

Single or multiport percutaneous endoscopic necrosectomy performed with the patient under conscious sedation is a safe and effective treatment for infected pancreatic necrosis (with video)

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Background: Infected pancreatic necrosis (IPN) is a dreaded adverse event of acute pancreatitis (AP). Most patients with IPN require drainage and necrosectomy, preferably by a minimally invasive method.

Objective: To study the success and safety of an alternative form of minimally invasive necrosectomy for IPN.

Design: Observational study.

Setting: Tertiary care academic center.

Patients: Consecutive patients with IPN formed the study group.

Intervention: Patients with IPN were initially treated conservatively including percutaneous drainage. Those who failed to improve underwent percutaneous endoscopic necrosectomy (PEN). Single- or multiport PEN was performed by using a flexible endoscope through the percutaneous tract. PEN involved vigorous lavage and suction followed by necrosectomy. Multiple sessions were undertaken depending on the size and number of collections and the amount of necrotic debris.

Main Outcome Measurements: Control of sepsis and resolution of collection(s) without the need for surgical necrosectomy.

Results: During the period from October 2012 to July 2013, 165 patients (mean age, 38.82 ± 14.99 years; 119 male patients) were studied. Of them, 103 patients had necrotizing pancreatitis and IPN had developed in 74. Of these 74 patients with IPN, 15 underwent PEN after a mean interval of 39.2 days. Fourteen of the 15 patients improved after a mean of 5 sessions of PEN. Two of 15 patients had minor adverse events: self-limiting bleeding and pancreatic fistula in 1 patient each. One patient required surgery but died of organ failure.

Limitations: Lack of a control arm.

Conclusion: PEN is a safe and effective minimally invasive technique for necrosectomy for IPN. (Gastrointest Endosc 2015;81:351-9.)

(footnotes appear on last page of article)



This video can be viewed directly from the GIE website or by using the QR code and your mobile device. Download a free QR code scanner by searching “QR Scanner” in your mobile device’s app store.

Acute pancreatitis (AP) is a potentially lethal disease with considerable morbidity and 10% to 40% mortality.¹ Two major forms of AP occur: interstitial and necrotizing pancreatitis. Acute necrotizing pancreatitis is the cause of most of the morbidity and mortality.² The most important determinants of mortality in AP are organ failure and infected pancreatic necrosis (IPN).³ Early deaths in AP are primarily due to severe organ failure termed as

early severe AP or fulminant pancreatitis.⁴ On the other hand, late deaths are sepsis related secondary to IPN.⁵ Although conservative treatment is recommended for sterile necrosis, surgical necrosectomy has generally been considered the standard of care for IPN.⁶ Open surgery is, however, associated with much morbidity and mortality.⁷ It is therefore recommended that surgical necrosectomy be delayed beyond 3 to 4 weeks after the onset of AP.⁸ During this period, infected necrosis is converted to what is now known as walled-off necrosis (WON).⁹ We¹⁰ and others¹¹ have shown that conservative treatment including percutaneous catheter drainage (PCD) is effective in a subset of patients with IPN. Patients in whom conservative treatment fails, however, require necrosectomy. To avoid the problems associated with open surgical necrosectomy, minimally invasive modalities such as laparoscopic and endoscopic necrosectomy and video-assisted retroperitoneal debridement have been introduced and shown to be effective with less morbidity than open surgery.¹²⁻¹⁴ The preferred route and modality for minimally invasive necrosectomy depend on the location of the infected collection and available expertise. Most forms of minimally invasive necrosectomy require general anesthesia. We have devised an alternative modality of percutaneous endoscopic necrosectomy (PEN), with the patient under conscious sedation, by using the conventional endoscopes. We present here the results of PEN in patients with IPN.

PATIENTS AND METHODS

Study design

This was an observational, cross-sectional study performed at a tertiary care academic center. All consecutive patients with acute necrotizing pancreatitis who were admitted to our hospital between October 2012 and July 2013 were studied. The diagnosis of AP was made in the presence of suggestive clinical features, increased serum amylase level (>3 times the upper limit of normal), and evidence of AP on imaging studies (ie, abdominal US and/or CT scan). Patients with IPN formed the study group.

Characterization of AP

AP was categorized as either interstitial or necrotizing. Pancreatic necrosis was diagnosed on a contrast-enhanced CT (CECT) scan as nonenhancing areas of the pancreas. Pancreatic necrosis was classified either as sterile or infected. IPN was suspected if there was evidence of sepsis in the form of fever with features of sepsis and deterioration or no improvement in clinical condition. The diagnosis of IPN was confirmed when pancreatic necrotic tissue/fluid showed the presence of bacteria on Gram stain or when it grew an organism on culture as

described previously.¹⁰ The severity of AP was classified according to the revised Atlanta classification.⁹

Management of AP

All patients were managed according to a pre-defined management protocol as described previously by us.^{2,4,10,15} Standard investigations including complete blood count, serum biochemistry, and imaging tests were done. A CECT scan was the main imaging modality that was done according to clinical need (eg, planning intervention for infected collections). Supportive management included maintenance of fluid and electrolyte balance, organ support, enteral nutrition, and, if indicated, antimicrobials. All patients with organ failure were managed in the intensive care unit (ICU).

Management of IPN

The management protocol was primarily conservative treatment (ie, all patients with IPN were treated initially with an aggressive medical management in the ICU) that included combination antibiotics, organ support, nutritional support, and percutaneous drainage, if required. The indication for drainage was continuing sepsis despite antibiotics. Percutaneous drainage was done for IPN that had become organized and walled-off (termed as WON according to the revised Atlanta classification⁹). Although in patients with necrotizing pancreatitis, it is almost always WON rather than a pseudocyst, either magnetic resonance imaging or abdominal US was used to differentiate WON from a pseudocyst, if required. Percutaneous drainage was achieved by placing a single or multiple 12F pigtail catheters under CT guidance. The catheters were upsized to 16F to 18F over 2 to 3 sessions over 1 to 2 weeks. The catheters were flushed with approximately 50 to 100 mL of normal saline solution 3 to 4 times a day to keep them patent.

If clinical improvement was noted, the patient was continued on conservative treatment, and antibiotics were given for up to 4 weeks. However, if there was no improvement or if there was deterioration in the patient's condition, then the patient underwent necrosectomy. The decision to escalate the therapy to necrosectomy was made in consultation with the surgeons. The timing of further therapy was guided by the clinical course of the patient and was variable. We devised a minimally invasive modality (ie, PEN).

Technique of PEN

PEN was performed with the patient under conscious sedation and analgesia by using a combination of midazolam, propofol, and fentanyl. The patients were monitored and were given oxygen. Topical anesthesia with lignocaine was used at the percutaneous site before dilation. The access route was provided by the percutaneously placed catheter. The site and route of the percutaneous

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