

Modified single transluminal gateway transcystic multiple drainage technique for a huge infected walled-off pancreatic necrosis: A case report

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Abstract

We report a successful endoscopic ultrasonography-guided drainage of a huge infected multilocular walled-off necrosis (WON) that was treated by a modified single transluminal gateway transcystic multiple drainage (SGTMD) technique. After placing a wide-caliber fully covered metal stent, follow-up computed tomography revealed an undrained subcavity of WON. A large fistula that was created by the wide-caliber metal stent enabled the insertion of a forward-viewing upper endoscope directly into the main cavity, and the narrow connection route within the main cavity to the subcavity was identified with a direct view, leading to the successful drainage of the subcavity. This modified SGTMD technique appears to be useful for seeking connection routes between subcavities of WON in some cases.

Key words: Endoscopic ultrasonography; Infected pancreatic necrosis; Walled-off necrosis; Endoscopic ultrasonography-guided drainage; Acute pancreatitis

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Core tip: Walled-off necrosis (WON) remains difficult to endoscopically manage because of insufficient drainage of solid necrotic tissues. Here, we present a case of successful drainage of a huge WON *via* a modified single transluminal gateway transcystic multiple drainage technique. After placing a wide-caliber covered metal stent, follow-up computed tomography revealed an undrained subcavity of WON. A large fistula created by the metal stent enabled the insertion of an upper endoscope directly into the main cavity, and the narrow connection route within the main cavity to the subcavity was identified with a direct view, leading to the successful drainage of the subcavity.

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INTRODUCTION

Endoscopic ultrasonography (EUS)-guided drainage for pancreatic fluid collection (PFC) is increasingly used as a minimally invasive alternative to surgical and percutaneous drainage^[1-3]. However, walled-off necrosis (WON) remains difficult to endoscopically manage because of insufficient drainage of solid necrotic tissues. Various techniques, such as the use of wide-caliber metal stents^[4,5], direct endoscopic necrosectomy^[6,7] and multiple transluminal gateway technique^[8] are reportedly useful for managing WON. However, responses to these advanced techniques remain unsatisfactory in some cases. Recently, a single transluminal gateway transcystic multiple drainage (SGTMD) was developed for treating complicated multilocular WON^[9]. Here, we present a case of successful endoscopic drainage of a huge infected multilocular WON *via* a modified SGTMD technique.

CASE REPORT

A 49-year-old male presented with upper abdominal pain and high fever of 7 d duration. He was diagnosed with alcohol-induced severe acute pancreatitis 1 mo before and was discharged 6 d after admission from a neighbouring general hospital. His computed tomography (CT) severity index^[10] was 6. He was re-admitted to our hospital with the above-mentioned chief complaints. Laboratory tests revealed elevated C-reactive protein (CRP) and procalcitonin levels (27.8 mg/dL and 6.17 ng/mL, respectively). Elevated levels of kidney function parameters were also noted (blood urea nitrogen level, 77 mg/dL; serum creatinine

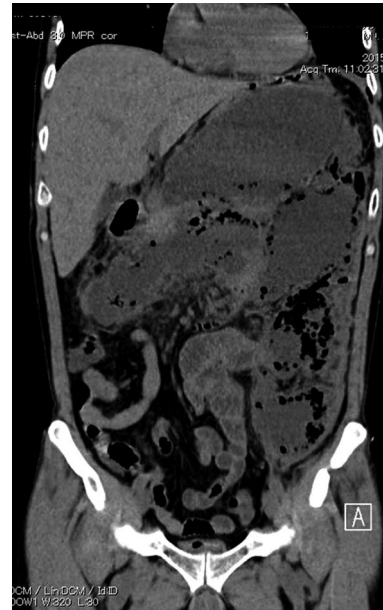


Figure 1 Abdominal computed tomography scan showing a huge multilocular walled-off necrosis replacing the body and tail of the pancreas, which extended to the pelvis. Gas bubbles were observed in the cavity.

level, 3.14 mg/dL). An abdominal CT revealed a huge multilocular WON measuring 31 cm × 16 cm, which spread from the pancreas to pelvis (Figure 1). Clinically, infection of the necrosis was assumed. Doripenem was intravenously introduced; however, his clinical symptoms and elevated inflammatory reaction persisted. As the main cavity of WON was close to the gastric lumen, we decided to puncture WON under EUS guidance. EUS-guided transluminal drainage was performed; a wide-caliber fully covered TTS Niti-S esophageal stent (internal diameter, 16 mm; maximum flange diameter, 24 mm; length, 40 mm; Taewoong Medical, Seoul, South Korea) was placed (Figure 2). Through the metal stent, a 7-Fr double-pigtail plastic stent (length, 80 mm) and a 7-Fr nasocystic catheter were inserted (Figure 3). During the procedure, approximately 2.4 L of purulent fluid were suctioned. A follow-up abdominal CT obtained 1 wk after the procedure demonstrated a significant reduction in the size of the main cavity; however, the undrained subcavity remained, which was mainly located in the left anterior pararenal space and extended to the left pelvis (Figure 4). Additional drainage targeting the subcavity was required because high fever continued after the procedure. Because the subcavity was not adjacent to the stomach or duodenum, additional EUS-guided puncture was difficult. CT suggested communication between the subcavity and main cavity; therefore, a SGTMD procedure was considered. Repeated attempts to determine the connection route within the main cavity to the subcavity using an ERCP catheter and 0.025-inch guidewire were unsuccessful. The metal stent was removed, and a large fistula that was created by the metal stent enabled the insertion

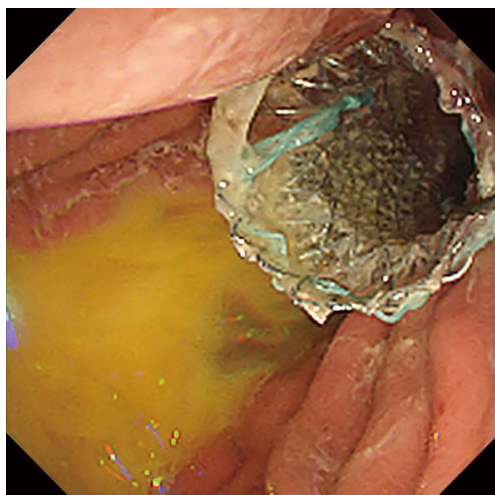


Figure 2 Successful deployment of a wide-caliber fully covered TTS Niti-S esophageal stent. Purulent fluid was observed in the gastric lumen.



Figure 4 Computed tomography one week after initial drainage showed an undrained subcavity, located mainly at the left anterior pararenal space that extended to the left pelvis.

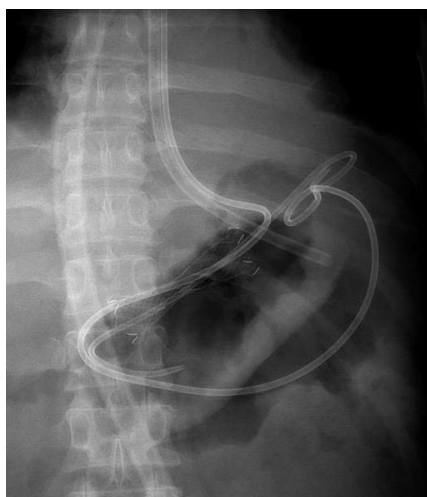


Figure 3 A 7-Fr double-pigtail plastic stent and a 7-Fr nasocystic catheter were deployed through the fully covered metal stent.

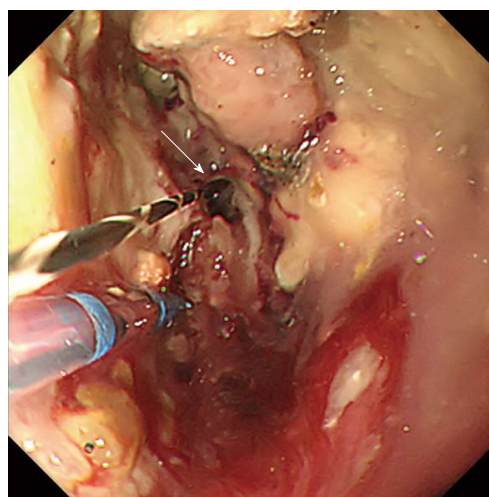


Figure 5 Endoscopic view of the cavity of walled-off necrosis by a modified single transluminal gateway transcystic multiple drainage technique. An upper endoscope was inserted into the walled-off necrosis (WON) through the fistula and a narrow connection route within the main cavity to the subcavity could be identified directly (white arrow).

of a forward-viewing upper endoscope directly into the main cavity. After the endoscope was advanced into the cavity, a narrow connection route was identified (Figure 5). Contrast medium was injected into the connection. Having confirmed the detection of the subcavity, the guidewire was inserted into the cavity and two 7-Fr double-pigtail plastic stents (lengths, 120 and 80 mm, respectively) were deployed (Figure 6). No procedure-related complications were observed. After additional endoscopic management, high fever resolved over the course of a few days and CRP levels significantly decreased. CT revealed that the subcavity of WON was well drained. The patient completely recovered and was discharged after 3 wk of hospitalization. Follow-up CT obtained 1 month after discharge revealed that WON had mostly collapsed (Figure 7) and the patient remained symptom free.

DISCUSSION

Over the last decade, techniques for pancreatic fluid collection have shifted toward minimally invasive approaches. Since first reported in 1992 by Grimm *et al.*^[1] EUS-guided transluminal drainage for pancreatic fluid collection has played a pivotal role and spread worldwide as a minimally invasive alternative to surgical and percutaneous drainage^[1-3]. However, the clinical response rate of the conventional single transluminal gateway technique deploying single or multiple stenting for treating WON is not satisfactory (described as 45%-63%)^[8,11]. Recently, various techniques, such as the use of wide-caliber metal

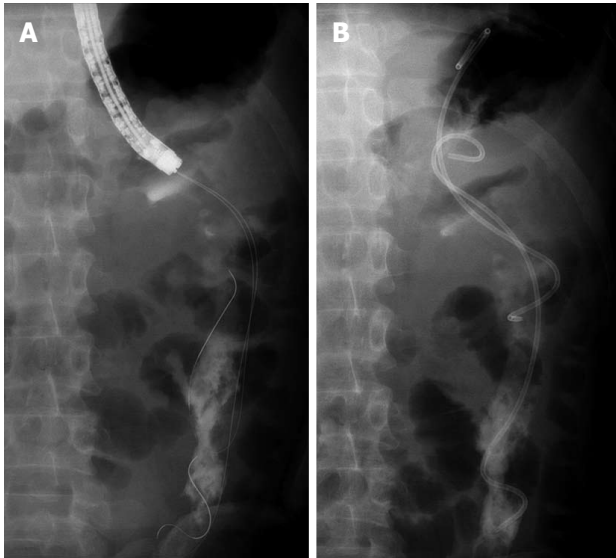


Figure 6 Fluoroscopic view of modified single transluminal gateway transcystic multiple drainage technique. With a direct view of the connection route, a 0.025-inch guidewire was inserted into the subcavity (A) and two 7-Fr double-pigtail plastic stents were deployed (B).

stents^[4,5], direct endoscopic necrosectomy^[6,7] and multiple transluminal gateway technique^[8] have improved the clinical success rate of endoscopic management of WON. However, response to these advanced techniques remains unsatisfactory in some cases. Mukai *et al.*^[9] recently described a novel SGTMD procedure for complicated multilocular WON and reported successful drainage in five cases using this technique. When subcavities are located far from the gastrointestinal lumen, percutaneous approach would have been used conventionally. Mukai *et al.*^[9] hypothesized that the multilocular cavity may have originally been unilocular and separated into subcavities with tiny, narrow connections during the process of treatment and collapse. They used an ERCP catheter and soft guidewire to locate tiny, narrow connections. In this case, we repeatedly attempted to identify the connection using an ERCP catheter and soft guidewire through the metal stent under fluoroscopic guidance, but the guidewire curled up in the main cavity and failed to locate a connection route. Instead, we inserted the upper endoscope into the cavity through the large fistula, which enabled the narrow connection route to be directly observed. The guidewire was easily and safely advanced into the subcavity, and successful drainage of the subcavity was achieved. This is a modified technique of the previously described SGTMD. In addition to SGTMD, having a direct view to identify the connection route may lead to a higher success rate in some cases.

In this case, the pig-tail stents have been left in place during 6 mo follow-up. This is because the previous studies revealed that stent retrieval was associated with higher PFC recurrence rates^[12,13].



Figure 7 Follow-up computed tomography obtained one month after discharge revealed the WON had mostly collapsed.

In conclusion, we presented a case of successful endoscopic drainage of a huge infected multilocular WON by a modified SGTMD technique with direct endoscope insertion into the cavity. This modified SGTMD technique appears to be useful in seeking connection routes between the subcavities of WON and might avoid the requirement for a more invasive drainage procedure, such as endoscopic or surgical necrosectomy.

COMMENTS

Case characteristics

One month after being diagnosed with alcohol-induced severe acute pancreatitis, a 49-year-old male presented with upper abdominal pain and high fever of 7 d duration.

Clinical diagnosis

The patient had upper abdominal pain and high fever.

Differential diagnosis

Pancreatic pseudocyst.

Laboratory diagnosis

The laboratory findings showed elevated C-reactive protein, procalcitonin levels and renal dysfunction.

Imaging diagnosis

Abdominal computed tomography demonstrated a huge multilocular WON measuring 31 cm × 16 cm, which spread from the pancreas to pelvis.

Pathological diagnosis

Pathological examination was not performed in this case.

Treatment

Endoscopic drainage with a modified single transluminal gateway transcystic multiple drainage (SGTMD) technique was performed.

Related reports

WON remains difficult to endoscopically manage because of insufficient drainage of solid necrotic tissues. Various techniques, such as the use of wide-caliber metal stents, direct endoscopic necrosectomy, multiple transluminal gateway technique and SGTMD technique were developed for treating WON.

Term explanation

Modified SGTMD is a novel alternative technique for drainage of WON which means a single transluminal gateway transcystic multiple drainage with direct endoscope insertion into the cavity.

Experiences and lessons

Modified SGTMD technique appears to be useful in seeking connection routes between the subcavities of WON and might avoid the requirement for a more invasive drainage procedure, such as endoscopic or surgical necrosectomy.

Peer-review

This case report is interesting and well documented.

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