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Case Report

Endoscopic necrosectomy through a self-expandable metallic stent placed percutaneously for walled-off pancreatic necrosis

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ABSTRACT

Walled-off pancreatic necrosis (WOPN) is defined as encapsulated necrotic tissue after severe acute pancreatitis. Treatment strategies for WOPN can be challenging. Although open surgical necrosectomy is the standard treatment for WOPN, it is associated with high rates of morbidity and mortality. Endoscopic necrosectomy, introduced recently, is a treatment option that produces lower rates of morbidity than does open surgery. We report a case of severe WOPN that could not be treated with the usual procedures. Although endoscopic necrosectomy of the left subphrenic and prepancreatic spaces was technically impossible, these spaces could be percutaneously drained. Finally, sufficient drainage of these spaces was achieved with endoscopic necrosectomy through the internal lumen of the self-expandable metallic stent placed percutaneously. This procedure was performed by an endoscopist and an interventional radiologist, and the multidisciplinary approach was useful.

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Keywords: Endoscopy; Pancreatitis; Self-expandable metallic stents

Introduction

Severe acute pancreatitis is a challenging disease, and the development of necrosis in the pancreatic parenchyma or surrounding fat tissue can lead to the formation of encapsulated fluid collections, defined as ‘walled-off pancreatic necrosis (WOPN)’.¹ Some cases of WOPN may be improved by drainage alone, but most cases necessitate necrosectomy because the underlying solid tissue is infected and necrotic.¹

Among various treatment modalities, surgical necrosectomy may be associated with prolonged recovery, the need for repeat operations, external fistula, and abdominal wall hernias.^{2,3} Percutaneous drainage techniques have been used as an alternative to surgical management; however, these methods are not universally successful, and additional combination treatment is often required.^{3–6} Recently, endoscopic necrosectomy has been introduced as a treatment option; rates of morbidity after this procedure are lower than those after open surgery.⁷ The WOPN cavity is punctured and entered under endoscopic ultrasound guidance, and the endoscope is inserted directly into the cavity to remove necrotic

tissue by irrigation, suction, and the use of endoscopic accessories.⁷ After mechanical removal of necrotic tissue, a large-bore double-pigtail plastic stent or a fully covered self-expandable metallic stent (SEMS) is inserted into the cavity to enable repeat intervention.³ Endoscopic necrosectomy requires proximity to the gastroduodenal lumen and WOPN, whereas percutaneous drainage may be suitable for collections distant from the gut lumen.³

We report a case of severe WOPN in which drainage was performed successfully in endoscopic necrosectomy through the internal lumen of the SEMS placed percutaneously.

Case Report

The Institutional Review Board of the Aichi Cancer Center Hospital requires no approval for publication of a retrospective case report.

A 59-year-old female with pancreatic head cancer underwent endoscopic retrograde cholangiopancreatography; acute pancreatitis developed afterwards and was managed conservatively. Contrast medium-enhanced computed tomography (CE-CT) 5

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weeks after the onset of pancreatitis revealed extensive pancreatic necrosis and acute necrotic collections with air density around pancreas, which indicated WOPN and infection (Fig. 1). Under endoscopic ultrasound guidance, a covered SEMS (10-mm diameter, 80-mm length X-Suit NIR; Olympus, Tokyo, Japan) and 7-Fr plastic stents were inserted for WOPN drainage (Fig. 2A). After that, the patient underwent endoscopic necrosectomy (Fig. 2B) and percutaneous drainage for necrotic collections in the abdominal and pelvic cavity (Fig. 2C). However, the patient's general condition was worsened by insufficient drainage, and the patient underwent a tracheostomy and was on mechanical ventilation.

Seven weeks after the onset of pancreatitis, CE-CT revealed residual necrotic collections in the left subphrenic and prepancreatic space, and additional percutaneous drainage was performed for the necrotic collection of the left subphrenic space (Fig. 3). However, sufficient drainage could not be accomplished. Also,

endoscopic necrosectomy of the left subphrenic space was technically impossible. Nine weeks after the onset of pancreatitis, CE-CT displayed the pseudoaneurysm formation of the gastroduodenal artery, and the patient underwent transarterial embolization with N-butyl cyanoacrylate mixed with iodized oil (Fig. 4).

We judged that sufficient drainage could not be obtained by usual endoscopic necrosectomy and percutaneous drainage. Hence, after obtaining informed consent, we attempted endoscopic necrosectomy through the internal lumen of the SEMS placed percutaneously for the residual necrotic collections. We used dilators to exchange the drainage catheter in the left subphrenic space for a 28-Fr catheter (Trocac catheter; Sumitomo Bakelite, Tokyo, Japan). Next day, the drainage volume was temporarily increased; however, necrotic tissues were remained. Two days after this exchange, a covered SEMS (18-mm diameter, 80-mm length Niti-S esophageal stent; Taewoong Medical, Gimpo,

Fig. 1. Contrast medium-enhanced computed tomography revealed extensive pancreatic necrosis and acute necrotic collections with air density, which indicated walled-off pancreatic necrosis and infection.

Fig. 2. (A) Endoscopic ultrasound-guided internal drainage and insertion of a covered self-expandable metallic stent (10-mm diameter, 80-mm length X-Suit NIR; Olympus, Tokyo, Japan) and 7-Fr plastic stents (arrows) were performed. (B, C) Endoscopic necrosectomy and percutaneous drainage for necrotic collections with 14-Fr drainage catheters (arrows) were performed in the abdominal and pelvic cavity.

Fig. 3. Additional percutaneous drainage was performed for the necrotic collection in the subphrenic space. The white arrows indicate the 14-Fr drainage catheter; the black arrow indicates the percutaneous transhepatic gallbladder drainage catheter.

Fig. 4. (A) Contrast medium-enhanced computed tomography revealed the formation of a pseudoaneurysm in the gastroduodenal artery (arrow). (B) The patient underwent the transarterial embolization with *N*-butyl cyanoacrylate mixed with iodized oil (arrow).

Fig. 5. (A–C) The covered self-expandable metallic stent (18-mm diameter, 80-mm length Niti-S stent; Taewoong Medical, Gimpo, Korea) was placed to extend from the subphrenic space to outside of the body 2 days after catheter exchange (arrows). (D) The endoscopic necrosectomy was performed through the internal lumen of the stent (arrow).

Korea) was placed to extend from the left subphrenic space to the outside of the body (Fig. 5A–5C). Subsequently, the patient underwent the endoscopic necrosectomy through the internal lumen of the stent, and sufficient drainage could be obtained (Fig. 5D). Considering the additional infection via the SEMS placed percutaneously, antibiotics were continuously administered before and after SEMS placement. This stent was removed manually 8 days after its placement, and a 22-Fr drainage catheter (Trocath catheter) was placed through the same fistula. The same procedure was performed for the residual necrotic collection of the prepancreatic space 12 weeks after the onset of pancreatitis (Fig. 6). The second stent was removed manually 14 days after its placement. These procedures were performed while the patient was under deep sedation using propofol and fentanyl citrate. Finally, all drainage catheters were removed without any major complications.

The follow-up CE-CT 18 weeks after the onset of pancreatitis revealed remarkable shrinkage of necrotic collections (Fig. 7). The patient's general condition was improved; however, she died of progressive disease of pancreatic cancer 6 months after the onset of pancreatitis.

Fig. 6. A second covered self-expandable metallic stent (18-mm diameter, 60-mm length Niti-S stent; Taewoong Medical, Gimpo, Korea) extended from the prepancreatic space to outside the body (arrow).

Fig. 7. Follow-up contrast medium-enhanced computed tomography revealed the remarkable shrinkage of necrotic collections. The arrow indicates retained N-butyl cyanoacrylate mixed with iodized oil.

Discussion

In our patient, the WOPN could not be treated with the usual procedures, but sufficient drainage was achieved by endoscopic necrosectomy through the internal lumen of the SEMS placed percutaneously. Although endoscopic necrosectomy of the left subphrenic and prepancreatic spaces was technically impossible, these spaces could be percutaneously drained. After adequate fistula dilation, placement of a SEMS extending from these spaces to outside of the body was technically not difficult. Also, endoscopic necrosectomy could be performed through the internal lumen of the percutaneously placed stent. With deep sedation, the patient could undergo these procedures safely because her respiratory condition was managed by mechanical ventilation through the tracheostomy.

SEMSs have been increasingly used because of their larger internal diameter and potential for improving drainage and because they allow direct endoscopic necrosectomy repeatedly through the internal lumen of the stent.⁸ In our patient, an esophageal SEMS was used because of its large internal diameter and fully covered design. Recently, lumen-apposing metal stents (LAMS) have been used instead of plastic stents for draining WOPN.^{9,10} However, bleeding after LAMS placement was reported as a procedure-related complication.¹⁰ Ahmad et al¹¹ reported that early LAMS removal could prevent delayed bleeding. In our case, first and second SEMSs were removed 8 and 14 days after each stent placement, respectively. The duration of stent placement was relatively short. Bleeding can be caused by stent edge injury, but in our patient, there were no major complications related to SEMS placement.

In conclusion, endoscopic necrosectomy through the internal lumen of the SEMS placed percutaneously effectively alleviated severe WOPN. This procedure was performed by an endoscopist and an interventional radiologist, and the multidisciplinary approach was useful.

Conflicts of Interest

No potential conflict of interest relevant to this article was re-

ported.

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