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Successful percutaneous transgastric diversion of a chronic post-operative combined pancreaticocutaneous and gastrocutaneous fistula using a snare-target technique: A case report

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ABSTRACT

INTRODUCTION: Gastrocutaneous fistula complicating a post-operative or post-pancreatitis pancreatic fistula is uncommon, but has a high mortality rate and typically occurs 6–9 weeks after initial drainage. Conventional methods of treatment may be limited by the size of the fistula tract and visibility.
PRESENTATION OF CASE: A 57-year-old man presented with a pancreatic duct leak, ten days after undergoing a distal pancreatectomy for renal cell carcinoma metastasis. Initial drainage attempts resulted in a chronic pancreaticocutaneous fistula (PCF)[1] complicated by a separate gastric fistula sharing the same cutaneous tract along the inserted drain as well as recurrent symptomatic pleural effusions requiring repeat hospitalizations for management. The chronic fistula tract was too small for conventional direct puncture under fluoroscopic or endoscopic ultrasound guidance; therefore, percutaneous transgastric diversion of the combined pancreatico-gastrocutaneous fistula using a snare-target approach was performed with complete resolution of clinical symptoms.
DISCUSSION: Complicated pancreatico-gastrocutaneous fistulae are rare and typically require drainage, either surgically or via percutaneous direct transgastric puncture or endoscopic-ultrasound guided stent insertion. This case report demonstrates that a minimally-invasive percutaneous snare-target approach can be effective in treating complex fistulae too small to be accessed through these conventional methods. This case also demonstrates that transgastric drainage along the tract, remote from either organ's fistula origin, can successfully divert and resolve the complex fistula without requiring direct drainage of the pancreatic duct itself.
CONCLUSION: Incorporating the snare-target technique facilitates accurate transgastric drain placement within chronic fistula, particularly when the fistula caliber is too small for conventional drainage methods.

1. Introduction

Pancreatic duct leaks are a common complication following pancreatectomy, occurring in approximately one in three patients, and are associated with abscess formation, sepsis and hemorrhage [1]. External percutaneous drainage of these leaks allows for local control, however, can lead to chronic pancreaticocutaneous fistulae (PCF) that may be challenging to resolve [2]. Post-operative PCFs are a major cause of morbidity and mortality, affecting between 13–41% of cases [3]. Isolated PCFs can also become complicated by additional fistulae involving other organs but which share the same cutaneous tract. Gastrocutaneous fistulae in particular are extremely rare, but have been shown to be life-threatening with a 50% mortality rate and to typically occur 6–9 weeks after initial drainage [4].

To avoid cutaneous fistulae formation, initial transgastric drainage of pancreatic fluid collections is preferred over external [5]. Conventional methods such as endoscopic-ultrasound or percutaneous direct transgastric puncture, which involves the placement of a needle or drain through the skin and stomach into a fluid collection under imaging guidance, are unfortunately restricted by the size of the fistula [5], as visualization is needed to target the tract. Rather, a snare-target approach can be effective for small or occult fistulae. This report describes the successful percutaneous treatment of a chronic, post-operative combined pancreatico-gastrocutaneous fistula using a snare-target approach for transgastric drain insertion. This work is in line with the SCARE 2020 criteria [6].

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[1] PCF: pancreaticocutaneous fistula

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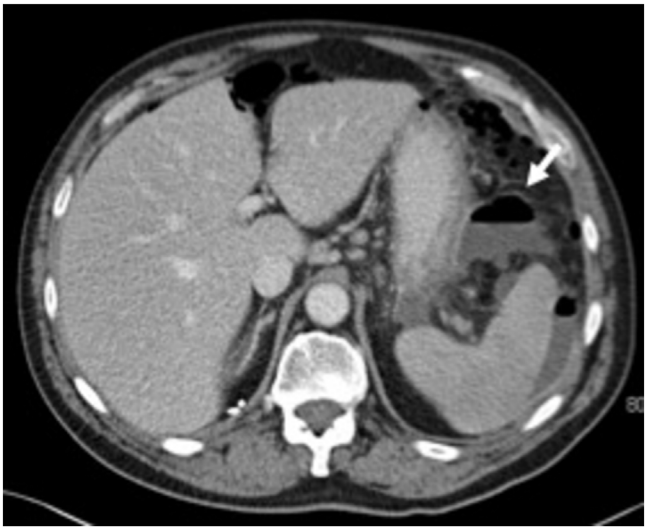

Fig. 1. Post-distal pancreatectomy contrast enhanced CT scan with small adjacent loculated rim-enhancing fluid collections (white arrow). Drain inserted into the fluid was lipase positive confirming post-pancreatectomy leak.

2. Presentation of case

A 57-year-old man presented with fever, abdominal pain and leukocytosis ten days after undergoing a distal pancreatectomy for renal cell carcinoma metastasis. CT revealed a 6.9 × 3.1 × 3.6 cm suspected abscess in the left upper quadrant (Fig. 1). Interventional radiology was consulted and a percutaneous drainage catheter was inserted directly into the collection. The drained fluid was negative for bacterial growth, however, elevated lipase/amylase levels indicated a pancreatic leak. Initial attempt at drain removal after four weeks failed clinically and required drain reinsertion with a prolonged course due ongoing pancreatic leak and pancreatic-ocutaneous fistula. Nearly three months post-pancreatectomy, a gastric fistula was suspected clinically and was confirmed radiographically arising from the posterolateral gastric fundus (Fig. 2). The pancreatic and gastric fistulae were separated by approximately 3 cm and shared the same cutaneous tract along the inserted drain. Two additional trials of drain removal failed clinically and required drain reinsertion through the fistula cutaneous site. The combined pancreatico-gastrocutaneous fistula was complicated by a recurrent large symptomatic left pleural effusion that required two separate admissions for chest tube insertion.

Nearly 4.5 months after initial drainage, a multidisciplinary discussion between general surgery and interventional radiology led to the plan to attempt percutaneous transgastric diversion of the complex combined pancreatico-gastrocutaneous fistula in hopes of controlling the fistula, resolving the recurrent symptoms, and avoiding repeat surgery. The small caliber of the residual fistula (2.2 cm at maximum width) was felt to preclude endoscopic-ultrasound or conventional direct transgastric puncture (Fig. 3). Therefore, a percutaneous transgastric snare-target approach was proposed to be performed in interventional radiology.

Ceftriaxone 2 g IV and Metronidazole 500 mg IV were given pre-procedure. A 5 F angled catheter inserted into the fistula cutaneous exit site was unable to visualize or cannulate the gastric fistula to gain access into the gastric lumen. Therefore, a 25-mm GooseNeck snare (ev3, Plymouth, MN) was inserted through the cutaneous fistula tract and positioned adjacent to the previously documented location of the gastric fundus fistula and downstream from the pancreatic resection margin leak (Fig. 3A). A 22-gauge needle was then inserted transgastric under gun-sight fluoroscopic guidance from the epigastric region into the snare (Fig. 3A, B). An 0.018" wire was captured by the snare and pulled through the left flank cutaneous fistula site, providing transgastric, transfistula through-and-through access. A 10 F multipurpose catheter was inserted from the epigastric region through the stomach and the pigtail loop was formed in the small fistula tract (Fig. 3C).

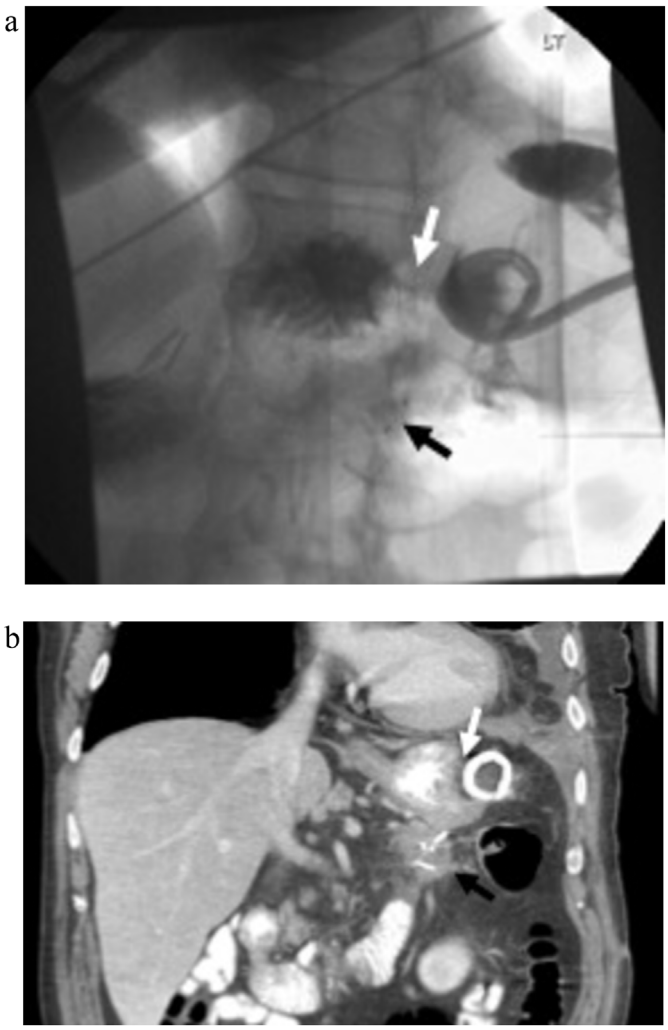

Fig. 2. (a) Fluoroscopy and (b) coronal CT images. Contrast injected into the pigtail drain within the pancreaticocutaneous fistula demonstrates a new gastrocutaneous fistula near the fundus (white arrow), located approximately 3 cm from the distal pancreatectomy site (black arrow).

There were no post-procedural complications nor further drainage out of the left flank fistula site. The left chest tube was removed two days post-procedure without any recurrence. The transgastric catheter was left to drain externally for six weeks to allow the transgastric tract to mature and was then removed. CT imaging eleven weeks after the drain removal showed no recurrent collections. The patient remained asymptomatic with normal imaging findings 27 months post-transgastric diversion.

3. Discussion

Simple pancreaticocutaneous fistulae are common complications of pancreatic surgery. Rarely, there may be the formation of additional fistulae from enzymatic damage to adjacent organs, such as the stomach. Gastrocutaneous fistulae are associated with high rates of mortality (50%) due to the stomach's vascularity and risk of life threatening hemorrhage and sepsis [4]. However, compound pancreatico-gastrocutaneous fistulae and their management are

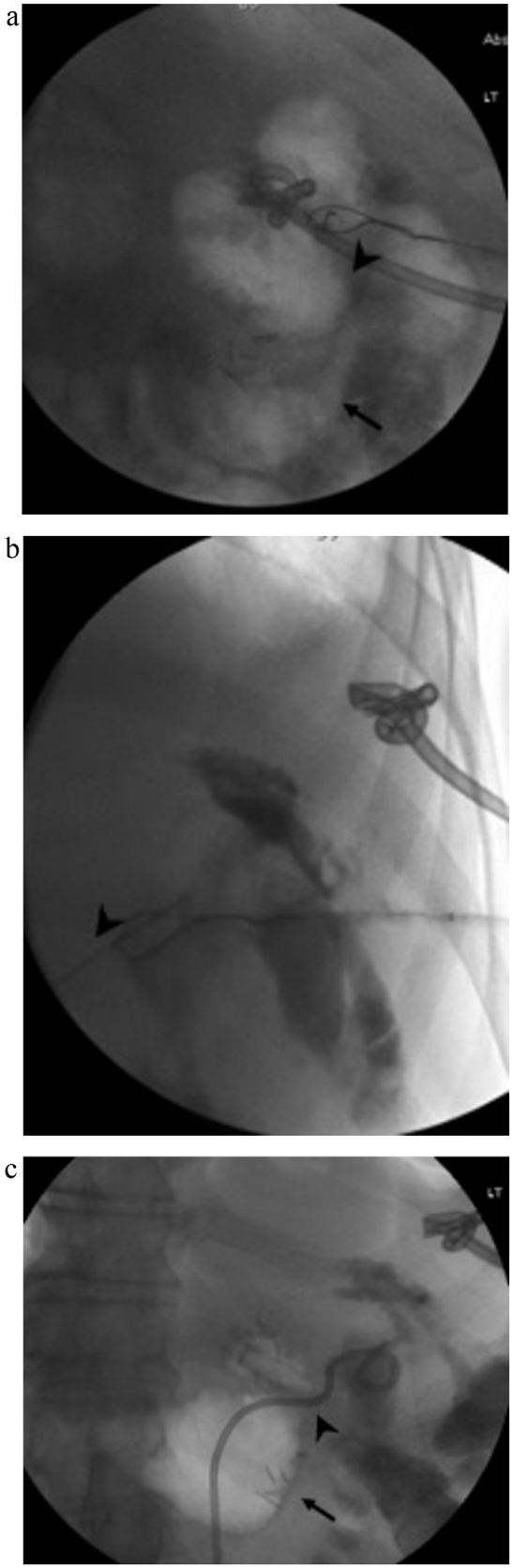

Fig. 3. Transgastric drain placement for pancreatico-gastrocutaneous fistula using snare-target technique. (a) Gunsight and (b) AP fluoroscopic transgastric 22 G needle targeting of a 25 mm gooseneck snare inserted through the fistula adjacent to the gastric fundus gastrocutaneous fistula origin (arrowhead) and just downstream from the pancreatectomy resection margin (arrow). (c) A 10 F multipurpose pigtail catheter was inserted transgastric over a through-and-through 0.018" wire into the fistula with the loop adjacent to the gastric fistula origin.

sparsely reported. The only post-operative incidence was described by Huei et al., who reported the successful drainage of a post-splenectomy combined pancreatico- and gastrocutaneous fistula by endoscopic stent insertion through a gastric fistula hole that was visible on endoscopy [7]. Percutaneous direct transgastric puncture and endoscopic-ultrasound guided stent drainage are conventionally used to divert pancreatic fluid back into the gastrointestinal tract as alternatives to invasive surgical management. These methods, however, are limited by the requirement of either a fistula tract large enough to visualize [5] or access to a dilated pancreatic duct (>4 mm) which would allow for easier entry from the stomach or duodenum [8]. In our patient, although clinically persistent, the gastric fistula was radiographically occult at the time of transgastric drain insertion and unlikely to be visible endoscopically. A snare-target technique – originally used for percutaneous access to non-dilated pancreatic ducts [9] – was therefore employed instead to target the small fistula tract for transgastric drainage. A similar technique has previously been described by Boas et al. [9] as treatment for pancreatitis-induced isolated PCFs with good clinical results, although never in post-operative and complex fistulae. This case demonstrates that transgastric drainage along the tract, remote from either organ's fistula origin, can successfully divert and resolve the complex fistula without requiring direct drainage of the pancreatic duct. Ultimately, the catheter was attached externally for 6 weeks to allow the newly formed transgastric tract to heal.

4. Conclusion

Post-operative combined pancreatico-gastrocutaneous fistula are rare, but can be successfully managed percutaneously by incorporating the snare-target technique for accurate drain placement within the chronic fistula. This technique is particularly valuable when the fistula is too small for conventional direct transgastric drain insertion under endoscopic-ultrasound or percutaneous guidance.

Declaration of Competing Interest

None.

Funding

None.

Ethical approval

Exempt from ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Katherine Li – Writing: original draft.

Dr. Derek Cool – Supervision, Report/study concept, Methodology of procedure, Writing: review and editing.

Dr. Ken Leslie – Writing: review and editing.

Registration of research studies

Not Applicable.

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Dr. Derek W. Cool, Md, PhD.

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