CASE REPORT

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EUS-Guided Multitransgastric Endoscopic Necrosectomy for Infected Pancreatic Necrosis with Noncontagious Retroperitoneal and Peritoneal Extension

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Endoscopic necrosectomy was introduced as a safe and effective treatment modality for infected pancreatic necrosis. Although there have been many reports of endoscopic drainage of retroperitoneal pancreatic necrosis, the optimal endoscopic management of pancreatic necrosis extending to the noncontagious retroperitoneal and peritoneal spaces has yet to be established. We report herein a patient with infected pancreatic necrosis with noncontagious retroperitoneal and peritoneal extension who was treated successfully by endoscopic ultrasound (EUS)-guided multiple cystogastrostomy and endoscopic necrosectomy. EUS-guided multitransgastric necrosectomy may be technically feasible and effective for the management of infected pancreatic necrosis with noncontagious retroperitoneal and peritoneal extension that demonstrates suitable anatomy. Further studies to assess the efficacy and safety of this technique are needed before its routine clinical use can be recommended. **(Gut Liver 2010;4:140-145)**

Key Words: Infected pancreatic necrosis; Pancreatitis; Endoscopic necrosectomy; Endoscopic ultrasound; Transmural drainage

INTRODUCTION

Infection of pancreatic necrosis is one of the most serious complications of acute pancreatitis. The standard treatment of infected pancreatic necrosis is considered to be surgical necrosectomy.[1] However, surgical management of pancreatic necrosis is associated with high morbidity and mortality, and with longer hospitalization.[2,3] Recently, transenteric endoscopic necrosectomy was introduced as safe and effective treatment modality for infected pancreatic necrosis.[4-10]

In accordance with our proposal that endoscopic multitransgastic drainage may be effective in multiple and noncontiguous pancreatic pseudocysts,[11] in this study we described an endoscopic ultrasound (EUS)-guided multitransgastric endoscopic necrosectomy of wide-spreading and noncontiguous pancreatic necrosis. Although there have been many reports of endoscopic drainage of retroperitoneal infected pancreatic necrosis,[5-7,9,12] no research has been done on the endoscopic management of infected pancreatic necrosis with noncontagious retroperitoneal and peritoneal extension. In an effort to reduce the need for additional surgical or percutaneous approaches, we hypothesized that an EUS-guided multitransgastric necrosectomy is technically feasible and effective for infected pancreatic necrosis with retroperitoneal and peritoneal extension that demonstrated suitable anatomy. In this article, we report our initial experience with this technique as a proof concept and describe the endoscopic procedures.

CASE REPORT

A 44-year-old man was admitted to our hospital for epigastric pain, abdominal distension, and intermittent fever after ingesting a large amount of alcohol 3 weeks before

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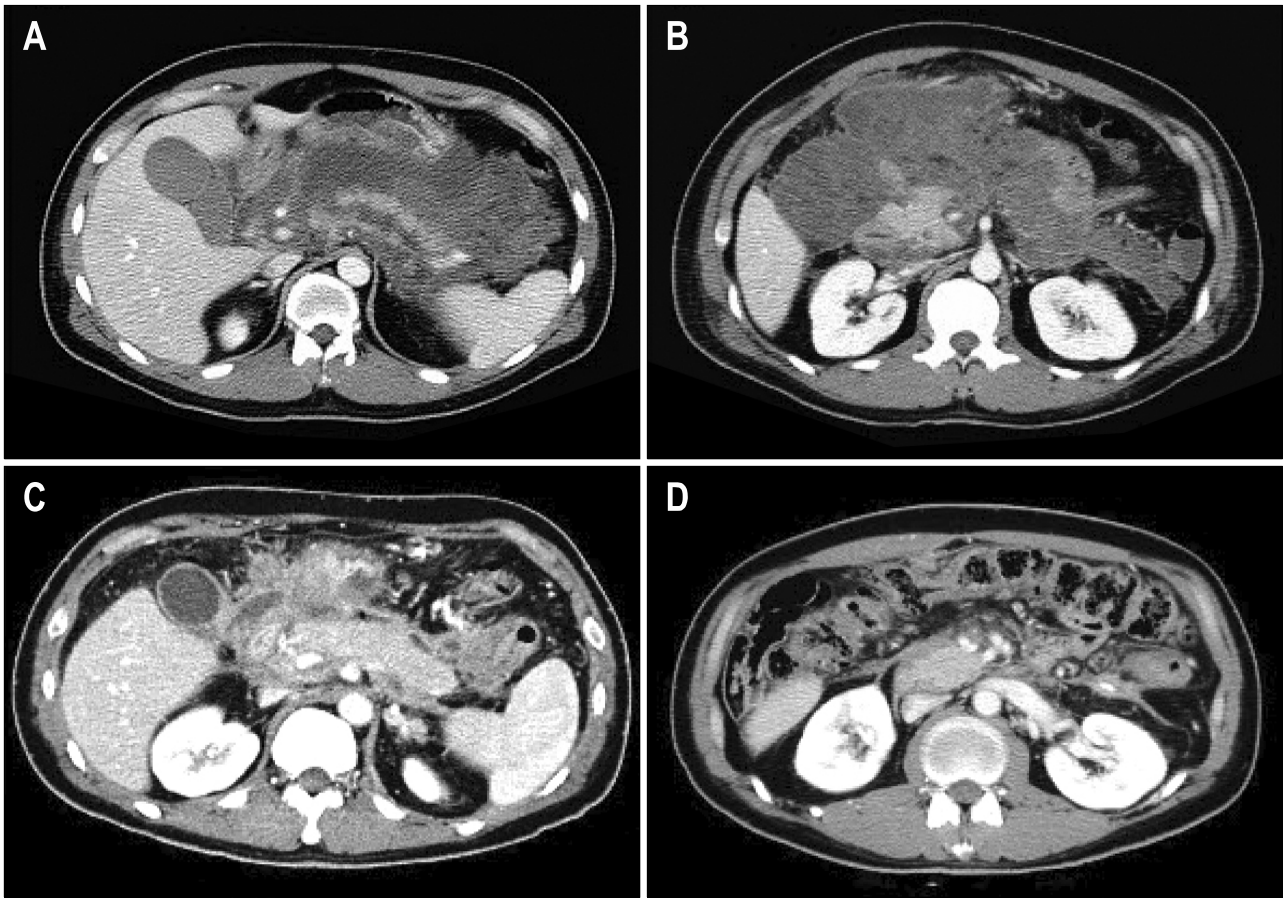

Fig. 1. (A, B) CT images showing peripancreatic necrosis; this lesion extended to the retroperitoneal and peritoneal cavity as far as the left pararenal space. (C, D) After multitransgastric endoscopic necrosectomy, a follow-up CT also showed the near resolution of the infected peripancreatic necrosis. The time interval between the images in panels A and B and those in panels C and D was 49 days.

admission. On admission, he had a fever of 38.2°C. Laboratory data showed elevated levels of white blood cell (WBC) and C-reactive protein (CRP). An abdomen computed tomography (CT) demonstrated diffuse pancreatic swelling and large areas of retroperitoneal necrosis extended to transverse colon anterior to stomach and left pararenal space suggestive of infected pancreatic necrosis (Fig. 1A, B). The patient was fasted. Broad spectrum antibiotics was administered him after blood cultures were obtained.

Because the patients did not want surgical or percutaneous drainage, we decided to perform endoscopic necrosectomy.

1. EUS-guided cystogastrostomy

All endoscopic procedures were performed with the patient under moderate conscious sedations. Due to a lack of a luminal compression of infected pancreatic necrosis, EUS guided transmural drainage (procedure time was 25 minutes) was done. For EUS-guided transmural drainage, a curvilinear array echoendoscope (UCT 240; Olympus Co., Tokyo, Japan) was used to perform this procedure. Before a puncture, color Doppler was used to identify intervening vessels. The cavity was punctured with 19-gauge EUS needle (EUSN-19T; Cook Endoscopy, Wilson-Salem, NC, USA) through the posterior wall of stomach body (Fig. 2A). A 0.035-inch guidewire was inserted through the lumen of the needle into the lumen of the necrotic cavity and coiled within the necrotic cavity using fluoroscopic guidance. Liquefied dark brown necrotic material was aspirated, and was cultured. *Pseudomonas aerusinosa* was grown from the necrotic fluid samples. A fistula was then created between the stomach the necrotic cavity by 6F Soehendra bougie dilator (Cook Endoscopy). The fistula tract dilated by an 8 mm balloon catheter (Hurricane or CRE; Microvasive Endoscopy, Boston Scientific Co., Marlboro, MA, USA), and then two 7F double-pigtail stents and a 7F nasocystic tube were placed to drainage.

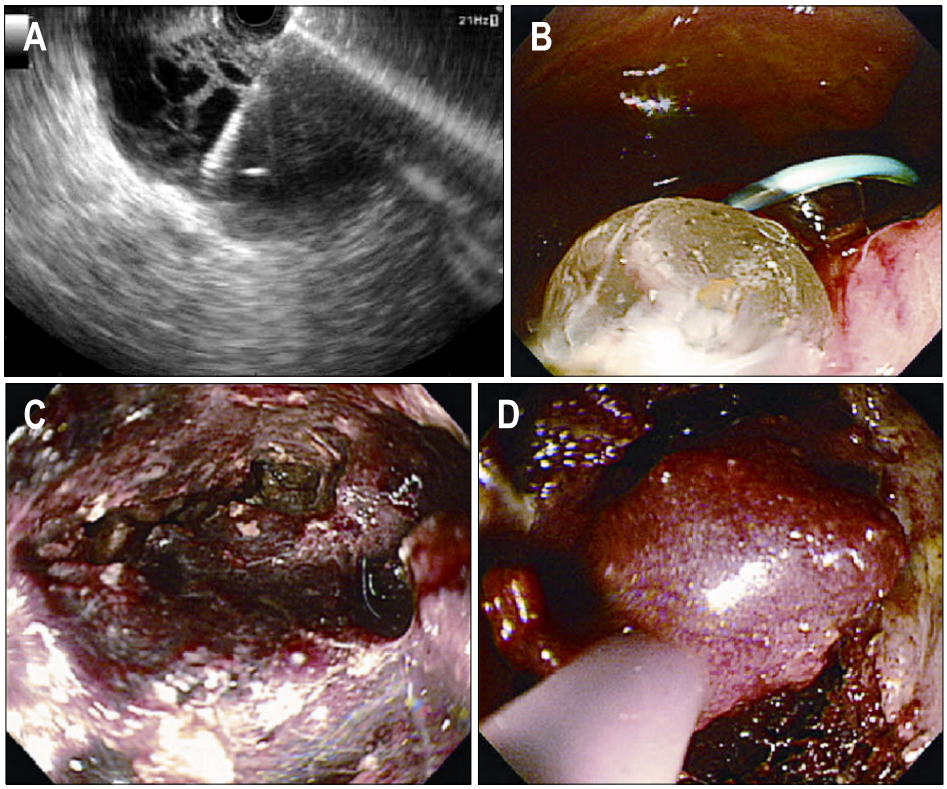

Fig. 2. (A) Linear endoscopic ultrasound identified the pancreatic necrotic cavity at the posterior wall of the high body. (B-D) After balloon dilatation, an endoscopic necrosectomy of the retroperitoneal area was performed. A large amount of necrotic materials was removed.

2. Endoscopic necrosectomy

By using a basket (lithotomy basket; MTW Endoskopie, Wesel, Germany), snare (rotatable snare; Microvasive Endoscopy, Boston Scientific Co, Natick, MA, USA), rat tooth or alligator forceps, and net catheter (Roth net standard; US Endoscopy, Mentor, OH, USA), transgastric necrotic tissue debridement was done (Fig. 2B-D). During this procedure, large amounts of saline solution were used to irrigate (mean 1,000 mL) by using the water-jet scope (GIF-Q 260J; Olympus Optical Co, Tokyo, Japan). The same procedure was repeated every 2 to 3 days under moderate sedation (median procedural time 35 minutes). During the necrosectomy, significant force was used at times to purchase the adherent necrotic tissue. We were careful to take smaller bites with the snare and to use the rat-tooth forceps to tease the tissue off, confirming absence of underlying healthy tissue. Pulsatile structures and other vascular-appearing tissue should be handled very carefully.[12] There was supplementary post-procedure naso-cavity irrigation (daily 500-1,500 cc).

A follow-up CT after 2 sessions of endoscopic necrosectomy showed slightly improved retroperitoneal peripancreatic necrosis, but a large amount of necrotic tissue still remained in the anterio-inferior portion of the stomach around the transverse colon, which was impossible to access through the posterior wall of highbody due to the noncontagious nature of retroperitoneal and peritoneal pancreatic necrosis. At this time, patient was suffering from abdominal pain and intermittent fever. Because the patient refused additional surgical or percutaneous approach, we performed an additional EUS-guided cystogastrostomy (UM 2000; Olympus Co.) at the posterior wall of the low body (procedure time was 20 minutes) (Fig. 3A). We were able to access the peritoneal space through this additional gastrostomy, and performed a necrosectomy at the anterio-inferior portion of the stomach around the transverse colon and left pararenal space (Fig. 3B-D). During this approach, endoscopic necrosectomy was achieved peritoneal space and left pararenal space at 11' to 12'clock under endoscopic view (Fig. 4).

After five sessions of necrosectomy, the fever subsided and the patient's condition improved significantly. He showed no post-procedure complications such as bleeding, abdominal pain, or fever. He was tolerable to advance diet. The same procedure was repeated every 2 to 3 days for a total of 9 sessions. A follow-up CT also showed a near resolution of infected pancreatic necrosis (Fig. 1C, D). The duration of hospitalization was 56 days. After 3 more months, the patient has continued to do well.

DISCUSSION

Infected pancreatic necrosis is the most serious compli-

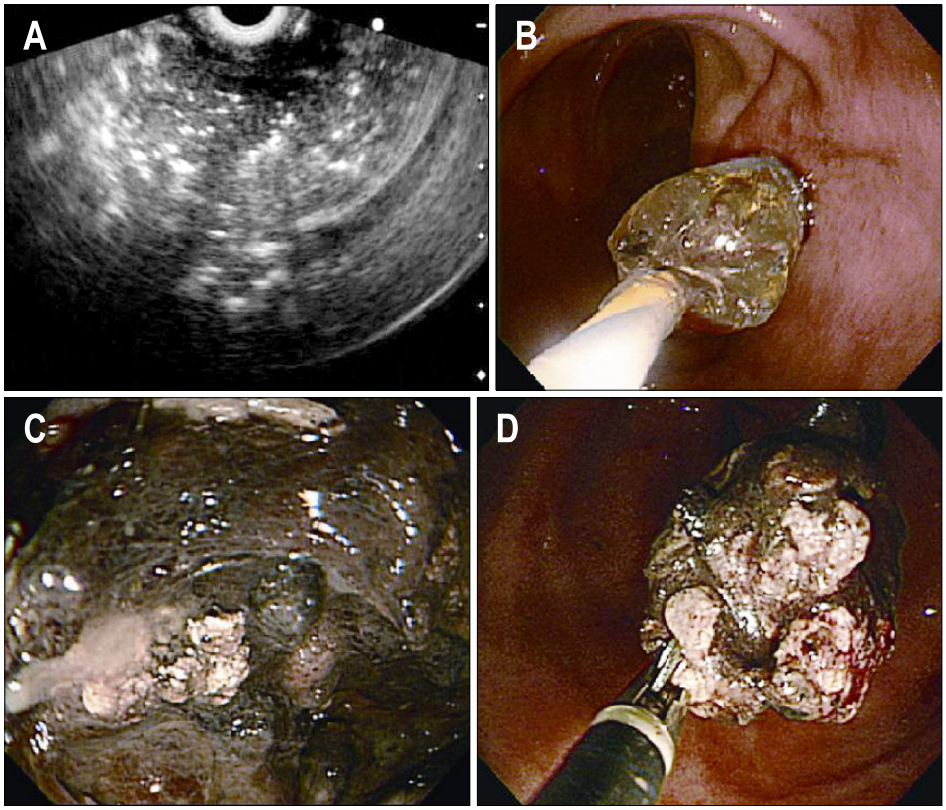

Fig. 3. (A) Linear endoscopic ultrasound identified the pancreatic necrotic cavity with echogenic debris at the posterior wall of the low body. (B-D) After balloon dilatation, an endoscopic necrosectomy of the peritoneal area was performed. A large amount of necrotic materials and pus were removed.

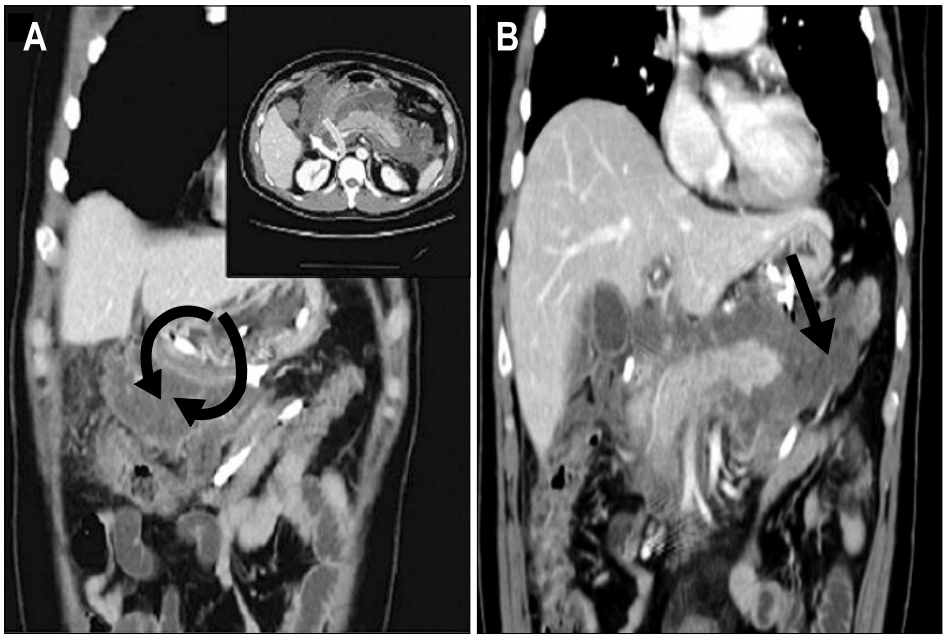

Fig. 4. CT showing the concept of multitransgastric necrosectomy. (A) Necrosectomy of the peritoneal space (curved arrow). Inset: cross-sectional view of the transgastric approach to the peritoneal space. (B) Necrosectomy of the retroperitoneal space (arrow).

cation in patients with severe acute pancreatitis. Open necrosectomy and post-operative irrigation of necrotic cavity have been conventional treatment for infected pancreatic necrosis.[1] However, open surgery necessitate a large abdominal incision and extensive dissection. Furthermore, it is commonly associated with high postoperative morbidity and mortality.[2,3] Therefore minimally invasive techniques have been described. These techniques have included percutaneous large-bore catheters placed via interventional radiology,[13] percutaneous necrosectomy using sinus tract endoscopy,[14] percutaneous laparoscopic necrosectomy,[15] and endoscopic transmural necrosectomy.[4-8]

Endoscopic transmural drainage has been established as the management for pancreatic pseudocyst.[16,17] Endoscopic treatment of pancreatic necrosis differs from that of pseudocysts because of the need to evacuate solid debris. However, due to the remarkable advances in EUS and endoscopic techniques, the role of endoscopy for infected pancreatic necrosis is growing. By using this technique, puncture of infected pancreatic necrosis under direct sonographic visualization is possible in patients without luminal compression and in those at high risk for bleeding such as portal hypertension or coagulopathy.[18]

The anatomical position of the infected pancreatic necrosis is an important factor when deciding the route of intervention.[5,12] Retroperitoneal pancreatic necrosis that is closely applied to the posterior gastric wall of high body is often suitable for endoscopic necrosectomy.[5,12] A retrogastric approach through the posterior wall may present difficulties if the pancreatic necrosis extends to the peritoneal space with noncontagious nature.[5] For these cases, an adjunctive approach with percutaneous drainage may be a last resort.[9,19] However, percutaneous drainage may be ineffective given the thick and solid nature of necrotic materials. Moreover, percutaneous drainage is frequently associated with patient discomfort related to the external drainage or pancreaticocutaneous fistula.[20] In our case, pancreatic necrosis was widespread from the retroperitoneum to the peritoneal space with noncontagious nature. An endoscopic necrosectomy through the high body posterior wall was not sufficient to remove the necrotic material extending to the peritoneal space. So we did an additional EUS-guided cystogastrostomy through the low body posterior wall and a multitransgastric necrosectomy was performed. After repeated multitransgastic necrosectomies, pancreatic necrosis was almost completely resolved. Because there were no accessories specifically designed for the purpose of endoscopic necrosectomy, this endoscopic necrosectomy via multitransgastric approach may need multiple sessions to clear the necrotic materials. Prior to performing this novel technique, therefore, patients should be provided with information about the advantages and disadvantages of this approach, so they can make an informed consent.

In summary, EUS-guided multitransgastric necrosectomy may be technically feasible and an effective means of managing infected pancreatic necrosis with noncontagious retroperitoneal and peritoneal extension. Further experience with this technique will define its role in the treatment of the subset of patients who have an infected pancreatic necrosis with retroperitoneal and peritoneal extension. Moreover, this approach is still not the standard of care until more favorable data becomes available in multiple centers with the expertise that can confirm its successful outcome.

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