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A novel approach using liquid embolic agent for the treatment of pancreatic-cutaneous fistulas: Report of a case



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ABSTRACT

Pancreatic fistula formation remains one of the most dreadful complications after pancreaticoduodenectomies, resulting in extended hospital stays, increased healthcare costs, along with significantly increased morbidity and mortality. Little is mentioned in the literature about the use of percutaneous techniques to resolve this complication when conservative treatments fail. Thus, we developed a novel technique for treating pancreatic-cutaneous fistulas that develop post-pancreaticoduodenectomy. This work describes a novel approach of using a liquid embolic agent to treat a high-output pancreatic-cutaneous fistula after a Whipple procedure, which to the best of our knowledge after extensive literature searches, has not been performed before.

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1. Introduction

This case report seeks to describe a novel technique for treating post-operative pancreatic fistulas. Conventional non-surgical treatments include nothing by mouth (NPO), total parenteral nutrition (TPN) and octreotide administration. Frequently these require lengthy durations and sometimes fail. When such a treatment fails, re-operation with complete pancreatectomy or entero-fistulotomy may be required. We present a case of post-operative pancreatic fistula treated with pancreatic duct embolization via a percutaneous approach as a new technique, which to the best of our knowledge has not been previously reported.

2. Case presentation

A 55-year-old Caucasian male with a history of morbid obesity, sleep apnea, chronic obstructive pulmonary disease and kidney stones was evaluated for acute onset of right upper quadrant abdominal pain, nausea and vomiting, unintentional 19-pound weight loss, and jaundice × 3 weeks was found to have an apple-core lesion involving the duodenum at the level of the ampulla causing gastric outlet obstruction and biliary obstruction. There was no evidence of metastatic disease and tumor markers were found to be normal.

The patient underwent a Whipple procedure, and was found to have periampullary adenocarcinoma. Of note the procedure was made difficult due to the patient's body habitus. Surgical drains were placed in proximity to the pancreatic and biliary anastomoses. His postoperative course was complicated with respiratory failure requiring prolonged intubation, multiple abdominal abscesses, candidemia, wound infections, and post-operative bleeding requiring re-exploration.

One month after the procedure, high output from the right corner of his incision persisted. A CT scan of the abdomen and pelvis demonstrated a fistulous communication from the pancreaticojejunostomy in the retroperitoneum to the skin (Fig. 1). This was managed by insertion of a percutaneous drainage catheter along the fistulous track to the pancreaticojejunostomy. The drain was left in place for 2 months in an attempt to conservatively treat the fistula in conjunction with NPO, TPN and octreotide, but the fistula persisted. Despite multiple attempts to percutaneously embolize the fistulous tract with TISSEEL fibrin sealant, the patient continued to have leakage. Fistulography through the drainage catheter site confirmed connection to the pancreatic duct. However, attempts at cannulation of the duct itself were unsuccessful. The Endoscopic retrograde cholangiopancreatography (ERCP) was performed and demonstrated that the pancreatic duct anastomosis had closed, thus the fistula was the only egress of pancreatic secretions.

Prior to completion pancreatectomy it was decided to proceed with percutaneous embolization of pancreatic duct via the fistulous tract. The percutaneous drain was exchanged over a guidewire and replaced with an 8 French vascular sheath (Terumo Medical Corp.), through which a Kumpe catheter (Cook Medical) was advanced to the central aspect of the fistula. A 2.4 French Progreat microcatheter

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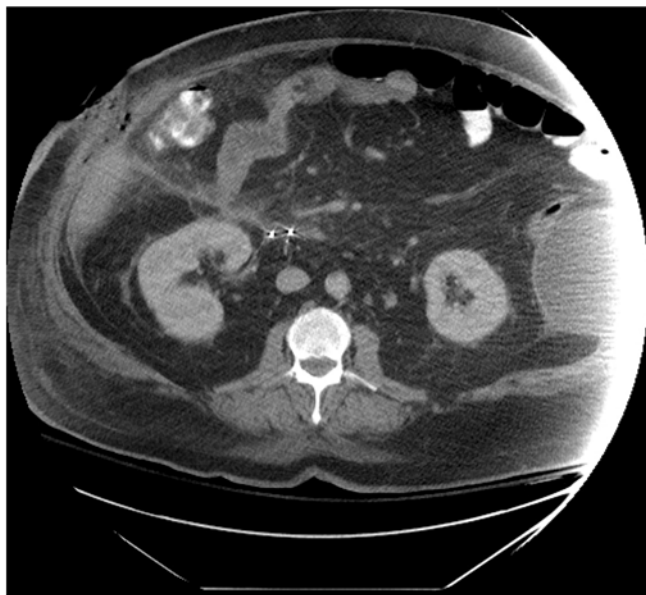


Fig. 1. CT scan of pancreatic fistula with communication from the retroperitoneum close to pancreatico-jejunosomy site.



Fig. 2. Post *n*-BCA Trufill glue embolization of pancreatic fistula.

(Terumo Medical Corp.) was advanced over a 016 Fathom guidewire (Boston Scientific) through the Kumpe catheter. Using this catheter and guidewire combination, the pancreatic duct was successfully cannulated. The microcatheter and guidewire were negotiated into the tail of the pancreas. The microcatheter was flushed appropriately with a dextrose and water solution. A 3-1 mixture of *n*-BCA Trufill glue was injected under fluoroscopic supervision completely filling the pancreatic duct, side-branches and the fistulous tract. The sheath, base catheter and microcatheter were removed and replaced with a 12 French Ultrathane percutaneous drain (Cook Medical) (Fig. 2).

The patient developed moderate abdominal pain within 20 min of embolization, which was controlled with a morphine patient-controlled analgesia (PCA). He was admitted to the hospital for 3 days post embolization for pain control and TPN. His lipase peaked at 538 within 12 h but returned to normal in 5 days. His pain resolved and his drain output decreased to less than 10 ml per day.

The drain was removed one week later and the patient has not experienced leakage since.

Follow up CT three weeks after embolization demonstrated no evidence of pancreatitis, fluid collection or abscess formation.

3. Discussion

In post-pancreaticoduodenectomy pancreatic fistulas, the severity of the leakage dictates the aggressiveness of treatment. The overarching goal is to control the leak by the least invasive means possible while preventing sepsis and maintaining adequate nutrition in the post-operative patient.¹

When conservative treatments fail, more aggressive method including complete pancreatectomy is considered. Minimally invasive catheter drainage has been described as a choice of treatment for pancreatic duct leakage.^{2,3} They, however, used a sclerosing agent, prolamine, as opposed to embolic glue. In the approach discussed in,² the sclerosant was delivered via the percutaneous drain that was positioned adjacent to the pancreas, not in the pancreatic duct as in our case. Moreover, Hirota discussed two different techniques depending on the situation. They performed two procedures in their post-surgical patients, resulting in trans-hepatic catheterization of the pancreatic duct to great an enteric fistula. For the patients with disconnected duct syndrome, they also use prolamine to sclerose the duct and their drainage catheter remains at the margin of the duct and does not cannulate the duct.³ Pancreatic duct embolization has been previously reported including pancreatic duct remnant during pancreaticoduodenectomy⁴ or as an alternative to complete pancreaticoduodenectomy in patients with chronic pancreatitis to block exocrine function.⁵ Previous methods of duct embolization have used fibrin sealants; however, this process is not always successful and often necessitates repeat injections to seal the fistula.⁶ This method was attempted in our patient, but was unsuccessful, producing similar results to the above studies. The use of *n*-butyl-2-cyanoacrylate has been used before to occlude pancreatic fistulas in several cases. Recent studies have determined that endoscopic sealing of pancreatic fistulas have been performed successfully, resulting in complete occlusion of the duct with leakage no longer occurring in these patients.^{6,7} This approach was not possible in our patient as the surgically created anastomosis had closed.

In this case report, we present a novel approach to treat pancreatic fistulas that occur as a complication of pancreaticoduodenectomy. Although *n*-butyl-2-cyanoacrylate has been used to embolize the pancreatic duct via ERCP, it has not been previously reported to treat pancreatico-cutaneous fistula in the post-Whipple patient. If percutaneous access to the pancreatic duct can be achieved, embolization is possible and can be useful as a minimally invasive treatment prior to more complex interventions such as completion pancreatectomy.

Conflict of interest

Authors have no conflict of interest to declare.

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Ethical approval

The appropriate consent has been obtained.

Author's contribution

AF – data collection, writing.

PPP – writing, editing, analysis.

SK and TM – study design, editing.

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