



Gastric Leak Treated by Endoscopic Gastric Bypass with Metal Stent in Stent Technique in Normal Volume Stomach (Outside Bariatric Setting): First Case Report

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ABSTRACT

A 35 year old gentleman, a citizen of Yemen, had multiple bullet injuries to the right side of his abdomen on 27th February 2022. He was operated in Yemen on the same day. As reported in the operative notes from Yemen; exploratory laparotomy with splenectomy, gastric wall repair, duodenal wall repair, diaphragm repair and transverse loop colostomy were done. Multiple drains were placed in the abdomen to evacuate hematomas and collections. A second look laparotomy was performed on the 10th March 2022, in view of persistent purulent discharge from the drains and also from the midline wound. And on 19th March 2022, the mid line wound was found to have dehisced, leading to further re-exploration and debridement of left diaphragm region, colostomy site and left side chest wound region. Computerised Tomography (CT) of abdomen done on 29th March 2022, in Yemen, revealed minimal amount of fluid in the left subphrenic and peri gastric region. He presented to us in India, on 23rd April 2022, with nonhealing midline abdominal and left chest wounds, with pus discharge. He complained that orally ingested food was coming out immediately from the left side chest wound and from the midline wound in the abdomen, since the time he was allowed oral diet after his initial surgery. Hence, he was placed on total parenteral nutrition (TPN) for most of the time since the first surgery, at the end of February 2022. Despite being on parenteral nutrition, and nil oral intake, the left chest wound continued to produce approximately 150 mL of pus per day, which was compounded by leaky midline wound.

Keywords: Endoscopic; Metal Stent; Gastric leak; Esophagus

INTRODUCTION

On examination, he was thin built, conscious and oriented with respiratory rate of 24 per minute and heart rate of 130 per minute. His blood pressure was 100/70 mm Hg, and was afebrile. The dehisced midline laparotomy wound was draining pus. The

colostomy bag on left side of abdomen was draining faces. The left side chest wound was draining frank pus. Left pleural fluid analysis revealed the presence of 70,000 White blood cells/microL with neutrophil predominance and triglycerides of 94 mg/dL.

CT abdomen performed on 23rd April 2022, revealed a large de-

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fect at greater curvature of body of stomach with contrast leaking into peritoneal cavity, which was extending inferiorly in the left paracolic region up to the colostomy site (Figure 1). Thick walled peripherally enhancing fluid collections with significant inflammatory changes were noted in the left paracolic region and in the pelvis.



Figure 1: CT abdomen shows leak of orally ingested contrast from gastric defect in A) axial view.

On 26th April 2022, Upper Gastrointestinal (UGI) endoscopy revealed a large defect (of nearly 4 cm), with surrounding gross edema and necrosis, in greater curvature of stomach, in the mid aspect of body region, communicating with peritoneal cavity. There was pus seen draining from stomach to peritoneal cavity. The endoscope could easily pass into the peritoneal cavity. The size of the defect or gastric fistula was large. A prolonged period of conservative therapy, with nil oral intake and total parenteral nutrition was ineffective. Surgery was considered difficult. Potential alternative option of endoscopic management was considered.

CASE PRESENTATION

On 26th April 2022, Ovesco over the Scope (OTS) clip (Ovesco Endoscopy AG, Tuebingen, Germany) Size 11, was applied over the defect, with the help of a twin grasper. Two Olympus EZ clips (Olympus Medical Systems India Pvt Ltd) were also applied over the margins of the defect. The pus was still draining into the peritoneal cavity freely. A guidewire was introduced through the endoscope up to duodenum. Over the guidewire, the Niti-S Mega Gastrointestinal stent (TaeWoong Medical, Gyeonggi-do, South Korea) sized 24 × 230 mm was placed over the guidewire up to distal body of the stomach. Two Olympus EZ clips were applied to connect the proximal edge of the mega esophageal stent to the esophageal mucosa.

On the day after endoscopic intervention, the patient had persistent leak from chest wound, draining approximately 80 mL of pus and continued leaky wet midline abdominal wound. The patient also had regurgitation and vomiting. CT abdomen, repeated on 26th April 2022, revealed persistent leakage of oral contrast from the gastric defect, and continued leakage from midline wound and also from the wound in the left side of chest. The patient was continued on TPN for next 5 days. His regurgitation decreased over the next few days. The patient then developed fever (maximum temperature: 102°F). Blood culture revealed *Enterococcus fecium* sensitive to Linezolid.

Intravenous Linezolid and change of central venous catheter helped fever to settle in the following 3 days. The patient and family were counselled regarding a further endoscopic attempt to control the deteriorating clinical situation.

On 3rd May 2022, Olympus CV-150 colonoscope was introduced through the existing esophagogastric stent up to distal body of the stomach. A guidewire was introduced up to the second part of duodenum. The Niti-S™ Esophageal TTS (Through The Scope) Stent (TaeWoong Medical, Gyeonggi-do, South Korea) (18 mm × 120 mm), with 24 mm wide flares, was placed up to first part of duodenum, with proximal part of stent positioned at the level of 2 cm inside the distal part of previously placed stent. Three Olympus EZ clips (Olympus Medical Systems India Pvt Ltd), were applied at the edges of the two stents at the site of approximation of stents.

On 4th May 2022, a day after the latest endoscopic stenting, clinically the chest wound output and leak from the abdominal wound stopped completely. CT abdomen, repeated on 4th May 2022, showed two stents together from esophagus to D1, with only minimal extravasation of oral contrast (Figure 2). The patient was allowed oral diet from 4th May 2022. There was no leak of orally ingested contents. His wounds became dry. He was discharged on 7th May 2022. His wound outputs remained nil, and both the abdominal and chest wounds showed significant healing. On 28th June 2022, both the stents were removed endoscopically. There was no extravasation of oral contrast. The wounds remained dry. CT abdomen, repeated on 29th June 2022 showed no abdominal collections and no extravasation of contrast (Figure 3). The patient underwent colostomy closure on 6th July 2022. The patient is asymptomatic at follow-up.

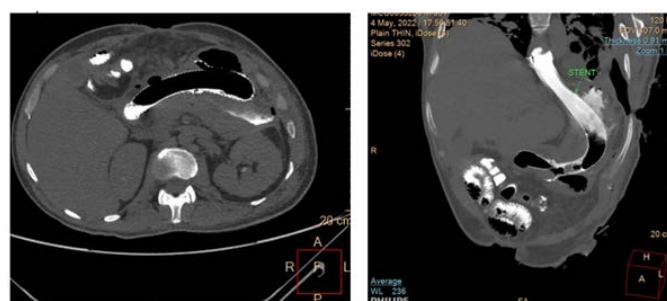


Figure 2: CT image shows stent-in-stent from esophagus to duodenum, with minimal extravasation of contrast through the gastric defect, in A) Axial and B) Sagittal views.



Figure 3: CT image shows no extravasation of oral contrast (after removal of stents), in A) Coronal and B) Axial views.

RESULTS AND DISCUSSION

Gastric leak is a complication known to occur in 0.5%-3% of patients after laparoscopic sleeve gastrectomy, due to a long

staple line and high intraluminal pressure [1]. Gastric leak is encountered in 0.7% of patients after Roux-En-Y Gastric Bypass (RYGB) [2]. Postoperative gastro-jejunal anastomotic leak has been reported in 1%-10% of patients after gastrectomy [3]. Gastric perforation has also been reported to complicate splenectomy [4]. Leakage of orally ingested food through abdominal wounds suggested the presence of communication of the wound with upper gastrointestinal tract (GIT), and not merely a surgical site infection. The leak of orally ingested contents and of salivary and gastric secretions, into left chest and midline wound, might be the reason for dehiscence of laparotomy wound and nonhealing chest wound. The leak did not heal even though the patient was not given anything by mouth since the time of injury. Treating this leak successfully, and allowing oral intake subsequently, had the potential to heal the wounds.

The possible reasons for gastrocutaneous fistula (or gastric leak) could be ischemia during splenectomy, hematoma, staple misfiring, or less likely due to direct damage to the stomach by the bullet, needing intervention on the stomach. Laparotomy for abdominal trauma, especially for multiple gunshot wounds, requiring a damage control surgery, added by the need for emergency splenectomy due to hemoperitoneum, could potentially compromise operative field visibility, leading to damage to short gastric arteries and left gastro epiploic artery branches [5]. Also, poor visibility due to the presence of lot of blood, intraoperatively, could have resulted in gastric tissue being crushed by forceps, causing tissue ischemia and necrosis. Allowing oral diet, too soon after surgery, could have aggravated the potentially compromised or injured area, leading to the formation of a gastric fistula.

Surgery, to close the gastric defect, was deemed to be risky, due to the presence of extensive adhesions in the abdominal cavity related to recent laparotomies and a dehiscent midline laparotomy wound draining pus. Surgery, at this point of time, might cause more fistulations and further injury to organs. Feeding jejunostomy was also difficult. Even if feeding jejunostomy alone were done, gastric secretions and saliva would still leak through the gastric defect leading to no significant clinical benefit. OTSC system was considered a promising endoscopic approach for management of post-laparoscopic sleeve gastrectomy (LSG) leaks in selected patients [6]. The surfaces of the peritoneal cavity had chronic inflammation with friable granulation tissue. Hence, satisfactory clipping was not possible, and the defect was still evident. The defect was too large to be clipped.

Niti S Mega Esophageal stent was considered to bypass the gastric leak as it was previously reported to be successful in the setting of gastric leaks after sleeve gastrectomy, to bypass the defects in a tubular shaped stomach [7]. Our patient did not undergo bariatric surgery. The volume of the stomach in this case was normal/higher than normal. The stomach was not tubular in shape. The guidewire and the stent had to go in a tortuous path along the surface of the stomach and hence, the stent could not be passed beyond the antrum region, leading to persistent leakage. Due to the risk of migration of the mega esophageal stent with reintervention, the next endoscopic intervention was delayed by five days. A through the scope (TTS) metal stent was chosen, as the scope was inserted through the already placed Mega stent. The stent could be placed through

the scope. The fully covered stent with the flares as wide as the previously placed stent, was chosen for relatively tight approximation.

Migration rate of these stents is reported to be as high as 30% [8]. Even with minimal migration, of either the first or second placed stents, the leak might not have settled or potentially could recur. This patient did not have migration of stents, likely due to the placement of Olympus EZ clips at the edges of stents. Previously, stents were successfully placed from esophagus to duodenum to bypass the gastric defects in tubular stomach after bariatric surgery [7]. To our knowledge, this is the first case of endoscopic gastric bypass by metal stenting, with stent in stent technique, from esophagus to duodenum to bypass the defect in the normal volume stomach.

CONCLUSION

In summary, our report indicates that if 6-7 weeks period of conservative treatment for gastric fistula has been ineffective and if peritonitis is minimal and if margins of the large gastric defect are edematous and necrosed, endoscopic stent placement is a good choice of treatment. This technique has the advantages of decreased procedure time and far lesser complications, reduced hospital time and is effective in the treatment of gastric fistula. It is possible and necessary to stent from esophagus to duodenum to bypass the gastric defect, especially if the margins of the defect are edematous and necrosed, even if the volume of stomach is normal (and not reduced as in the case of sleeve gastrectomy).

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None

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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