

Percutaneous Endoscopic Necrosectomy of Complex Walled-Off Lateral Necrosis of the Pancreas with the Aid of Laparoscopic Babcock Forceps: A Case Report of an Endoscopic and Radiologic Team Approach

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ABSTRACT

Introduction: The initial therapeutic intervention for infected necrotizing pancreatitis usually begins with endoscopic cystogastrostomy for drainage, followed by endoscopic necrosectomy. Endoscopic pancreatic necrosectomy is commonly performed transluminally through transgastric or transduodenal routes. This case describes necrosectomy via a transcuteaneous route for laterally located walled-off pancreatic necrosis and the novel use of Babcock forceps for an obstructed fully covered metal stent.

Case Presentation: A 62-year-old woman presented with abdominal pain, nausea, and vomiting. After multiple admissions and repeated abdominal imaging, she was found to have laterally located, infected, walled-off pancreatic necrosis. Initially, a drainage catheter was placed by an interventional radiologist and was eventually upsized to a 28F catheter. Subsequently, a fully covered metal stent was placed in the gastroenterology suite under fluoroscopic guidance and was used to gain access for percutaneous sessions of necrosectomy. A percutaneous sinus tract endoscopic necrosectomy was performed under direct endoscopic view. However, difficulties occurred with removing necrotic debris even through this large covered stent. Thus, laparoscopic Babcock forceps were used under fluoroscopy to remove lodged debris from the midstent. Repeat abdominal computed tomography scan 3 days after necrosectomy showed near resolution of the walled-off pancreatic necrosis.

Discussion: This Babcock technique with endoscopic necrosectomy has not been previously described in the literature, to our knowledge. Babcock forceps were an ideal tool in our case because they were able to gain access to the obstruction in the stent, but the “teeth” are small and dull enough to prevent from catching onto the metal stent mesh.

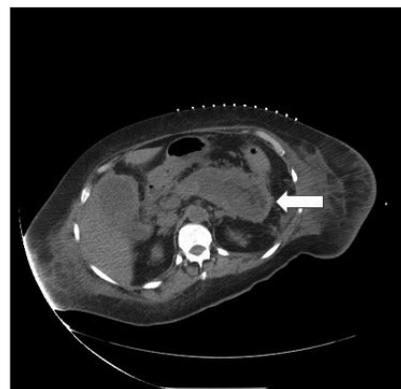


Figure 1. Transverse computed tomography of the abdomen showing necrotic pancreatic cavity before any intervention (arrow).

INTRODUCTION

Necrotizing pancreatitis is a severe form of pancreatitis in which necrosis can occur in or around the pancreas, which leads to a substantial increase in morbidity and mortality.^{1,2} Walled-off pancreatic necrosis (WOPN) with encapsulated necrotic pancreatic and peripancreatic tissue usually develops 4 weeks after an acute pancreatic episode.³ Abdominal ultrasonography, computed tomography (CT), and magnetic resonance imaging have been used to differentiate WOPN from pancreatic pseudocyst,⁴ although contrast-enhanced CT remains the gold standard for imaging in severe acute pancreatitis.³ Endoscopic ultrasonography with fine-needle aspiration can aid in the diagnosis of WOPN by assessing the distinguishing features of the lesion, such as size and echogenicity.

Treatment strategies differ between sterile and infected necrosis. Sterile acute pancreatic necrosis does not warrant early intervention, but infected necrosis is one indication for intervention. Traditionally, treatment would be débridement or endoscopic necrosectomy, but some studies have shown antibiotics alone or antibiotic therapy with percutaneous drainage may also be effective.³ Surgical pancreatic débridement, although considered the definitive treatment, has been associated with mortality rates of up to 58%.^{5,6}

CASE PRESENTATION

Presenting Concerns

A 62-year-old woman with a medical history of diabetes mellitus type 2 with chronic kidney disease stage 3, hypertension, and hyperlipidemia arrived at the

Emergency Department with abdominal pain, nausea, and vomiting. The pain was epigastric and radiated to the back. An abdominal CT scan showed evidence of necrotizing pancreatitis and gallstones. The patient improved clinically and was discharged home.

The patient was admitted several weeks later with increased abdominal pain, altered mental status, elevated lactate level (2.7 mmol/L, reference range = 0.5-1.9 mmol/L), and leukocytosis (leukocyte count of $13.7 \times 10^9/L$, reference range = $4.0-11.0 \times 10^9/L$). Infected WOPN was diagnosed (Figure 1). A gastroenterologist performed

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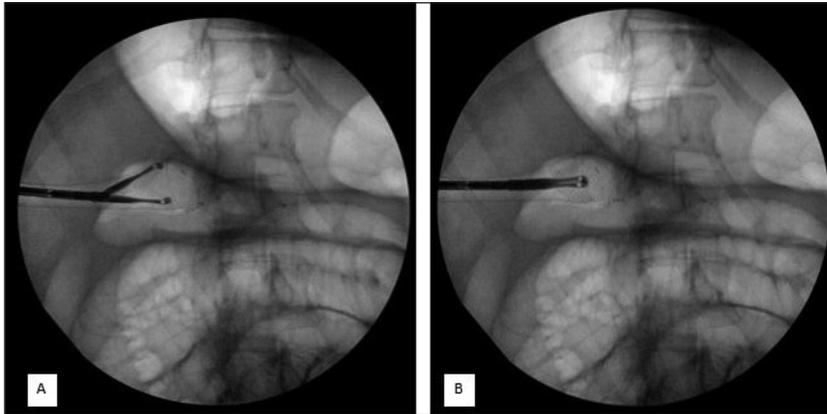


Figure 2. Illustration of Babcock forceps used under fluoroscopic guidance to dislodge debris from the fully covered metal stent by opening (A) and closing (B) forceps teeth at the level of the obstruction within the stent.

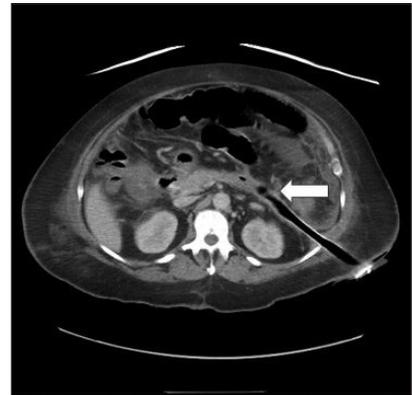


Figure 3. Transverse computed tomography scan of the abdomen showing necrotic pancreatic cavity after percutaneous sinus tract necrosectomy (arrow).

endoscopic ultrasonography. However, it was determined that endoscopic cystogastrostomy would be unsafe and technically not feasible primarily because of a large intervening vessel in the trajectory of the needle. Instead, an interventional radiologist initially placed a 14F drainage catheter into the body of the large collection of necrosis to help remove the thick purulent discharge. Cytologic findings showed acute and chronic inflammation, but no malignant cells. Cultures yielded *Klebsiella*, and the patient was started on ertapenem therapy. The interventional radiologist upsized the drainage catheter to 28F percutaneously.

Given the patient’s worsening clinical status despite antibiotics and supportive care, a decision was made to perform transcuteaneous endoscopic necrosectomy through the percutaneous tract. A guidewire with a hydrophilic tip was inserted into the cavity through the existing drainage catheter, over which the drain was removed. The wire tip location within the pancreatic necrotic cavity was confirmed on fluoroscopy. Over the wire, a 20-mm × 150-mm fully covered metal stent was placed under fluoroscopic guidance with the distal tip in the cavity and approximately 1 cm to 1.5 cm of stent protruding out at the skin level, which was

sutured onto the skin to prevent migration. A 15-mm controlled radiation expansion balloon was placed over the wire to dilate the tract at 3 different locations throughout the newly created percutaneous tract.

Necrosectomy was performed under direct endoscopic visualization with different surgical accessories, including alligator forceps, rat-tooth forceps, net retriever, metal basket, and quadra-pod forceps. A large amount of necrotic debris was able to be removed. At the end of the necrosectomy procedure, an interventional radiologist placed a stiff (floppy tip) wire into the cavity under fluoroscopic guidance, over which a 28F drainage catheter

Table 1. Timeline of the Case			
Relevant Medical History and Interventions			
A 62-year-old woman with a medical history of type 2 diabetes mellitus and stage 3 chronic kidney disease, hypertension, and hyperlipidemia arrived at the Emergency Department with abdominal pain, nausea, and vomiting.			
Date	Summaries from initial and follow-up visits	Diagnostic testing	Interventions
9/20/2017	Patient initially presented with abdominal pain, nausea, and vomiting. Pain was epigastric and radiated to the back.	Abdominal CT scan showed evidence of necrotizing pancreatitis and gallstones.	Patient improved with symptomatic treatment and was discharged home.
12/10/2017	3 months later, patient was admitted for increased abdominal pain and altered mental status.	Elevated lactate level (2.7 mmol/L, reference range = 0.5-1.9 mmol/L) Leukocytosis (leukocyte count of $13.7 \times 10^9/L$, reference range = $4.0-11.0 \times 10^9/L$)	EUS performed. Interventional radiologist placed 14F drainage catheter. Cultures grew <i>Klebsiella</i> which was treated with ertapenem. Drainage catheter upsized to 28F.
12/23/2017	Patient declined clinically during admission.		Transcutaneous endoscopic necrosectomy performed.
12/24/2017	Patient had continued low-grade fevers and flank pain.		Repeated necrosectomy the next day. Babcock forceps used to relieve repeated obstruction of stent caused by large amount of necrotic debris.
12/27/2017	Results of repeated CT scan of the abdomen 3 days after the procedure showed near resolution of WOPN near the body and tail of the pancreas.		

CT = computed tomography; EUS = endoscopic ultrasonography; WOPN = walled-off pancreatic necrosis.

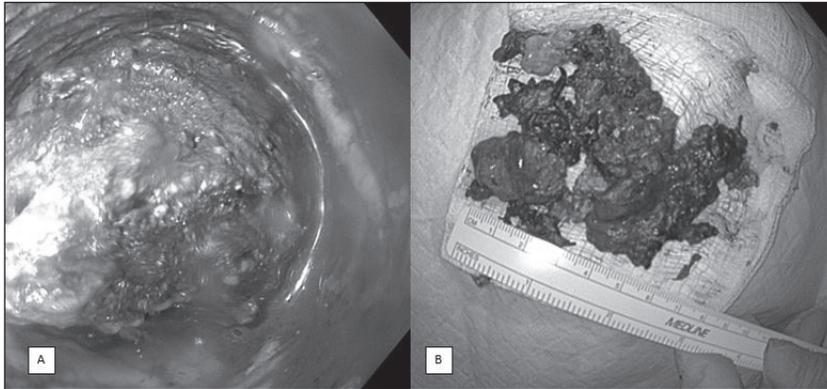


Figure 4. Clogged large debris within fully covered metal stent (A) and removed debris after Babcock forceps were used (B).

was replaced through the existing metal stent for continuous drainage.

The patient continued to have low-grade fevers and flank pain, requiring further necrosectomy the next day. The existing drainage catheter was removed, and necrosectomy was performed with various endoscopic accessories that were used in the previous procedure. The necrotic debris became repeatedly lodged in the stent, which was difficult to extract with any accessories, making the procedure extremely prolonged. To overcome this difficulty, we used laparoscopic Babcock forceps under fluoroscopic guidance to pull out the lodged debris from the midstent (Figures 2A and 2B). This tool allowed for much easier removal of the debris out of the stent, shortening the duration of the procedure.

Results of repeated CT scan of the abdomen 3 days after the procedure showed near resolution of WOPN near the body and tail of the pancreas (Figure 3). The patient improved clinically and was discharged home shortly after the last necrosectomy procedure. Informed consent was obtained from the patient for publication of the case details. A timeline of the case appears in Table 1.

DISCUSSION

Necrotizing pancreatitis is a severe form of pancreatitis in which necrosis can occur in or around the pancreas. This pancreatic necrosis is associated with high morbidity and mortality of up to 10% to 40% and can lead to severe end-organ damage.⁷

The initial therapeutic intervention usually begins with endoscopic

cystogastrostomy for drainage, followed by endoscopic necrosectomy. Endoscopic pancreatic necrosectomy is commonly performed transluminally through transgastric or transduodenal routes, but our case describes necrosectomy via a transcutaneous route for laterally located WOPN. The transluminal approach was not technically possible. Therefore, drainage placement by an interventional radiologist, percutaneous fully covered metal stent placement, and percutaneous necrosectomy were performed.

Percutaneous necrosectomy and sinus tract endoscopy performed in this manner have been successfully described in the literature previously.^{8,9} Initial results supported the advantage of percutaneous necrosectomy over open necrosectomy given the reduction in complications and death.^{8,10} Algorithm-based nonsurgical approaches have shown favorable outcomes compared with surgery, beginning with endoscopic drainage, followed by endoscopic necrosectomy as needed, and percutaneous catheter drainage/sinus tract endoscopic necrosectomy as an adjunctive therapy.⁶ In addition, there is substantial cost savings with minimally invasive intervention, as open necrosectomy can cost upward of \$130,000 per patient.¹¹

The continued clinical deterioration of our patient required additional necrosectomy with a considerable amount of necrotic debris removed through the fully covered metal stent nested in the transcutaneous tract. However, from our experience with this patient, we found that large necrotic debris can clog the stent in such



Figure 5. Babcock laparoscopic forceps used in this case.

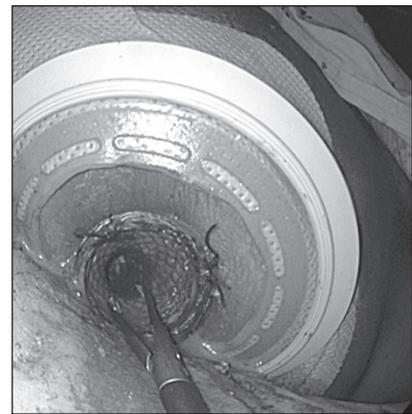


Figure 6. Babcock laparoscopic forceps inserted into fully covered metal stent.

cases, leading to prolonged procedures (Figure 4). Laparoscopic Babcock forceps traditionally used in laparoscopic surgeries can be used in these situations (Figure 5). The forceps were inserted into the fully covered metal stent (advanced only to the extent of the stent and *not* into the necrotic cavity) to grasp and remove the necrotic debris obstructing the stent (Figure 6). Babcock forceps were an ideal choice because they were able to gain access to the obstruction in the stent, but the “teeth” are small and dull enough to prevent the tip from being caught in the metal stent mesh during repeated débridement.

This Babcock technique with necrosectomy has not been previously described in the literature, to our knowledge. The technique helped lead to near resolution of WOPN on repeat CT scan just 3 days after the procedure and improved the patient’s overall clinical status, which allowed her to be discharged from the hospital shortly after the final necrosectomy. Although pancreaticocutaneous fistula can be a concern in transcutaneous endoscopic necrosectomy, especially with a large stent size such as in our case, our patient was

not found to have a pancreaticocutaneous fistula in follow-up clinic visits.

CONCLUSION

This case describes necrosectomy via a transcuteaneous route for laterally located WOPN resulting from severe necrotizing pancreatitis. Cases where the walled-off necrosis is laterally located can be challenging to access through the gastrointestinal lumen endoscopically as in this case and may require transcuteaneous access. Necrosectomy with a substantial amount of necrotic debris removed can lead to the stent becoming obstructed repeatedly during the procedure. In our case, Babcock forceps were able to gain access and relieve the obstruction in the stent, facilitating the procedure without any additional complications. ❖

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

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