

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://Elsevier.com/locate/radcr>

Interventional Radiology

Gastrojejunoscopy facilitates placement of a percutaneous transgastric jejunostomy in a patient with a pancreaticoduodenectomy and multiple-failed feeding tube placements

Jeffrey Forris Beecham Chick MD, MPH, DABR, James Shields MD,
Joseph J. Gemmete MD, FSIR, Anthony Hage BS, Ravi N. Srinivasa MD*

Department of Radiology, Division of Vascular and Interventional Radiology, University of Michigan Health Systems, 1500 East Medical Center Drive, Ann Arbor, MI 48109, USA

ARTICLE INFO

Article history:

Received 17 July 2017
Received in revised form 21 August 2017
Accepted 5 September 2017
Available online 21 October 2017

Keywords:

Gastrojejunostomy
Interventional endoscopy
Enteral access
Feeding tube placement
Pancreaticoduodenectomy
Interventional radiology

ABSTRACT

Enteral access is one of the most common procedures performed in abdominal and interventional radiology. The surgical anatomy of the postoperative stomach may, however, make enteral access challenging. This report describes a patient with a pancreaticoduodenectomy complicated by a gastrojejunostomy leak who underwent 2 unsuccessful transoral endoscopic nasojejunal tube placements and 2 failed percutaneous gastrojejunostomy tube placements. Eventually, a gastrojejunostomy tube was placed utilizing percutaneous techniques with fluoroscopy assistance and gastrojejunoscopy guidance. A combined technique with fluoroscopy and endoscopy, both controlled by interventional radiology, may be useful in patients with complex postsurgical gastrointestinal anatomy who require enteral access.

© 2017 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Case report

Institutional review board approval was not required for preparation of this report. A 61-year-old woman underwent a pancreaticoduodenectomy with gastrojejunostomy for

pancreatic cancer, which was complicated by a gastrojejunal anastomotic leak and sepsis. Computed tomography of the abdomen and an upper gastrointestinal series confirmed a leak at the gastrojejunal anastomosis with luminal contents within the peritoneal cavity. Because of a hostile abdomen, operative intervention was deferred and a drain was placed within

Competing Interests: The authors report no conflicts of interest.

* Corresponding author.

E-mail address: rnsriniv@med.umich.edu (R.N. Srinivasa).

<https://doi.org/10.1016/j.radcr.2017.09.004>

1930-0433/© 2017 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

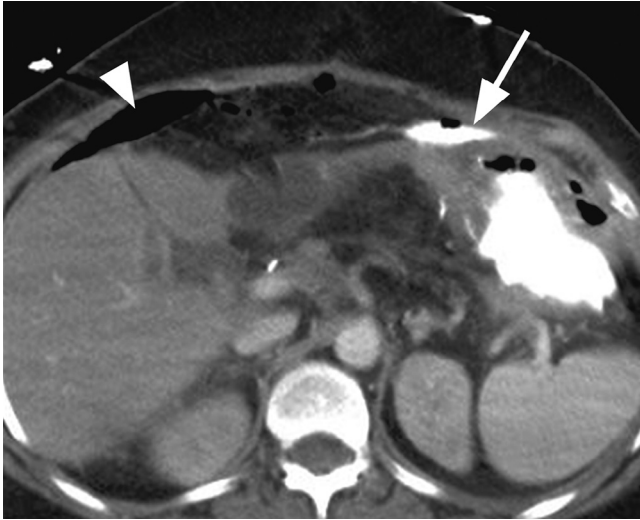


Fig. 1 – Axial computed tomography image of the abdomen with contrast showing extraluminal contrast in the peritoneum anterior to the stomach compatible with leak (arrow). Free air is seen (arrowhead).

the peritoneal fluid collection (Fig. 1). Given the patient's poor medical condition and nutritional status, a tracheostomy was placed and enteral access was requested.

Two bedside and 2 fluoroscopic attempts at nasojejunal tube advancement were unsuccessful. Gastroenterology was consulted for endoscopically guided nasojejunal tube placement. Because of the leak at the gastrojejunal anastomosis, visualization was difficult. The afferent limb was visualized; however, the efferent limb could not be cannulated. A second attempt at placement of a nasojejunal tube by gastroenterology was made 2 days later, and a nasojejunal tube was successfully placed into the efferent limb. Unfortunately, because of a tight stenosis in the mid-jejunum, the tube could not be placed distally and it became dislodged into the stomach the following day. An interventional radiologist with 30 years of experience then made 2 fluoroscopic attempts at placement of a percutaneous gastrojejunostomy; however, because of the sharp

angulation of the anastomosis, this was unsuccessful. Subsequent discussions considered placement of a percutaneous or surgical jejunostomy; however, this was not thought to be optimal because of the patient's body habitus (body mass index of 38 kg/m²) and clinical status. A percutaneous fluoroscopic-guided gastrojejunostomy placement with the assistance of gastrojejunoscopy was considered the safest option (Fig. 2).

Under fluoroscopic-guidance, the stomach was insufflated through a nasogastric tube. A 2-point gastropexy (Kimberly Clark, Dallas, TX) was performed. An 18-gauge single-wall needle (Cook Medical, Bloomington, IN) was used to puncture the stomach between the gastropexies and an Amplatz Super Stiff Guidewire (Boston Scientific, Marlborough, MA) was coiled within the stomach. A 9-French 25-cm Pinnacle Sheath (Terumo Medical, Tokyo, Japan) was placed over the wire and used to place a second safety Amplatz Super Stiff Guidewire (Boston Scientific) within the stomach. Over one of the wires, the tract was dilated using a 24-French Nephromax High Pressure Balloon Catheter (Boston Scientific) and the metal sheath was placed into the stomach. Through this sheath, a 16.5-French, 5.5-French working channel, flexible endoscope (Olympus Medical, Center Valley, PA) was placed through the 24-French cannula with direct visualization of gastric rugal folds (Figs. 3 and 4). Under direct visualization, enteric contents could be seen flowing toward the gastrojejunal anastomosis. The direction of flow was followed with the endoscope and the gastrojejunal anastomosis was easily visualized. The endoscope was then advanced into the efferent limb of the small bowel (Fig. 5). An Amplatz Super Stiff Guidewire (Boston Scientific) was placed through the working channel and the endoscope was removed over the wire. A 9-French 40-cm sheath was then placed into the efferent loop and a 5-French Glidecath (Terumo Medical) was advanced further into the small bowel. Contrast injection showed a severe focal stricture within the jejunum 9 cm distal to the anastomosis (Fig. 6). This was traversed using a 5-French Glidecath (Terumo Medical) and an angled tip Glidewire (Terumo Medical). The wire was exchanged for an Amplatz Super Stiff Guidewire (Boston Scientific) and a 26-French Peel-Away Introducer Sheath (Cook Medical) was placed. A 22-French jejunostomy tube (Halyard Health, Alpharetta, GA) was then introduced through the peel-away sheath and the balloon was inflated within the stomach.

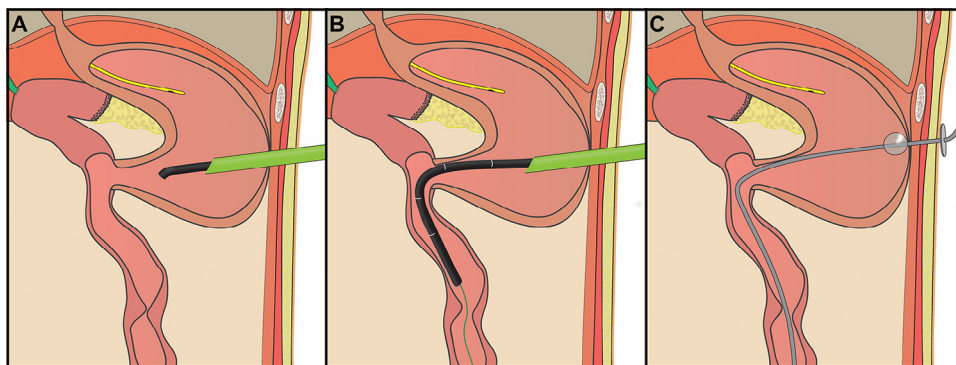


Fig. 2 – Schematic illustration depicting gastrojejunoscopy-facilitated placement of a percutaneous transgastric jejunostomy in a patient status post pancreaticoduodenectomy. (A) Nasogastric tube insufflation of the stomach and endoscopic visualization of the gastrojejunal anastomosis. (B) Advancement of the endoscope into the efferent limb and placement of an Amplatz super-stiff guidewire. (C) Removal of the endoscope followed by jejunostomy tube placement.

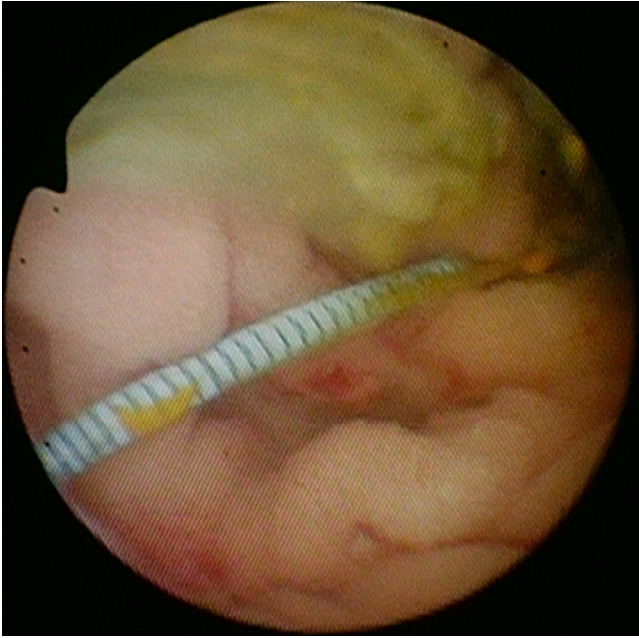


Fig. 3 – Percutaneous gastrojejunoscopy image demonstrating rugal folds within the stomach with enteric contents noted to be flowing toward the anastomosis on live endoscopy. An Amplatz Super Stiff Guidewire is partially seen coiled within the stomach.

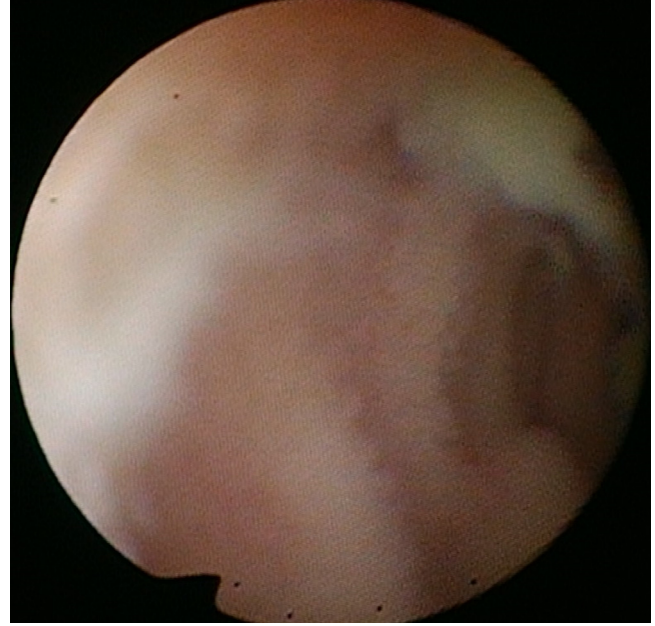


Fig. 5 – Additional percutaneous gastrojejunoscopy image showing successful cannulation of the small bowel, with visualization of small bowel folds.

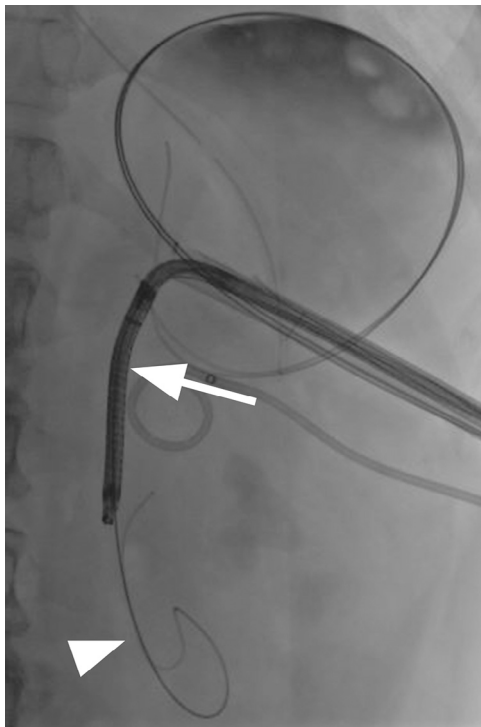


Fig. 4 – Frontal fluoroscopic image during percutaneous gastrojejunoscopy showing the endoscope passing through the gastrojejunal anastomosis (arrow) and a coaxial-placed Amplatz Super Stiff Guidewire (arrowhead) through the endoscope working channel.

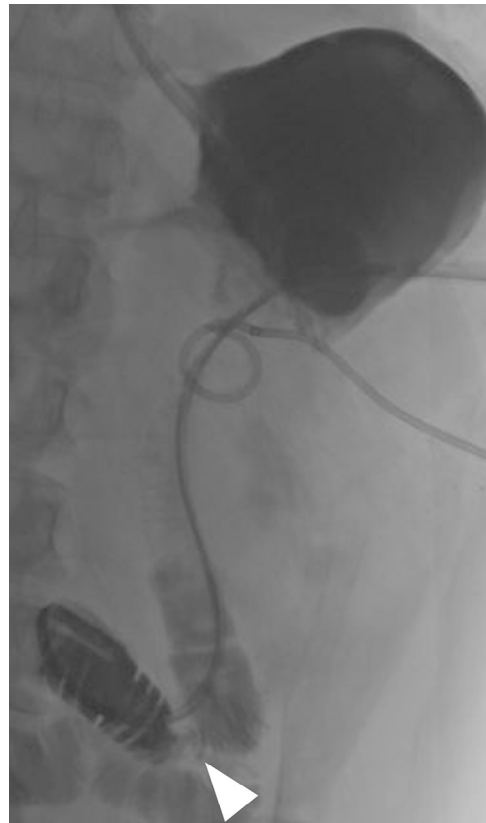


Fig. 6 – Frontal fluoroscopic image showing successful placement of a 22-French jejunostomy tube within the efferent limb. The balloon is inflated within the stomach. A tight stricture is noted 9 cm from the gastrojejunal anastomosis, likely the cause of transoral endoscopic nasojejunal tube placement failures.

Contrast injection showed appropriate position of the tube (Fig. 6). The patient tolerated jejunostomy tube feeds for the next 3 days and continues to improve clinically.

Discussion

Percutaneous enteral access is one of the most common procedures performed in abdominal and interventional radiology [1,2]. The surgical anatomy of the postoperative stomach and small bowel, however, may make enteral access challenging [3]. This report describes a patient with a pancreaticoduodenectomy complicated by a gastrojejunostomy leak who underwent 2 unsuccessful transoral endoscopic nasojejunal tube placements and 2 failed percutaneous gastrojejunostomy tube placements. Eventually, a gastrojejunostomy tube was placed utilizing percutaneous techniques with fluoroscopy assistance and gastrojejunoscopy guidance. A combined technique with fluoroscopy and endoscopy, both controlled by interventional radiology, may be useful in patients with complex postsurgical gastrointestinal anatomy who require enteral access [4]. Percutaneous endoscopy is an invaluable technique that should be added to the abdominal and interventional radiology armamentarium. Technical success may be achieved with minimal risk to the patient, and proce-

dures that are otherwise unsuccessful by fluoroscopy may be made successful with the combination of fluoroscopy and endoscopy, thereby avoiding additional surgical procedures and reducing procedure and fluoroscopy times. Although additional studies are needed to validate this technique, percutaneous gastrojejunoscopy may play a useful role in patients with complex postsurgical gastrointestinal anatomy who require enteral feeds.

REFERENCES

- [1] Barkmeier J, Trerotola S, Wiebke E, Sherman S, Harris V, Snidow J, et al. Percutaneous radiologic, surgical endoscopic, and percutaneous endoscopic gastrostomy/ gastrojejunostomy: comparative study and cost analysis. *Cardiovasc Intervent Radiol* 1998;21(4):324–8.
- [2] Sutcliffe J, Wigham A, Mceniff N, Dvorak P, Crocetti L, Uberoi R. CIRSE standards of practice guidelines on gastrostomy. *Cardiovasc Intervent Radiol* 2016;39(7):973–87.
- [3] Toihata T, Hashimoto D, Hayashi H, Chikamoto A, Beppu T, Baba H. Intraoperative gastrojejunoscopy-assisted fistulojejunostomy for postoperative pancreatic fistula. *Asian J Endosc Surg* 2014;7(4):311–3.
- [4] Ahmad W. Percutaneous endoscopy to diagnose malignancy in gastric outlet obstruction of excluded stomach after gastric bypass. *Ann Gastroenterol* 2017;30(3):367–9.