

Palliative Endoscopic Salvage of a Functionally Obstructed Gastrojejunostomy – Report of Technique

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ABSTRACT

Background: Gastric outlet obstruction secondary to foregut gastrointestinal malignancies can be managed with a variety of medical, endoscopic, and surgical options. Laparoscopic gastrojejunostomy is an option for those patients who are able to tolerate an operation as a long-term palliative option. This operation may be associated with some significant post-operative technical and nontechnical complications, including delayed gastric emptying. This paper describes an incisionless, endoscopic option that we propose can be used to salvage a functionally obstructed gastrojejunostomy.

Case Description: A 57-year old male patient had a history of pancreatic adenocarcinoma causing gastric outlet obstruction and underwent a previously created surgical

gastrojejunostomy at an outside hospital. His procedure was complicated by anastomotic leak and essentially persistent obstructive symptoms secondary to delayed gastric emptying. Though his anastomosis was demonstrably patent, these symptoms were thought to be secondary to a functional obstruction at the gastrojejunostomy. After repeated workups and many failed attempts to treat these symptoms, he ultimately underwent endoscopic placement of an uncovered colonic stent into the efferent limb of his gastrojejunostomy. This allowed for preferential drainage of gastric contents down the efferent limb, and improvement of his delayed gastric emptying.

Conclusions: In a select group of patients with advanced foregut malignancy, and with high re-operative risks, salvage endoscopic stenting may be useful in the palliation of symptoms from a functionally obstructed gastrojejunostomy.

Key Words: Gastric outlet obstruction, Gastrojejunostomy, Delayed gastric emptying, Endoscopy, Stent.

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INTRODUCTION

A 57-year-old man with no significant past medical or surgical history initially presented with postprandial abdominal fullness and diarrhea. Computed tomography (CT) imaging showed nonspecific mesenteric edema. An upper gastrointestinal (UGI) contrast study and barium enema were unremarkable. Approximately three months later, a repeat CT of the abdomen demonstrated a central mesenteric mass abutting the pancreas, encasing the superior mesenteric vessels, causing extrinsic narrowing of the second portion of the duodenum.

The patient underwent CT guided biopsy of the mass; this was consistent with invasive moderately to poorly differentiated adenocarcinoma, thought to have arisen from the upper gastrointestinal tract and/or pancreaticobiliary tract. Given his locally advanced disease, he was nonoperable and started on chemotherapy. Approximately 11 months after the initiation of chemotherapy, he presented to the hospital with nausea, emesis, and abdominal distention.

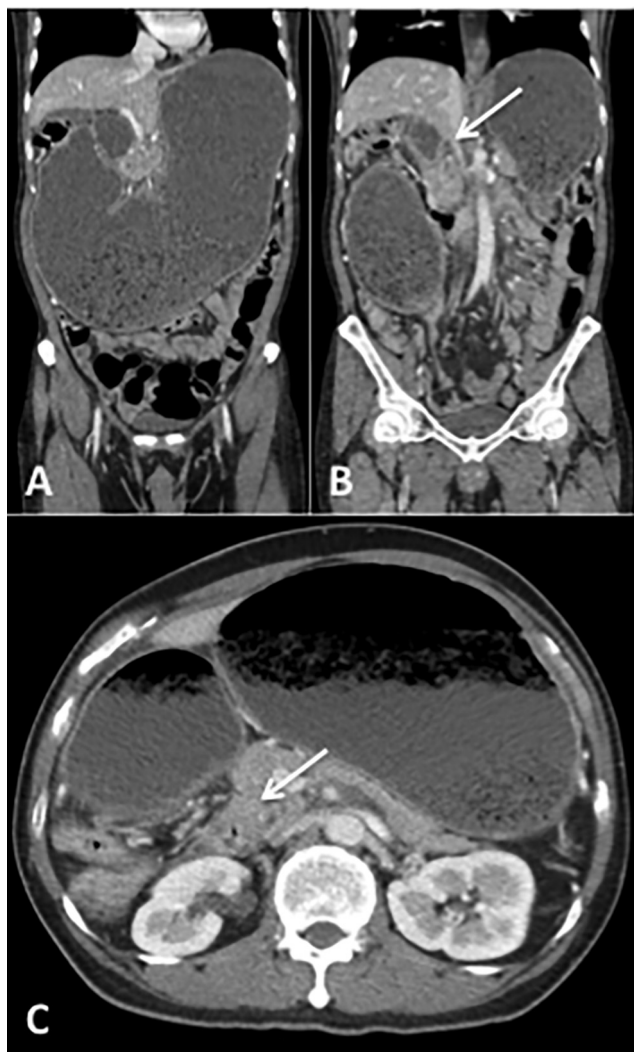


Figure 1. Computed tomography of abdomen and pelvis demonstrating gastroduodenal outlet obstruction secondary to unresectable pancreatic head mass (A). Arrow points to transition point (B) and pancreatic head mass (C).

His imaging was consistent with gastroduodenal outlet obstruction secondary to the pancreatic mass (**Figure 1**).

The patient underwent laparoscopic gastrojejunostomy (GJ) for palliative bypass by an outside surgeon. This was complicated by an anastomotic leak on postoperative day (POD) 7 and he underwent relaparoscopy. Sutures placed at the GJ were noted to be loose; these were reinforced, intra-abdominal abscesses were drained, and a surgical drain was left in place.

An UGI study performed on POD 11 (4 days after the re-operation) showed no leak; however, no contrast was noted to empty from the GJ. There was slow emptying of contrast

into the duodenum and proximal jejunum. A follow-up CT on POD 14 (7 days after the second operation) revealed distension of the stomach and proximal small intestine, with otherwise improved findings. His nasogastric (NG) tube was replaced with subsequent drainage of > 3 liters of fluid. On POD 16, esophagogastroduodenoscopy (EGD) was performed; per report, the GJ was widely patent without evidence of stricture. Bilious fluid was noted in the stomach.

With his failure of progression, the patient was then referred to our service for further management. Given clinical suspicion of delayed gastric emptying secondary to long-standing malignant obstruction, a gastrojejunal tube was placed by interventional radiology (POD 21) to allow for long term gastric decompression and possible distal jejunal feeds. The jejunal limb was unable to be placed through the surgically created GJ; it was placed post pyloric into the proximal jejunum. The patient was discharged two days post-procedure (POD 23).

The patient had two subsequent readmissions for high gastrostomy tube output. A UGI study revealed preferential drainage of contrast into the duodenum; no contrast was seen traversing the GJ. Given our concerns about the location of the jejunal extension, we proceeded with endoscopic placement of a nasojejunal (NJ) tube into the efferent limb of the GJ to allow for complete gastric decompression. EGD (**Figure 2**) demonstrated a widely patent afferent limb; push enteroscopy showed the jejunal limb of the gastrojejunal tube in the proximal jejunum. The efferent limb was subsequently intubated, and a NJ tube was placed. It was noted to be sharply angulated which was thought to be contributing to a functional obstruction and delayed gastric emptying. The patient was discharged with gastric decompression and NJ feeds.

He required replacement of this NJ tube multiple times, and due to the findings noted on endoscopy, we considered stent placement into the efferent limb in an attempt to encourage preferential drainage. An AXIOS™ stent (20 mm x 10 mm, Boston Scientific, Natick, MA) was placed. After initial symptomatic improvement, recurrent symptoms of delayed gastric emptying prompted a repeat UGI study which showed stent migration. We then placed a through the scope uncovered WallFlex™ colonic stent (25 mm x 90 mm, Boston Scientific, Natick, MA) (**Figure 3**). Four days later, a repeat CT showed a small amount of extraluminal air abutting the stent. A repeat UGI study (**Figure 4**) revealed markedly improved gastric emptying into the efferent limb through the stent. The patient was discharged home, tolerating gastric tube feeds and oral liquids. He was subsequently ultimately transitioned to hospice care.

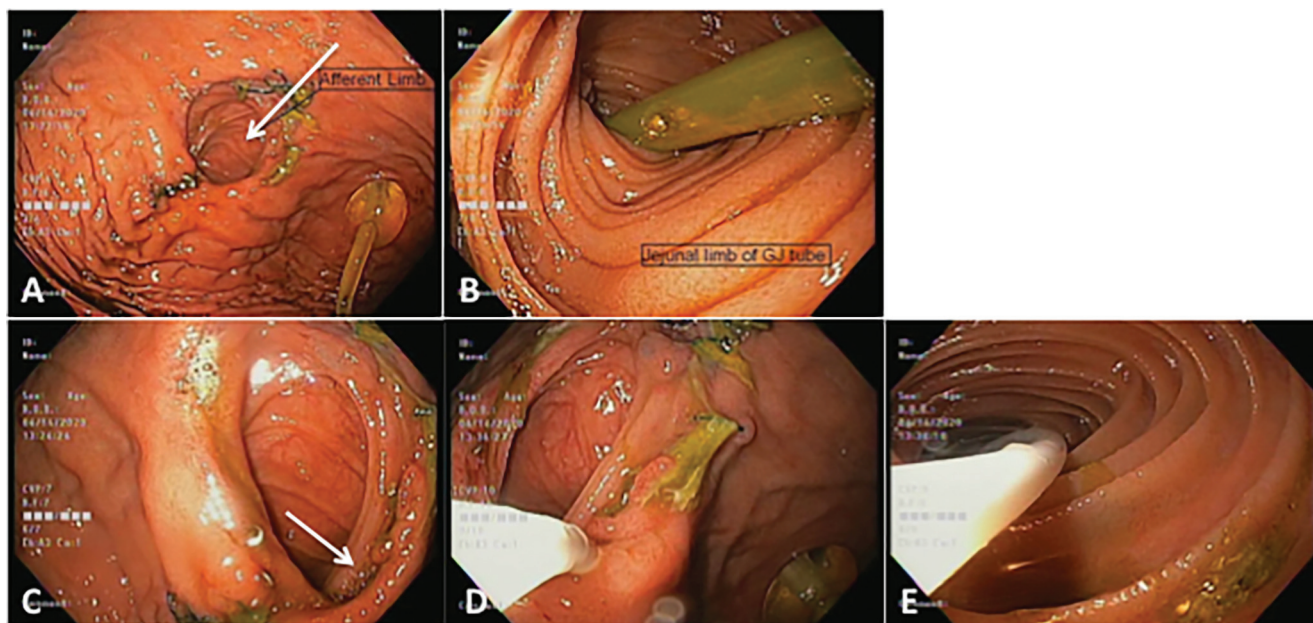


Figure 2. Widely patent afferent limb (A) which on intubation revealed the jejunal extension of the gastrojejunal tube (B). The sharply angulated efferent limb (C) was intubated, with placement of a nasojeunal tube (D, E). This angle caused a functional obstruction.

DISCUSSION

Patients with surgically unresectable gastrointestinal malignancies of the foregut may develop gastroduodenal outlet obstruction due to disease progression. Management of symptomatic malignant obstructions that are not amenable to surgical resection is multimodality and multidisciplinary, involving pharmacologic, endoscopy, and surgical techniques.

Many drugs have been useful for the purposes of palliation.¹ Gastric acid reducing medications and antisecretory drugs are integral to helping alleviate symptoms in patients with a malignant bowel obstruction.² Anticholinergic drugs (e.g., scopolamine) can also help to improve motility and reduce intestinal secretions and visceral pain. NG tubes can also help relieve symptoms, and while they are helpful for immediate relief, they tend to be uncomfortable and carry the risk of dislodgement and tube misalignment.³ Percutaneous gastrostomy tubes may also help with decompression in certain patients and allow them to tolerate small amounts of oral liquids for comfort.

Other options for the palliation of foregut obstructions include endoscopic stenting (first described in 1992) and gastrojejunal bypass.⁴ Stents have become more widely used in recent years and have been shown to be a safe option.⁵⁻⁸ One of the issues with endoscopic stenting is with longer-term failure; recurrent obstruction seems to be more common after endoscopic stent placement.

Additionally, complications associated with stent placement are reported to be up to 30%.⁹ Patient life expectancy may require consideration of surgical bypass given the higher long-term success rates, specifically when evaluating recurrent symptoms of obstruction.⁹⁻¹¹ Laparoscopic GJ should be considered the standard of care for surgical palliation, as it is associated with better results as compared to the open technique, and with higher technical success than endoscopic GJ.^{9,12}

A well-documented complication in patients who undergo a palliative GJ is delayed gastric emptying, with rates reported up to 50%¹³⁻¹⁵ and represents one of the more frequently reported functional complications after this procedure.¹⁶ There have been multiple surgical modifications proposed to reduce gastric emptying, including partial or complete stomach partitioning^{14,15} and incorporating Braun enteroenterostomy or Roux-en-y reconstruction (albeit with the associated risks of a second anastomosis).¹⁷ Complete stomach partitioning should generally not be used in advanced malignancies as it may lead to stump blowout from an evolving closed loop obstruction.¹⁷ A recent systematic review and meta-analysis did note that partial stomach partitioning decreases rates of decreased gastric emptying.¹⁸ It is important to note however, that a Roux-en-y gastrojejunostomy was performed, which may independently have positive effects on gastric emptying.

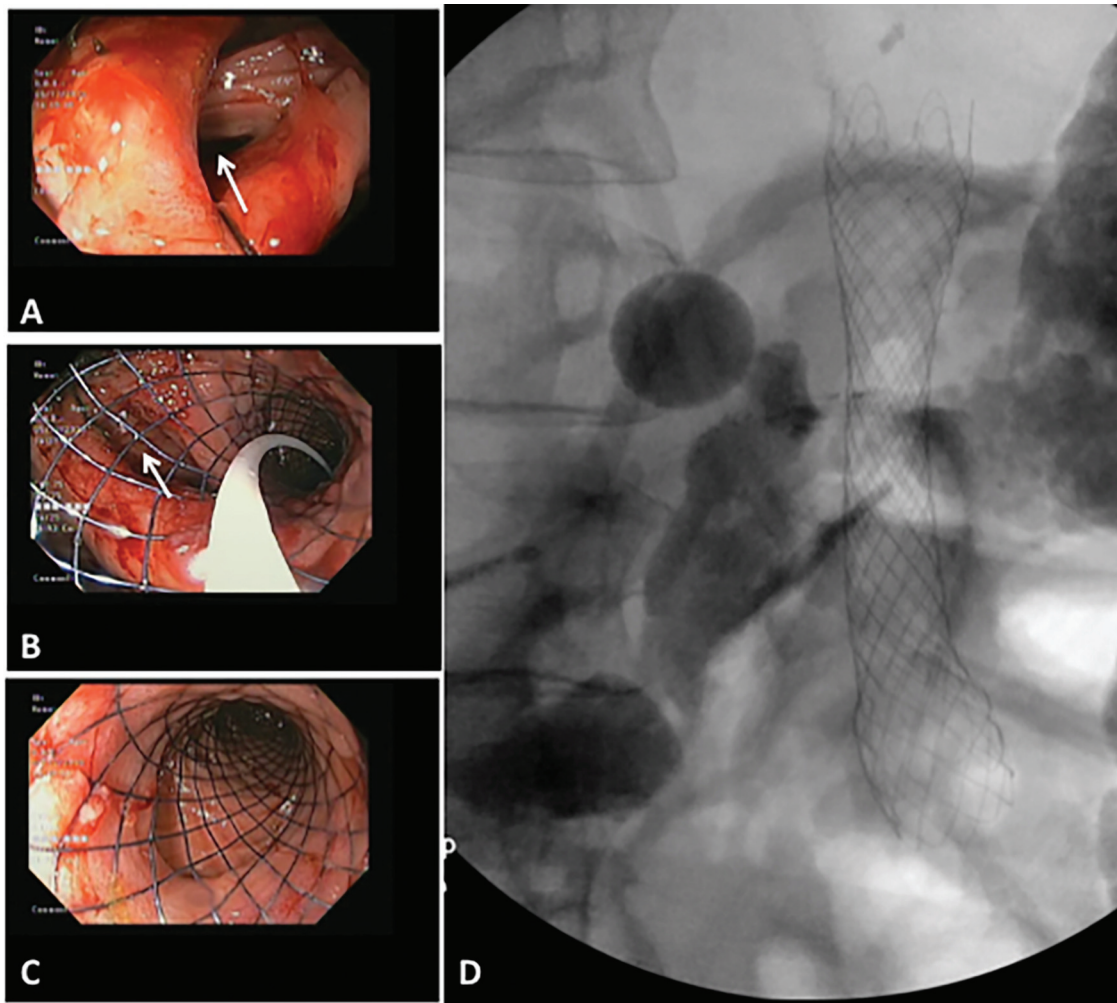


Figure 3. Repeat Esophagogastroduodenoscopy With Placement Of An Uncovered WallFlex™ Through-the-scope Colonic Stent. Efferent Limb (A), Followed By Uncovered Stent Placement Into The Efferent Limb (B, C). Arrow (B) Demonstrates The Afferent Limb. Final Fluoroscopic Images Demonstrated Appropriate Stent Placement (D).

The patient discussed in our report had a traditional loop GJ. Prolonged gastric distention prior to surgery likely contributes to a poor emptying. Care must be taken to ensure as close to an isoperistaltic path as possible for the emptying gastric contents. In general, the GJ should be matured similar to the Omega loop technique described for Roux-en-y gastric bypass. Initially, identification of the ligament of Trietz is facilitated by retracting the transverse colon cephalad (Figure 5A). The small bowel is then followed distally in a clockwise manner, where the biliary (afferent) limb will remain on the screen right (patient left), and the alimentary limb remains on the screen left (patient right) (Figures 5B and 5C). When the GJ is created, a truly isoperistaltic anastomosis is created (Figure 5D). Similar to how the small bowel is run and brought

up to the stomach, the biliary (afferent) limb is positioned towards the patient's left (proximal), with the efferent limb positioned towards the patients right (distal). This allows for an efferent limb that is not under tension and has less tendency for acute angulation. While this configuration may lead to some angulation at the afferent limb's entry to the stomach, it is important to remember that there is usually not an issue with biliary limb peristalsis distal to the obstructing lesion. However, since prolonged gastric distention likely impairs gastric peristalsis, an isoperistaltic anastomosis is important to help encourage free emptying through a nonangulated efferent limb.

We suspect that in this patient, the GJ was matured in the opposite direction as what is depicted in Figure 9. The

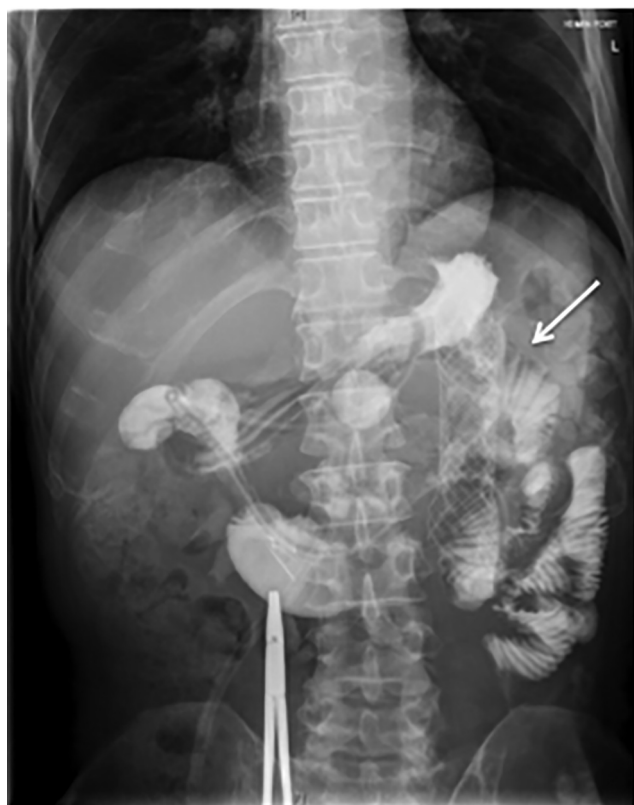


Figure 4. Upper gastrointestinal study performed after uncovered stent placement demonstrated prompt contrast emptying via the stent into the efferent limb (**Arrow**).

afferent limb was widely patent, but the efferent limb was functionally angulated and obstructed. A third surgical revision was not thought to be a good option given poor functional status and history of recent leak. A venting gastrostomy tube offered some palliation, however due to the angulation of the efferent limb, the jejunal limb of the gastrojejunum tube was unable to be placed through the efferent limb, which may have been the ideal option if it were technically possible. As we felt that the issue was a functionally obstructed efferent limb, we elected to place an uncovered long colonic stent as a way of encouraging functional drainage. To our knowledge, this has not been reported widely in the literature, but it seems to be a feasible option in selected cases, especially when surgical revision is not a good option.

CONCLUSION

In patients with advanced gastrointestinal tract malignancies resulting in gastroduodenal obstruction, the

ultimate goal of any intervention is palliation of symptoms and improved quality of life, with the least risk and best long-term outcomes possible. This may involve medical therapy, endoscopic therapy, or surgical minimally invasive GJ. Management of delayed gastric emptying after GJ may pose a particular challenge. Although rarely described, functional obstruction due to anastomotic techniques may be a cause of delayed gastric emptying. We propose in this select group of patients, and especially those at high or prohibitive risk for reoperation, enteral stent placement may serve as a potential tool for palliation. We encourage others to publish their experience in similar patients.

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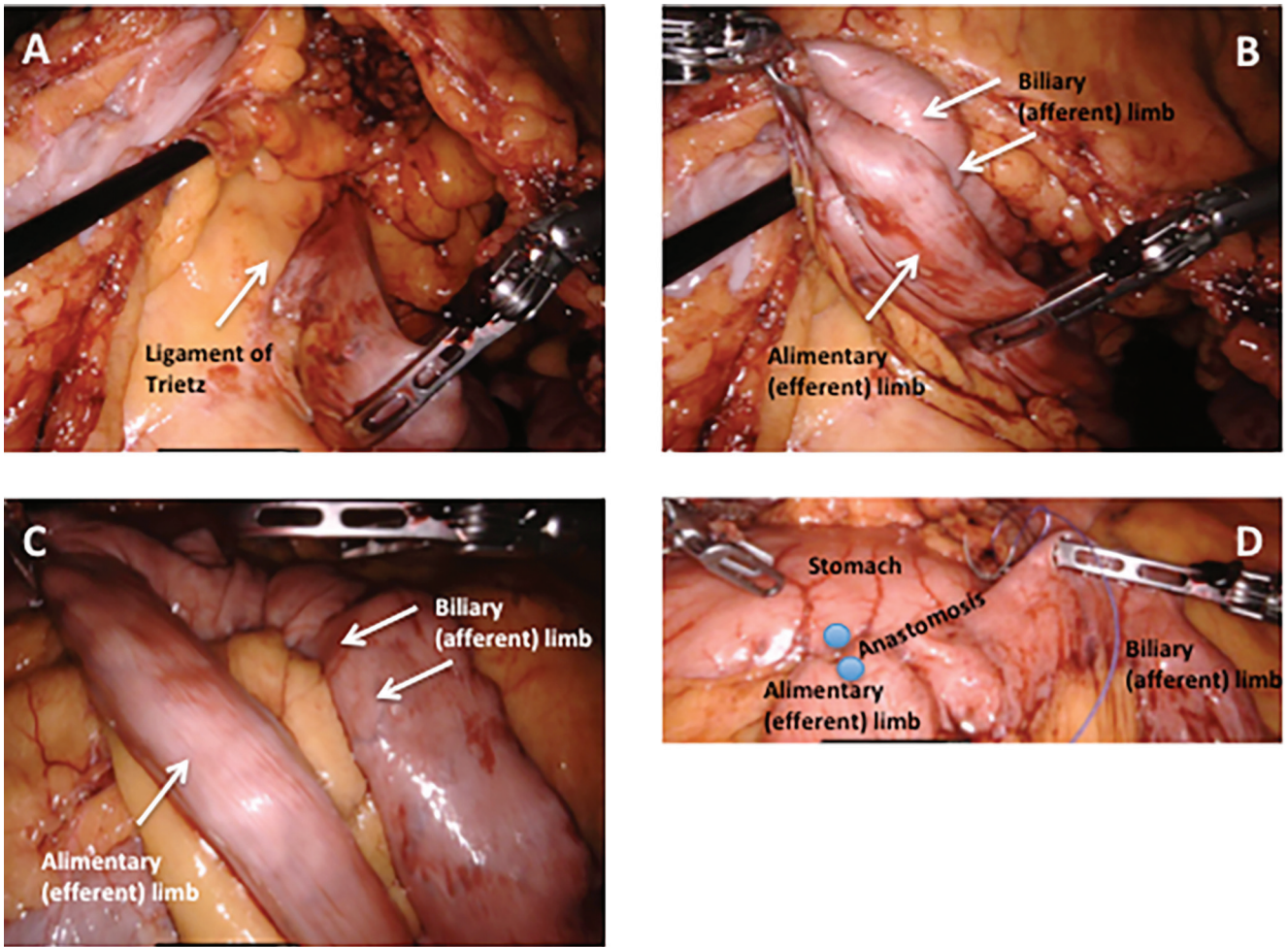


Figure 5. Isoperistaltic technique for minimally invasive antecolic loop gastrojejunostomy. after identification of the ligament of trietz (A), The bowel is followed distally in a clockwise manner, ensuring the biliary limb is positioned to the patient's left (**screen right**) and the alimentary limb to the patient's right (**screen left**) (B And C). The gastrojejunal anastomosis is then fashioned as depicted in D; The biliary (Afferent) limb is positioned toward the patient's left (Proximal) with the alimentary (Efferent) limb positioned towards the patient's right (Distal). We typically make our enterotomy on the distal aspects of the stomach and small bowel (**Blue Dot**), followed by an anastomosis with a linear stapler. The enterotomy is closed with running absorbable suture in one or two layers (as per surgeon's preference).

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