally, endoscopic ultrasound–guided biliary drainage (EUS-BD), performed using a transmural gastric or duodenal approach, has become an alternative for malignant biliary obstruction, especially in cases where duodenal papilla access is limited due to local disease, anatomic variation, or failed endoscopic retrograde cholangiopancreatography (ERCP).

This article presents the case of a patient with concurrent malignant gastric outlet obstruction and biliary obstruction secondary to recurrence of infiltrating ductal adenocarcinoma of the pancreas. The patient had previously undergone proximal pancreatoduodenectomy, biliary reconstruction, lymphadenectomy, and adjuvant chemotherapy, and was successfully managed with EUS-guided gastroenterostomy.

Keywords

Gastric outlet obstruction, extrahepatic bile duct obstruction, endoscopic ultrasound, gastroenterostomy.

INTRODUCTION

One of the leading causes of gastric outlet obstruction is locally advanced gastric and pancreatic carcinomas. In patients with advanced, unresectable disease, management is oriented toward a palliative approach aimed at symptom relief and improvement of quality of life[(1)]. Available therapeutic options include placement of metallic stents—performed under fluoroscopic guidance or using a combination of fluoroscopic and endoscopic techniques—[(2)], surgical gastrojejunostomy, and more recently, endoscopic gastroenteroanastomosis with stent (EUS-GE). This latter technique has proven to be highly effective, with excellent technical and clinical success rates and a low incidence of complications, making it a valuable alternative in the management of this complex condition.

Herein, we present a successful case of EUS-GE in a patient with malignant gastric outlet obstruction and malignant biliary obstruction secondary to recurrence of an infiltrating ductal adenocarcinoma of the pancreas, which had initially been managed with proximal pancreaticoduodenectomy, biliary reconstruction, lymphadenectomy, and adjuvant chemotherapy.

CLINICAL CASE

A 78-year-old male patient with an ECOG performance status of 1, diagnosed with adenocarcinoma of the pancrea-

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tic head, underwent proximal pancreaticoduodenectomy along with biliary reconstruction and lymphadenectomy. Histopathological analysis revealed a 3 cm tumor with perineural invasion (PNI+), no lymphovascular invasion (LVI–), R0 resection, and 0/10 lymph nodes negative for disease; the final classification was stage IB (pT2pN0cM0R0G2). Accordingly, the patient was considered a candidate for adjuvant chemotherapy with curative intent. He received six cycles of single-agent gemcitabine due to mild frailty (vulnerability) and age.

Seven months after completing the sixth cycle of chemotherapy, the patient presented with chills, fever, abdominal pain in the mesogastrium, and episodes of vomiting. Abdominal computed tomography demonstrated a 40 × 40 × 28 mm mass with central necrosis and peripheral enhancement with irregular contours, located anterior to the abdominal aorta and associated with peritoneal and perihepatic implants. This mass infiltrated the mesenteric artery and caused occlusion of the inferior mesenteric vein, as well as severe obliteration of the splenomesenteric or portal confluence. In addition, tumoral involvement of the bilioenteric diversion intestinal loop was observed, resulting in luminal occlusion and subsequent retrograde dilation (**Figure 1**).

Given these findings, magnetic resonance cholangiopancreatography was requested, confirming tumor recurrence manifested by an infiltrative mass at the root of the mesentery and the presence of peritoneal implants. In addition, a tumoral "closed-loop" obstruction of the bilioenteric diversion jejunum was described, with biliary duct dilation due to reflux and ascending hepatobiliary cholangitis (**Figure 2**). During hospitalization, the patient developed fever. *Escherichia coli* bacteremia secondary to cholangitis was documented, and he received antibiotic therapy for seven days, initially with meropenem and subsequently with ciprofloxacin.

Therefore, the condition was considered to be malignant gastric outlet obstruction and malignant biliary obstruction with associated cholangitis secondary to an unresectable locoregional recurrence. The patient was evaluated by the Gastroenterology service and deemed a candidate for EUS-GE.

A linear endoscopic ultrasound with a disposable balloon was performed, revealing a distended biliary loop measuring up to 3 cm in diameter in contact with the gastric wall. A 20 mm × 10 mm HOT AXIOS lumen-apposing metal stent was introduced; the loop was punctured from the gastric body, a Jagwire metal guidewire was advanced into the intestine, and the stent was deployed under combined ultrasound and endoscopic visualization. Copious drainage of retained bile was observed (**Figure 3**).

After the procedure, the patient was transferred to the general ward. He was discharged two days later following a non-contrast abdominal computed tomography that demonstrated a patent gastroenteroanastomosis without signs of complications, intestinal loop dilation, or obstruction (**Figure 4**). Subsequently, he was evaluated in the outpatient setting by clinical oncology, where systemic chemotherapy with gemcitabine and nab-paclitaxel was indicated with palliative intent.

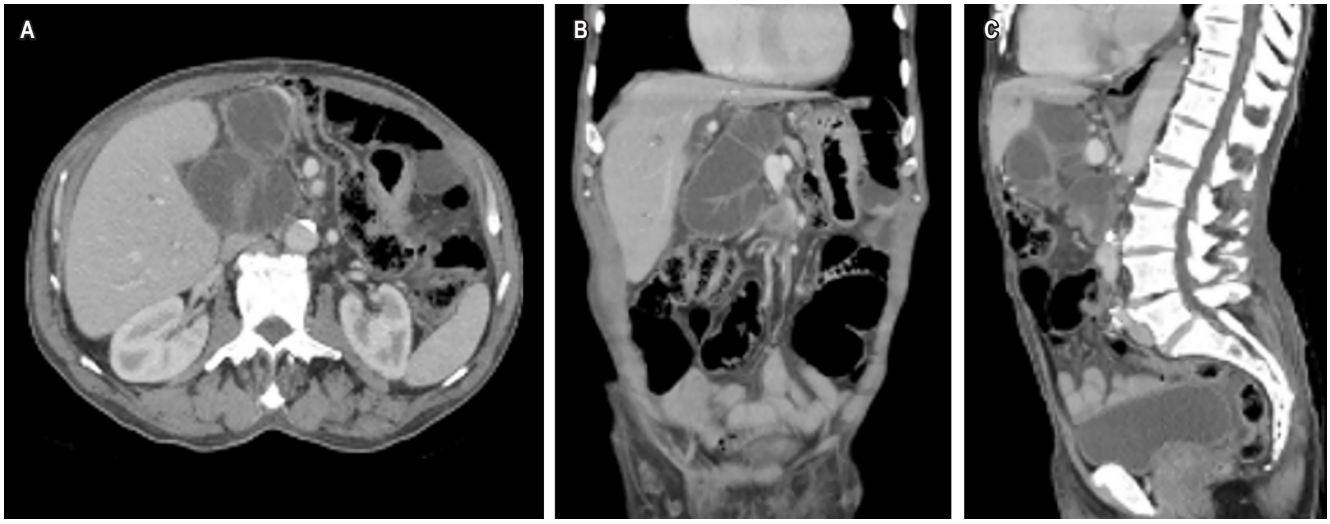


Figure 1. Contrast-enhanced abdominal computed tomography showing tumoral involvement of the bilioenteric diversion intestinal loop, occluding its lumen and causing retrograde dilation. **A.** Axial view. **B.** Coronal view. **C.** Sagittal view. Author's file.

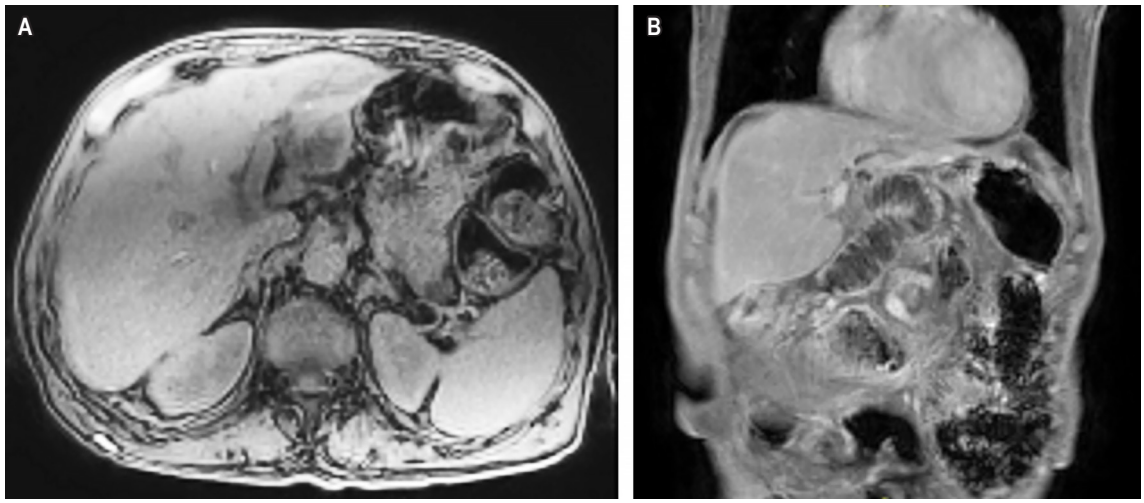


Figure 2. Magnetic resonance cholangiopancreatography showing: **A.** Infiltrative mass at the root of the mesentery and **B.** Tumoral "closed-loop" obstruction of the bilioenteric diversion jejunum. Author's file.

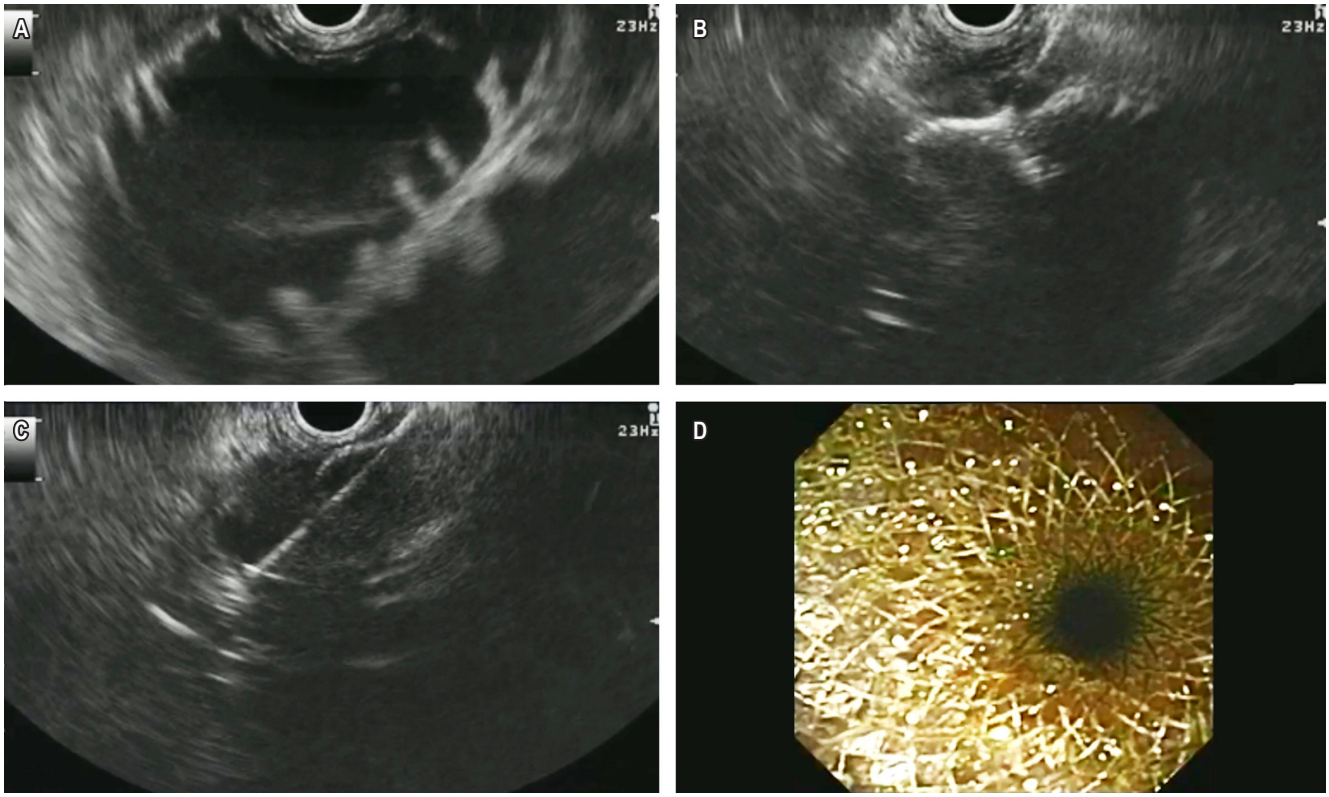


Figure 3. A. Endoscopic ultrasound showing a distended biliary loop up to 3 cm. **B and C.** Puncture of the loop from the gastric body and stent deployment. **D.** Stent under endoscopic view with evidence of bile drainage. Author's file.



Figure 4. Non-contrast abdominal computed tomography showing a patent gastroenteroanastomosis. Author's file.

DISCUSSION

Gastric outlet obstruction may be caused by motility disorders or by mechanical obstruction resulting from benign or malignant conditions. Malignant neoplasms are the most frequent cause, accounting for 50%–80% of cases. Among these, locally advanced gastric and pancreatic carcinomas are the most common, particularly when there is infiltration of the stomach and duodenum[1,3–5].

In patients with advanced, unresectable disease, palliative management focuses on symptom control. Options include endoscopic placement of self-expanding metal stents, surgical gastrojejunostomy, and, more recently, endoscopic ultrasound-guided gastroenteroanastomosis (EUS-GE). This technique involves deployment of a lumen-apposing metal stent (LAMS) to create a transmural tract between the stomach and the small intestine, thereby bypassing the site of obstruction. The stent used in this clinical case was the AXIOS, a device designed to facilitate transluminal flow and fully covered with silicone. Its name combines the terms axial and ostomy, reflecting two fundamental characteristics of LAMS: axial deployment and creation of a transluminal anastomosis. This stent is available in a range of luminal diameters, from 6 mm to 20 mm. Selection of the optimal diameter depends on multiple anatomical factors, including the size and location of the target lumen and the intestinal lumen, as well as the therapeutic intent[6].

Use of the largest feasible diameter is recommended to optimize drainage of retained contents. In cases of concomitant biliary obstruction, a diameter of 10 mm has been shown to be effective for drainage. In addition, it is essential to assess the transverse diameter of the site where the distal anchoring flange will be positioned, as a 20 mm stent requires a minimum transverse diameter of 29 mm, corresponding to the size of the flange.

In most cases, fluoroscopy is used to confirm stent insertion into the appropriate loop, guiding the passage of contrast medium through catheters across the stenotic site or via ultrasound-guided puncture with a 19 G needle. However, in the setting of closed-loop obstruction, sonographic identification of the dilated loop is sufficient to define the puncture site; therefore, fluoroscopy is not indispensable in these cases.

EUS-GE has demonstrated technical and clinical success rates comparable to those of surgical gastrojejunostomy and conventional stent placement, with lower rates of reintervention, adverse events, and costs. Acquisition of the skills required to perform the technique is estimated to require approximately 25 procedures, while full mastery is achieved after about 40 cases[7]. As operator experience increases, technical and clinical success rates tend to improve, reaching 92,9% and 90,1%, respectively. In high-volume centers, optimization of the learning curve also contributes to a reduction in adverse events, which in multicenter studies have been reported at 10,6% overall and 5,6% for severe adverse events[4,8,9].

Similarly, endoscopic ultrasound-guided biliary drainage (EUS-BD) has been described as a modality for primary decompression in patients with malignant biliary obstruction, particularly in cases of altered anatomy, ampullary distortion, periampullary diverticulum, gastric outlet obstruction, presence of *in situ* duodenal stents, or after failed attempts at endoscopic retrograde cholangiopancreatography (ERCP)[10]. This is because EUS-BD can provide direct biliary drainage through a transmural gastric or duodenal approach, as well as via a transpapillary route[11–13].

This report documents the first recorded case of successful endoscopic gastroenteroanastomosis in a patient with a history of proximal pancreaticoduodenectomy for oncologic disease at Hospital San Vicente Fundación in Medellín. A PubMed search was performed using the terms ((“endosonography”[MeSH Terms] OR endosonography [Text Word]) AND (gastroenteric)) AND (“anastomosis, surgical”[MeSH Terms]), limited to human cases, adults older than 19 years, over the past 33 years. As a result, only a small number of case reports were identified in the global medical literature[14]. This underscores the uniqueness of the case and highlights the importance of the procedure as an innovative alternative for managing gastric outlet obstruction of both benign and malignant origin. Endoscopic

gastroenteroanastomosis avoids complications associated with major surgery, such as high morbidity and prolonged recovery times—factors that are particularly relevant in frail patients and those with advanced oncologic disease. This report opens new possibilities in the palliative treatment of these complex conditions, improving patient prognosis and quality of life.

However, the procedure faces certain limitations, including the lack of prospective studies with larger cohorts to confirm its effectiveness and safety compared with conventional management[15,16]. In addition, the limited availability of personnel trained in endoscopic gastroenteroanastomosis reduces its widespread applicability, restricting implementation to highly specialized centers.

CONCLUSION

EUS-GE is a valuable and innovative technique for the treatment of malignant gastric outlet obstruction and malignant biliary obstruction. It has proven to be particularly beneficial in patients with advanced, unresectable pancreatic cancer, as in the case presented, with technical and clinical success rates close to 90%. These outcomes are comparable to those of surgical gastrojejunostomy, but with significantly lower morbidity and need for reintervention. In the present case, EUS-GE successfully restored intestinal transit, relieving obstructive symptoms, and resolved biliary obstruction, thereby positively impacting the patient's quality of life.

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