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Case Report

Percutaneous transgastric stenting of proximal jejunal obstruction secondary to direct invasion of a pancreatic carcinoma

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ABSTRACT

Pancreatic cancer has been identified as one of the most common malignant causes of upper gastrointestinal obstruction. Most common sites of obstruction include the pyloric region and second and third portions of the duodenum. If surgical gastrojejunostomy is not a viable option, metallic stent placement may be performed either by transoral or transgastric approach. Transgastric technique is considered to be more invasive and is often employed only in failed attempts to insert a stent using transoral technique. This report presents a 70-year-old patient with pancreatic cancer involving the proximal jejunum. Although this is a rarely described location for stenting, the patient was successfully treated using transgastric technique.

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Keywords: Fluoroscopy; Jejunum; Self-expandable metallic stent

Introduction

Upper gastrointestinal (GI) obstruction is a common complication of advanced GI malignancies. It is considered as a preterminal event due to the short survival time and unfavorable condition of most patients presenting with this condition.^{1–3} Patients with upper GI obstruction usually present clinically with poor oral intake, nausea, vomiting, abdominal discomfort and weight loss.^{3–5}

Pancreatic cancer has been identified one of the most common malignant causes of upper GI obstruction.^{3,4,6,7} The most common sites of upper GI obstruction reported in literature are the gastric pyloroantral region and the second or third portions of the duodenum.^{6,8–10} Only a few studies have reported the treatment of distal duodenal lesions.^{10,11} To the author's knowledge, there has been no previous report of malignant involvement and treatment of the proximal jejunum.

In patients where surgical gastrojejunostomy is not a viable option, metallic stent placement may be performed using two approaches, transoral or transgastric.⁵ The transgastric technique is considered to be more invasive and is often employed only in failed attempts to insert the stent using the transoral technique.^{11,12} Here, we report a case of successful transgastric technique after a

failed transoral approach of stenting a proximal jejunal obstruction secondary to direct invasion of pancreatic cancer.

Case Report

A 76-year-old male presented with 1 month history of weight loss of about 2 kg, diffuse abdominal pain, dyspnea and vomiting which prompted hospital admission. Contrast-enhanced abdominal computed tomography revealed a 4 cm infiltrative lesion at the body of the pancreas with multiple liver nodules (Fig. 1). The pancreatic mass exhibited proximal jejunal invasion with associated dilatation of the duodenum accounting for the symptoms of obstruction. Biopsy of the liver nodules revealed adenocarcinoma likely representing metastasis from the pancreatic tumor.

An initial attempt to relieve obstruction was made by performing an endoscopic transoral approach to place a stent (Fig. 2A). However, the approach was unsuccessful because of the distant location of the stricture beyond the reach of the endoscope. The patient was subsequently referred to the general surgery for a palliative gastrojejunostomy. Due to the poor clinical status of the patient, however, a minimally invasive approach was decided upon by the medical team. A fluoroscopically-guided transoral stent insertion was initially attempted by the interventional radi-

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ologist. However, access to the stricture proved difficult due to the tortuous nature of the course from the stomach to the site of obstruction in the proximal jejunum (Fig. 2B). The decision was then made to create a percutaneous gastrostomy and utilize this approach to access the stricture and deliver a stent through it.

The gastrostomy procedure was performed under local anesthesia. A previously inserted nasogastric Levine tube was used to infuse air into the stomach to assist in the anterior gastric wall puncture. Two gastropexy sutures (Cook, Bloomington, IN, USA) were used to fix the anterior wall of the stomach to the anterior abdominal wall. An anterior transgastric puncture was made using a 18 G Chiba needle (Cook) and exchanged with a 14 Fr introducer sheath (Boston Scientific, Boston, MA, USA). A 0.035 inch in hydrophilic guidewire (GlideWire; Terumo, Tokyo, Japan) and 5 Fr Berenstein catheter (Terumo) were used to navigate the course from the stomach to the proximal jejunum where the stricture was identified. Careful manipulation of the guidewire was made to get

past the stricture segment (Fig. 3; arrow) which was about 4 cm in length. An 18 mm $\times$ 6 cm self-expanding Hercules Pyloric Stent-Graft (S&G Biotech Inc., Seongnam, Korea) was deployed over a 0.035 inch stiff guidewire (GlideWire) into this stricture. Upon deployment, stent waisting was still evident hence a post-stent dilatation was performed using a 16 mm $\times$ 4 cm balloon catheter (Boston Scientific, Marlborough, MA, USA) which eliminated the waisting and restored the patency of the lumen. After the stenting procedure, a 14 Fr gastrostomy feeding tube (Cook) was inserted through the transgastric tract (Fig. 4A).

Symptoms of obstruction resolved after the procedure. Patient's condition improved and the patient was discharged after 2 days.

Follow-up study by fluoroscopy and administration of contrast media through the gastrostomy tube done after two weeks showed a fully expanded stent without waisting and with good passage of contrast media through the stent lumen (Fig. 4B). Adequate gas was demonstrated in the small bowel lumen distal to

Fig. 1. (A-D) Axial computed tomography scan sections of the patient show the infiltrative lesion at the body of the pancreas (curved arrows) involving the proximal jejunum (solid arrows) with associated multiple liver nodules (short arrows) and dilated proximal duodenum (open arrows).

Fig. 2. (A) Failed endoscopic transoral approach due to the inadequate reach of the endoscope to the site of obstruction. (B) Failed fluoroscopic transoral approach due to the tortuous course from the stomach to stricture at the proximal jejunum.

the stent. The gastrostomy tube was removed after one month.

Discussion

The most common malignant causes of upper GI obstruction include pancreatic carcinoma and gastric carcinoma^{2,5,11,13} but pancreatic carcinoma has been cited by some authors as the most common indication for metallic stent placement.^{1,3,4,6,7,10,14}

For patients who are not considered to be suitable candidates for palliative gastrojejunostomy, self-expandable stents have been used to ease obstructions caused by malignancies that directly invade the upper GI tract.⁴ Main indications for stenting include gastric, duodenal, and proximal jejunal malignant obstructions caused by nonresectable tumors.² Stent placement is minimally invasive, can be done in an outpatient setting, is cost-effective and allows rapid gastric emptying with earlier tolerance of oral food intake.^{2,3,6} It is only contraindicated in patients with evidence of GI perforation and the presence of distal GI obstruction.²

Placement of the upper GI stent may be accomplished either via fluoroscopy alone or with a combination of endoscopy and fluoroscopy. Both techniques have yielded similar success rates.^{2,8} An earlier preliminary study by de Baere et al¹² has already established that fluoroscopy-guided approach alone is technically

feasible and allows for accurate placement of stents compared to endoscopy.

Delivery of stents into the gastroduodenum area may be done via either a transoral or percutaneous transgastric approach, both of which may be performed under fluoroscopic guidance alone.^{5,11} The transoral approach is technically successful in most cases with published success rates ranging from 96% to 100%.^{14,15} However, it is more challenging to perform particularly in patients with pancreatic carcinoma¹³ and with more distant lesions in the duodenum compared to lesions in pre-pyloric region.⁸ This difficulty may be attributed to the catheter-guidewire maneuvering challenges within a distended stomach as well as to the tortuous curvature of the duodenum.^{8,14} Park et al¹⁶ enumerated several causes of technical failure in their series using transoral approach, including failure of delivery system advancement because of redundant stomach, failure of guidewire passage because of severe stenosis in the lesion, and failure of stent deployment due to kinking of the introducer. In this case, the tortuous course from the gastric lumen and more distant location of the lesion are the main reasons that made the transoral approach difficult either by fluoroscopy or endoscopy.

Previous authors have described the use of the transgastric approach only after failure with the transoral route.^{11,12} Direct access to the stomach is gained via the placement of an introducer sheath which allows the guidewire and catheter to be directed in the direction of the pylorus, leading to increased control of both the catheter and guidewire.¹⁷ The transgastric technique provides a direct route approach that is useful in pancreatic cancers and duodenal lesions which are technically difficult to stent orally.¹³

However, the transgastric approach is considered to be more invasive compared to transoral route and is associated with several complications. Bessoud et al¹⁴ reported a case of a patient developing pneumoperitoneum and transient epigastric pain 3 days after stent placement, which spontaneously resolved after 2 days. Leakage of ascitic fluid through the gastrostomy orifice was seen in 1 out of 7 patients in a series by Pinto Pabón et al.¹¹ In our case, the gastrostomy tube was removed after 1 month to allow the tract to mature and thereby prevent leakage of gastric content into the peritoneum.

Miller et al⁵ in 2013 compared the outcomes of the transoral and transgastric techniques of stent insertion. Their results showed that both approaches have similar clinical outcomes and that the preferred technique can be tailored depending on the location of the lesion and feasibility of doing a transgastric puncture.

This case highlights the value of the transgastric approach as a useful technique in relieving GI obstruction, particularly when

Fig. 3. Transgastric approach shows wire and catheter manipulation through the stricture (arrow).

Fig. 4. Successful transgastric approach shows the stent properly deployed in the target location with good patency. A 14 Fr gastrostomy tube was inserted through the transgastric tract. (A) After stent placement. (B) Follow-up image after 2 weeks.

the transoral approach has failed.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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