We are living in a time where social distancing can mitigate the spread of the disease. This cannot stop us from sharing knowledge and experiences which will improve healthcare worldwide. We have the tools that allow us to make it available to everyone and Hernia U is part of this arsenal.

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## Conflicts of interest

DL Lima and RNCL Lima have no conflict of interests.

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# Use of endoluminal vacuum-assisted therapy for treatment of gastric fistula after Appleby procedure

## Uso de la terapia de vacío endoluminal para el tratamiento de la fístula gástrica tras el procedimiento de Appleby

The use of vacuum-assisted therapies for anastomotic leakage after rectal resection is a well-known minimally invasive technique. It showed excellent results in the literature, with successful curative rates over 90%.[1]

A novel use of endoluminal vacuum-assisted therapies for treatment of upper gastrointestinal (GI) tract defects has recently been proposed. Several studies have been published in the literature, reporting promising results on the use of

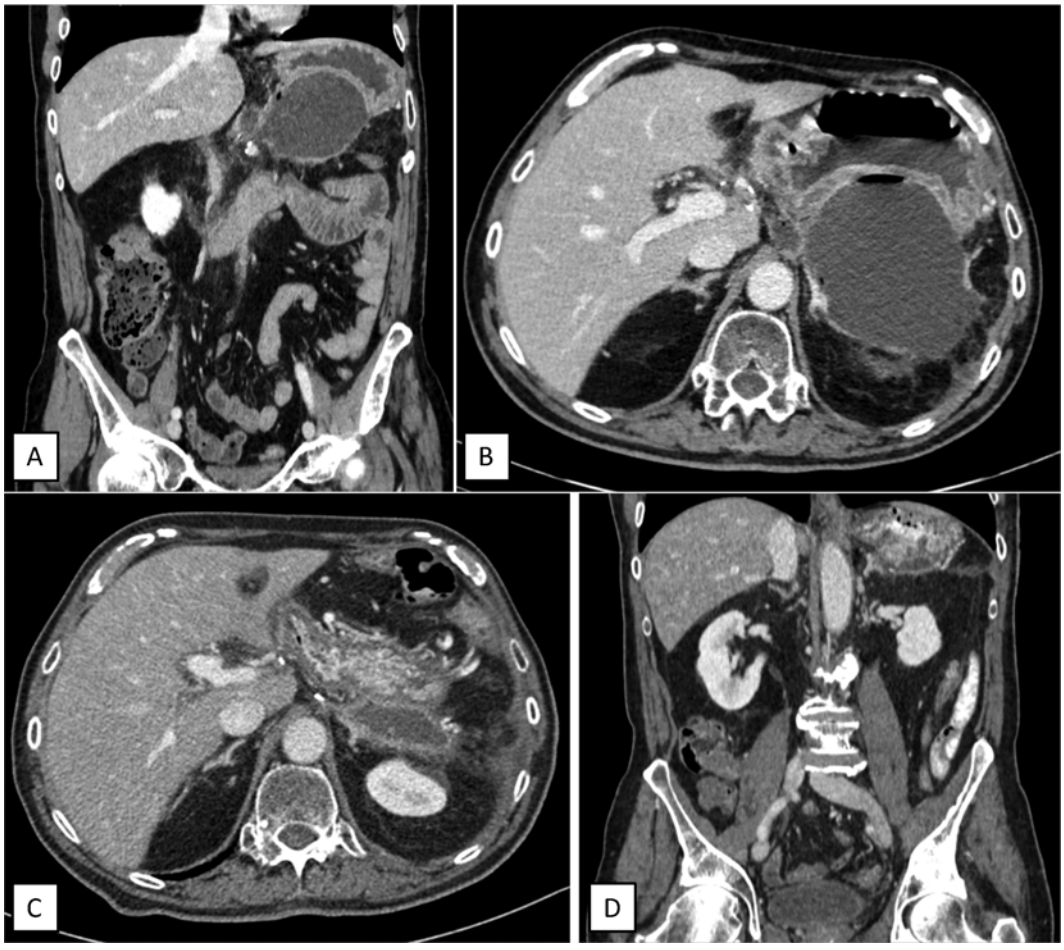


**Fig. 1 – Post-operative scheduled CT scan showing retrogastric collection (A: Coronal view. B: Cross-section showing posterior gastric wall thinning) and control CT scan after completing endoluminal vacuum-assisted therapy, showing decrease in collection size, without defects on the gastric wall (C: Cross-sectional view. D: Coronal view).**

these techniques after esophageal anastomotic leakages, gastric (mainly in bariatric surgery) and colorectal leaks and fistulas.[2] We herein present, to our knowledge, the first case of endoluminal vacuum-assisted therapy for treatment of gastric fistula secondary to gastric ischemia after Appleby procedure for pancreatic ductal adenocarcinoma (PDAC).

A 67-year-old male with history of tobacco consumption, Hodgkin's lymphoma and lumbar spinal stenosis and a 6-month low back pain resistant to analgesic treatment. Finally, he was diagnosed with a pancreatic body tumor, which was considered locally advanced because of infiltration of less than 50% of the celiac trunk without involvement of the superior mesenteric artery (SMA). Splenic artery and vein were also involved. He received neoadjuvant chemotherapy (gemcitabine plus abraxane) for 9 cycles, followed by concomitant radiation therapy and oral capecitabine for 2 months.

The case was presented in the Multidisciplinary Meeting after neoadjuvant therapy and because there was no disease progression, still invading the celiac trunk without involvement of neither gastroduodenal artery, nor SMA, nor portal vein, a curative resection was decided. A modified Appleby procedure (en-bloc distal pancreatectomy and celiac trunk resection with gastric preservation) was performed. The immediate post-operative period was uneventful, so the patient could be discharged 7 days later. The pathology report informed of infiltrating ductal adenocarcinoma of high-grade clear cells, stage ypT1cN0 (0 out of 33 lymph nodes). One month after surgery, in a scheduled post-operative CT scan, a 108 × 79 mm retrogastric collection was diagnosed, alongside a marked thinning of a 1 cm in diameter area in the lower face of the gastric fundus, in contact with the collection, suggestive of gastric rupture secondary to ischemia (Fig. 1A and 1 B). Although the patient was completely asymptomatic, he was readmitted and a CT scan-guided puncture was performed, obtaining purulent liquid positive to multisensitive Escherichia coli. Pancreatic amylase levels in the collection were in normal range (<1000 U/L). Antibiotic treatment with Amoxicillin/clavulanic acid was initiated, alongside nasogastric tube placement, fasting and parenteral nutrition.

An esophagogastroduodenoscopy (EGD) was performed 6 days later, showing a 1 cm wall defect in the posterior gastric wall, without signs of ischemia in the rest of the stomach. It was decided to treat the gastric defect with endoluminal vacuum-assisted therapy (Eso-SPONGE®, Braun). A sponge was placed inside the cavity through endoscopic direct view and afterwards connected to a negative pressure device

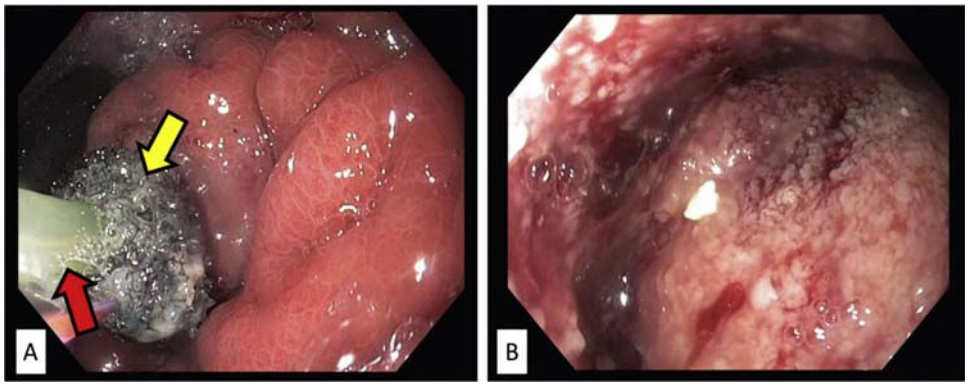


**Fig. 2 – Endoscopic images showing endoluminal vacuum-assisted therapy (EsoSponge®, Braun) replacement. (A) The sponge covering the gastric defect (yellow arrow), in contact with the negative pressure therapy probe (red arrow). (B) Inside the cavity, in which granulation tissue and fibrin detritus are observed.**

(Fig. 2). Follow-up endoscopies were repeated every 48–72 h, showing progressive improvement, with a decrease in cavity size, as well as in purulent content and formation of granulation tissue. In each control, the sponge was replaced by a smaller version according to the observed changes in the defect size. The duration of treatment was 11 days, including a total of 4 sponge replacements.

A control CT scan performed afterwards showed a 23 × 61 × 17 mm collection, with no evidence of oral contrast leak (Fig. 1C and D). Food intake was restarted, and the patient was discharged without new complications after 5 months of follow-up and normal CT-scans.

Locally advanced pancreatic cancer involving the celiac axis has classically been considered unresectable. In selected patients, following neoadjuvant therapy, modified Appleby technique following neoadjuvant therapy has proven to be a safe procedure with favorable outcomes. Recent publications[3] demonstrated a median survival of three years after successful arterial resection. However, gastric ischemia is one of the most feared complications of this technique, being responsible for a wide range of problems that go from gastric motility disorders to gastric perforation. In order to avoid that, it is recommended to preserve the left gastric artery (LGA), that was routinely included in en-bloc resection during modified Appleby procedures. In our case, the tumor involved the celiac trunk including the LGA, whose origin was not independent as an antecedent first branch, which only occurs in 68–72% of cases.[4]

Nowadays, minimally invasive and bloodless methods are arising for the treatment of upper GI defects. For example, in hemodynamically stable patients with benign esophageal perforations, endoscopic stenting may allay the potential morbidity of a surgical intervention. Comparing this technique to surgical repair, a recent systematic review reported a higher success rate (88% vs 83%) as well as a decrease in mortality rate (7.5% vs 17%).[5] Nevertheless, stenting can present potentially serious complications such as migration, dysphagia, hemorrhage, stent fracture, airway compromise or allergic reactions.[6]

Endoluminal vacuum-assisted therapies have been recently proposed as a novel technique for treatment of upper GI tract defects. A drainage sponge is placed under direct endoscopic view either inside the cavity or into the upper GI lumen and afterwards it is connected to a continuous negative pressure system via a nasogastric tube. This system allows drainage of the perianastomotic leak abscess, as well as favors changes in perfusion and reduction of interstitial edema, stimulating granulation and re-epithelialization of surrounding tissues.[7] In a recent study, complete restoration of the esophageal defect was achieved in 60 out of 77 patients (77.9%).[7]

In conclusion, in our specific case, the use of endoluminal vacuum-assisted therapy (Eso-SPONGE®, Braun) was a good option to treat gastric perforation secondary to ischemic gastropathy after modified Appleby procedure for pancreatic cancer in the reported case, allowing intraabdominal abscess drainage, granulation of the cavity walls and closure of the gastric wall defect. Moreover, this avoided the need for reoperation and also a longer hospital stay. In the future, randomized controlled trials will be required to confirm our proposed treatment strategy.

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# Hybrid management for intestine preservation in intussusception due to Peutz-Jeghers syndrome in an adult patient

## Manejo híbrido con preservación de intestino en invaginación intestinal por síndrome de Peutz-Jeghers en un paciente adulto

Peutz-Jeghers syndrome (PJS) is a rare autosomal dominant disease with an estimated prevalence of 1:100,000 births.[1,2] It is characterized by pigmentation of the skin and mucosa and multiple hamartomatous polyps in the gastrointestinal tract.[3] The average age of presentation is usually between 11 and 13 years of age, and approximately, half of the patients will experience symptoms before the age of 20.[2] Although most polyps are usually jejunal, they can also be found in the ileum, stomach, duodenum, and colon. Intussusception or bleeding are often complications associated with the presence of polyps[4].

Intussusception cases occur more frequently in the pediatric population, mainly in the first 6 years of life, with a percentage of 73% of intussusception from any cause, while in those over 18 years this percentage drops to 23%.

We present the case of a 44-year-old woman with a history of PJS that is admitted to the Emergency Room with signs of intestinal occlusion. As background she referred two laparotomies in early childhood with extensive intestinal resections due to intussusception, living however a normal life without intestinal failure; and a recent hospitalization 30 days prior to admission in our Hospital for intestinal occlusion, where she underwent exploratory laparotomy and surgical reduction of the intussuscepted intestine. The patient was discharged but continued with oral intolerance and abdominal pain, so she was referred to our institution. She was admitted with moderate intensity intermittent abdominal pain and vomiting, hemodynamically stable. There were no alterations in the laboratory. A computed tomography (CT) showed two small bowel intussusceptions. The longest one, projected in the lower right quadrant, involved the ileum and generated moderate distention of proximal small bowel; and the other one, shorter in length, projects into the epigastrium involving the jejunum. A moderate free fluid is associated. No vascular compromise was found (Fig. 1).

Due to the prior history of extensive intestinal resections and the appearance by CT of short small bowel and both intussusceptions showing intestinal polyps as lead point, an hybrid approach is decided (surgical and endoscopic) to treat the cause while preserving intestinal length. An exploratory laparotomy was performed, and revision of the small bowel showed two intussuscepted bowel segments: one close to the Treitz angle (proximal) and another close to the ileocecal valve (distal) (Fig. 2A and B) with intestinal dilation proximal to the occlusion site. Both intussusceptions are manually desinvaginated. New revision of the small bowel shows approximately 1 meter total of intestine from the Treitz angle to the ileocecal valve. A hand-assisted intraoperative enteroscopy is performed at the same time, in which several polyps of different sizes are observed. In the proximal and distal invagination sites, polyps larger than 4 centimeters are encountered, which are resected with a mucosectomy technique (Fig. 2C and D).