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Pancreatic Stent Placement Is Associated with Resolution of Refractory Grade C Pancreatic Fistula after Left-Sided Pancreatectomy

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Abstract

Pancreatic fistula have been a source of significant morbidity and mortality after left-sided pancreatectomy. The majority of fistulas are classified as Grade A and resolve quickly with no intervention. Grade C pancreatic fistulas, which require percutaneous or operative drainage, are less common and may be associated with morbidity and mortality. We used postoperative endoscopic pancreatic stent placement as an adjunctive strategy in the management of refractory Grade C pancreatic fistulas. Patients undergoing endoscopic pancreatic stent placement for persistent, refractory peripancreatic fluid collections/pancreatic fistula after left-sided pancreatectomy were identified. Eight patients underwent endoscopic pancreatic stent placement for refractory Grade C pancreatic fistulas. Six patients had percutaneous catheter placement; two patients had transgastric drainage. Endoscopic retrograde cholangiopancreatography (ERCP) showed extravasation of contrast from the distal end of the pancreatic duct in seven patients. Pancreatic stents were placed in all patients at a median time of 48 days postoperation and left for a median of 47 days. Before stent removal, ERCP demonstrated pancreatic fistula closure. Median time to complete resolution of the fistula was 41 days after stent placement. Endoscopic pancreatic stents were associated with resolution of Grade C fistulas. After distal pancreatectomy, pancreatic stent placement should be considered in the postoperative period for refractory pancreatic fistulas.

A postoperative pancreatic fistula (POPF) is One of the most common complications after left-sided pancreatectomy and has traditionally been a source of significant morbidity.^{1–4} Using the criteria proposed by the International Study Group on Pancreatic Fistula (ISGPF), recent series have demonstrated an incidence of POPF after left-sided pancreatectomy ranging between 22 and 31 per cent.^{3–6} Although many POPF quickly resolve without medical therapy or invasive intervention (Grade A), approximately 40 per cent of POPFs are clinically significant (Grade B or C) and require additional intervention.^{3, 4, 6, 7}

Clinically significant POPF (Grades B and C) typically present with signs and symptoms of intra-abdominal inflammation (abdominal pain, delayed gastric emptying) or signs of systemic inflammatory response, including leukocytosis and fever.⁷ Many Grade C

pancreatic fistulas after left pancreatectomy will resolve with percutaneous drain placement.⁸ A small subset of patients with Grade C pancreatic fistula may develop more significant sequelae, including abscess formation, bleeding, wound dehiscence, sepsis, and even death.⁴ A wide range of interventions have historically been used for these challenging patients, including avoidance of enteral intake with intravenous hyperalimentation, somatostatin, percutaneous drainage, transgastric drainage, and exploratory laparotomy with intraoperative drainage.^{4, 9, 10} There is currently no standardized management strategy for these patients.

Our group has used postoperative endoscopic pancreatic duct stent placement^{11–13} in patients with refractory Grade C pancreatic fistula after left-sided pancreatectomy in an effort to accelerate resolution of the fistula and reduce associated morbidity. In this article, we examine our experience with postoperative endoscopic pancreatic duct stenting in the management of refractory Grade C POPFs after left-sided pancreatectomy.

Methods

Retrospective review of the clinical records of all patients undergoing left-sided pancreatectomy at the University of Florida College of Medicine/Shands Hospital (UFCOM/SH) from January 2004 until November 2008 was conducted with approval of the UFCOM/SH Institutional Review Board and in accordance with the Health Insurance Portability and Accountability Act.

Records were reviewed and patients undergoing postoperative pancreatic stent placement for management of postoperative pancreatic fistula after left pancreatectomy were identified. Demographics, clinical history, and postoperative course for these patients were collected, analyzed, and studied.

There were no standardized criteria for the decision to place a postoperative pancreatic stent in this series. Endoscopic retrograde cholangiopancreatography (ERCP), sphincterotomy, and pancreatic stent placement were performed at the discretion of the attending surgeon and the attending gastroenterologist for the management of refractory Grade C fistulas. After catheter insertion into the pancreatic duct, contrast was injected to evaluate for a leak from the pancreatic duct. A 5-French stent was placed into the pancreatic duct in every case.

The ISGPF definition was used for this study.⁵ POPF is defined as output through an operatively placed drain or a subsequently placed, percutaneous drain of any measurable volume of drain fluid on or after postoperative Day 3 with an amylase content greater than or equal to three times the upper normal serum value. “Grade A” POPF has no clinical impact, requires little change in management or deviation from the normal clinical pathway, and typically shows no peripancreatic fluid collection on CT scan. “Grade B” POPF requires a change in the clinical management or adjustment in the clinical pathway, usually with prohibition of enteral intake and support with total parenteral nutrition, and may be associated with abdominal pain, fever, or leukocytosis requiring antibiotics. Medical intervention with a somatostatin analog may be required. Grade B POPF typically leads to a delay in patient discharge. “Grade C” POPF requires a major change in the clinical pathway, requiring percutaneous drainage or reoperation in addition to restriction of oral intake, antibiotics, and somatostatin analogs. Grade C POPF may be associated with hemodynamic instability.

Results

Eight patients developed a refractory Grade C postoperative pancreatic fistula after left pancreatectomy and were managed in part by the placement of an endoscopic postoperative

pancreatic stent. Median patient age was 54 years (range, 41–78 years). Five of the patients were men (63%). Final pathology revealed a wide range of benign and neoplastic pancreatic lesions: pseudocyst (n = 2), cystic neoplasm (n = 2), chronic pancreatitis (n = 2), and adenocarcinoma (n = 2). All patients had closed suction drains placed at the time of operation.

Six patients required readmission and percutaneous drainage catheter placement for peripancreatic fluid collections. A total of nine percutaneous catheters were placed in these six patients in an attempt to manage the pancreatic fistulas. Two patients underwent endoscopic transgastric drainage of pancreatic fistulas.

Unsatisfactory clinical resolution of the pancreatic fistula prompted the decisions to perform ERCP, sphincterotomy, and pancreatic stent placement in these patients. ERCP was performed and demonstrated clear extravasation of contrast in seven of eight patients. The median time from operation to endoscopic pancreatic duct stenting was 48 days (range, 12–130 days). Most patients (six of eight) required no additional interventions or operations after pancreatic duct stent placement. Two patients required additional drainage procedures to facilitate management of the pancreatic fistula (Table 1). Pancreatic duct stents remained in place for a median of 46.5 days (range, 32–84 days; Table 1). Before stent removal, ERCP demonstrated pancreatic fistula closure in all patients. There were no episodes of pancreatitis, perforation, or other complications associated with pancreatic stent placement or removal. There were no postoperative deaths in this series of patients with refractory Grade C pancreatic fistulas after left pancreatectomy. No patients have developed recurrent pancreatic fistula.

Discussion

POPF remains a significant cause of morbidity for patients undergoing left-sided pancreatectomy.^{1–4, 6–10} Grade C pancreatic fistulas have been associated with increased rates of intensive care unit use, hospital length of stay, reoperations, readmissions, and death.⁷ Much attention has focused on the identification of risk factors for the development of pancreatic fistula, the sequelae of postoperative fistulas, and surgical techniques to reduce fistula rates. Relatively less attention has been focused on strategies to manage high Grade C pancreatic fistulas after left pancreatectomy.

Many Grade C pancreatic fistulas will respond to percutaneous drainage and conservative drain management resulting in resolution of the pancreatic fistula in five to 17 days.^{4, 8} A small subset of Grade C fistulas are more severe and may be, despite aggressive management strategies, associated with closure times up to 365 days and mortality rates of 4 to 5 per cent.^{2, 4, 7}

In the setting of left pancreatectomy, sphincterotomy and pancreatic duct stenting are performed in an attempt to decompress the pancreatic duct and promote antegrade flow of pancreatic fluid for the prevention or treatment of a pancreatic fistula. The concept of pancreatic duct stenting for the prevention of pancreatic fistula after left pancreatectomy has been evaluated in several small reports. Abe et al. reported no Grade C pancreatic fistulas after preoperative endoscopic stenting of the main pancreatic duct in 10 consecutive patients.¹⁴ Hirota et al. reported no Grade C postoperative pancreatic fistulas in five consecutive patients undergoing preoperative endoscopic pancreatic duct stenting.¹⁵ Fischer et al. have reported a reduction in pancreatic fistula rates after left pancreatectomy with routine placement of pancreatic duct stents into the duodenum directly through the pancreatic duct after pancreatic transection and before pancreatic duct closure.¹⁶

There has been limited reported use of endoscopically placed pancreatic stents for the treatment of pancreatic fistulas. Saeed et al. have reported the use of endoscopically placed pancreatic stents for the successful treatment of refractory pancreatic fistulas in five patients.¹¹ Similarly, Goasguen et al. have reported successful resolution of Grade C fistulas in association with pancreatic duct stent placement in five patients.¹⁷ The use of endoscopically placed stents for the management of refractory Grade C pancreatic fistulas after left pancreatectomy has also been previously reported in a few case reports.^{12, 13} In these reports, the authors associate the use of postoperative endoscopic pancreatic stents with resolution of refractory pancreatic fistulas after left pancreatectomy. In the present series of eight patients, the median time to pancreatic duct stenting was 48 days. In all cases after pancreatic stent placement, there was resolution of the pancreatic fistula without recurrence. Only two patients in this series required additional interventional therapy after pancreatic stent placement. An example of successful endoscopic pancreatic stent placement for management of pancreatic fistula after left pancreatectomy is shown in Figure 1.

The present report certainly does not prove a beneficial role for endoscopic pancreatic stent placement for the management of refractory Grade C pancreatic fistulas. Proof of this would require a prospective randomized trial. However, it does suggest that this strategy may have a beneficial role in the management of these patients and that this approach should be considered in patients not responsive to traditional management strategies.

Given the potential association of pancreatic stent placement with pancreatitis in 5 to 6 per cent of patients undergoing the procedure¹⁸ and the efficacy of traditional strategies (percutaneous drain management, somatostatin, and so on) in the majority of patients with Grade C pancreatic fistulas, we currently recommend endoscopic pancreatic stent placement for patients with refractory Grade C pancreatic fistulas after left pancreatectomy. This would include patients with prolonged drainage (longer than 4 weeks) without signs of improvement and patients with secondary life-threatening complications (including sepsis or hemorrhage).¹⁷ This approach may reduce the need for additional interventions and may prevent reoperation, morbidity, and mortality in select patients with Grade C pancreatic fistula after left-sided pancreatectomy.

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Fig. 1. Technique of postoperative pancreatic stenting and results. (A) CT scan of patient on postoperative Day 12 demonstrating postoperative pancreatic fistula (POPF) at the site of pancreas transection not accessible to percutaneous drainage. (B–C) ERCP demonstrating extravasation of contrast and pancreatic duct stenting on postoperative Day 14. (D) CT scan of the abdomen and pelvis on postoperative Day 21 demonstrating resolution of the POPF.

Table 1

Patients with Grade C Postoperative Pancreatic Fistula with Interventions before Pancreatic Stent Placement, Days until Placement of Pancreas Stent, Interventions after Stent Placement, and Days until stent removed

Patient No.	Initial Interventions	Days from Operation to Pancreatic Stent	Interventions after Pancreatic Stent	Days until Stent Removal
1	CT drain	41	None	38
2	CT drain	117	None	32
3	Transgastric drain	45	None	41
4	CT drain	120	Transgastric drain	55
5	CT drain × 2	51	None	42
6	CT drain × 2	83	None	70
7	None	12	None	21
8	CT drain	14	CT drain	84