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Transgastric pancreatic necrosectomy—expedited return to prepancreatitis health

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ABSTRACT

Background: The best operative strategy for necrotizing pancreatitis remains controversial. Traditional surgical necrosectomy is associated with significant morbidity; endoscopic and percutaneous strategies require repeated interventions with prolonged hospitalizations. We have developed a transgastric approach to pancreatic necrosectomy to overcome the shortcomings of the other techniques described.

Materials and methods: Patients with necrotizing pancreatitis treated from 2009 to 2016 at an academic center were retrospectively reviewed. Open or laparoscopic transgastric necrosectomy was performed if the area of necrosis was walled-off and in a retrogastric position on cross-sectional imaging. Study endpoints included postoperative complications and mortality.

Results: Forty-six patients underwent transgastric necrosectomy (nine open and 37 laparoscopic). Median (interquartile range) preoperative Acute Physiologic and Chronic Health Evaluation II score was 6 (3-12). Seventy percent of patients had >30% necrosis on preoperative imaging; infected necrosis was present in 35%. Median total length of stay (LOS) was 6 (3-12) d. No patient required a second operative debridement; four patients (9%) had short-term postoperative percutaneous drainage for residual fluid collections. Median follow-up was 1 y; there were no fistula or wound complications. Six patients (13%) had postoperative bleeding; five patients received treatment by image-guided embolization. There was one death in the cohort.

Conclusions: Transgastric pancreatic necrosectomy allows for effective debridement with a single definitive operation. When anatomically suitable, this operative strategy offers expedited recovery and avoids long-term morbidity associated with fistulas and prolonged drainage.

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Introduction

Necrotizing pancreatitis occurs in approximately 20% of patients with acute pancreatitis and confers substantial additional morbidity and mortality.[1] Patients with infected necrosis represent a subset of the most critical patients in whom persistent multiorgan failure occurs in approximately two-thirds of these patients and mortality approaches 40%.[2] Although open surgical debridement has been considered the traditional treatment for infected pancreatic necrosis, the physiological stress of this invasive approach is associated with high rates of complications (ranging from 35% to 95%) and death up to 35% with an additional risk of long-term pancreatic insufficiency, pancreatic or enteric fistulas, and incisional hernias.[3-5]

The early mortality of acute necrotizing pancreatitis has progressively decreased as a result of improvements in recognition of disease,[2] avoidance of early surgery,[6] and advances in critical care management.[7] Minimally invasive surgical techniques (including percutaneous lavage, endoscopic necrosectomy, laparoscopic assisted debridement, minimally invasive retroperitoneal debridement, or combinations of these procedures) have also contributed to better outcomes with novel debridement strategies for infected pancreatic necrosis.[2,8] However, despite this progress, the morbidity and late sequale of complications after interventions for pancreatic necrosis can still be debilitating and prolonged. External pancreatic and gastrointestinal fistulas have been reported to occur in 20%-44% of patients after surgical management.[5,9] Parenchymal necrosis in itself is a primary risk factor for these fistulas; small pancreatic ducts are disrupted in necrotizing pancreatitis with extravasation of exocrine secretions. Operative debridement contributes to the substantial risk of pancreatic and bowel fistulae, which are associated with prolonged length of stay (LOS), recurrent hospitalizations, additional invasive procedures, and long-term support to manage pain or nutritional requirements. Treatments periods of 2-3 mo have been associated with percutaneous or minimally invasive retroperitoneal approaches[10] and endoscopic necrosectomies require typically 3-6 sessions for complete debridement.[2]

The purpose of this study was to examine the clinical course and postoperative outcomes of patients with pancreatic necrosis who underwent necrosectomy via a transgastric approach. We hypothesized that by creating a surgical cystgastrostomy for debridement of necrosis, this "controlled fistula" to the stomach would allow for continued drainage of necrosum, thereby reducing subsequent procedures and minimizing the incidence of postoperative external pancreatic fistula.

Materials and methods

Patients and clinical data collection

The inclusion criteria for this study were patients with radiologic evidence of pancreatic and/or peripancreatic necrosis who underwent operative necrosectomy via a transgastric approach at Stanford University Medical Center from 2009 to 2016. A total of 91 patients with necrotizing pancreatitis underwent necrosectomy between 2009 and 2016. Forty-six patients (51%) underwent debridement via a transgastric approach (37 laparoscopic transgastric necrosectomy [LTN] and nine open transgastric necrosectomy [OTN]) were included in this study analysis; the other 45 patients were excluded because they underwent necrosectomy via other approaches—open pancreatic debridement (19), laparoscopic approach (seven), endoscopic necrosectomy (seven), percutaneous drainage (one), or underwent a minimally invasive retroperitoneal pancreatic debridement (11). Twenty-eight patients with a pseudocyst who underwent transgastric drainage performed either surgically (two) or endoscopically (26) were also excluded from this analysis. These patients were identified through our prospectively managed database. International review board approval was obtained for data collection from the medical record. A retrospective analysis of patient presentation, severity of disease, radiological findings, operative characteristics, and clinical outcomes was performed.

Our clinical practice is to avoid surgical intervention in the early phase of necrotizing pancreatitis whenever possible and delay for a minimum of 4 wk from the onset of symptoms. Multiple studies have demonstrated that delay of necrosectomy for at least 30 d after initial presentation decreases morbidity and mortality.[2,4] Preoperative infected necrosis was defined by the radiologic presence of gas within a fluid collection or by culture fine-needle aspirate of pancreatic necrotic tissue. Disease severity was assessed in the 24 h leading up to operative intervention and reported as the presence of systemic inflammatory response syndrome (SIRS) and the Acute Physiologic and Chronic Health Evaluation II (APACHE II) score.[11] The degree of necrotizing pancreatitis was scaled radiographically from preoperative computed tomography (CT) scans using standard scoring systems (CTSI—CT severity index and Balthazar score).[12]

Postoperative complications during the index hospitalization were stratified according to the Clavien-Dindo classification and complications of grade III or more were defined as major morbidity.[13] Long-term complications were assessed through follow-up clinic visits and serial radiographic imaging; these included the development of pancreatic or enterocutaneous fistula, incisional hernia, and pancreatic insufficiency. New-onset endocrine insufficiency was diagnosed on the basis of a fasting plasma glucose level of $\geq$126 mg/dL or postoperative hemoglobin A1c $\geq$ 6.5%.[14] Pancreatic exocrine insufficiency was diagnosed on the basis of persistent symptoms of steatorrhea which improved with enzyme supplementation.

Operative technique

Patients are considered for a transgastric approach if the area of pancreatic necrosis requiring debridement is walled-off (based on duration and radiologic findings) and in a retrogastric position (anatomical proximity to posterior stomach wall required for safe entry) based on preoperative cross-sectional imaging. In some cases, as part of a