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

Kosuke Minaga, Masayuki Kitano, Hajime Imai, Kentaro Yamao, Ken Kamata, Takeshi Miyata, Tomohiko Matsuda, Shunsuke Omoto, Kumpei Kadosaka, Tomoe Yoshikawa, Masatoshi Kudo

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

© The Author(s) 2016. Published by Baishideng Publishing Group Inc. All rights reserved.
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.

Minaga K, Kitano M, Imai H, Yamao K, Kamata K, Miyata T, Matsuda T, Omoto S, Kadosaka K, Yoshikawa T, Kudo M. Modified single transluminal gateway transcystic multiple drainage technique for a huge infected walled-off pancreatic necrosis: A case report. World J Gastroenterol 2016; 22(21): 5132-5136 Available from: URL: http://www.wjgnet.com/1007-9327/full/v22/i21/5132.htm DOI: http://dx.doi.org/10.3748/wjg.v22.i21.5132

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 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...
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...
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 transcytic 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.

REFERENCES

1. Grimm H, Binmoeller KF, Soehendra N. Endosonography-guided drainage of a pancreatic pseudocyst. Gastrointest Endosc 1992; 38: 170-171 [PMID: 1568613 DOI: 10.1016/S0016-5107(92)70384-8]
2. Park DH, Lee SS, Moon SH, Choi SY, Jung SW, Seo DW, Lee SK, Kim MH. Endoscopic ultrasound-guided versus conventional transmural drainage for pancreatic pseudocysts: a prospective randomized trial. Endoscopy 2009; 41: 842-848 [PMID: 19798610 DOI: 10.1055/s-0029-1215133]
3. Talreja JP, Shami VM, Ku J, Morris TD, Ellen K, Kahaleh M. Transenteric drainage of pancreatic-fluid collections with fully covered self-expanding metallic stents (with video). Gastrointest Endosc 2008; 68: 1199-1203 [PMID: 19028232 DOI: 10.1016/j.gie.2008.06.015]
4. Bapaye A, Itoi T, Kangkam P, Dubale N, Mukai S. New fully covered large-bore wide-flare removable metal stent for drainage of pancreatic fluid collections: results of a multicenter study. Dig Endosc 2015; 27: 499-504 [PMID: 25545957 DOI: 10.1111/den.12421]
5. Attam R, Trikudanathan G, Arain M, Nemoto Y, Glessing B, Mallory S, Freeman ML. Endoscopic transluminal drainage and necrosectomy by using a novel, through-the-scope, fully covered, large-bore esophageal metal stent: preliminary experience in 10 patients. Gastrointest Endosc 2014; 80: 312-318 [PMID: 24721519 DOI: 10.1016/j.gie.2014.02.013]
6. Selte H, Wehrmann T, Schmitt T, Zeuzem S, Caspary WF. Retroperitoneal endoscopic debridement for infected peripancreatic necrosis. Lancet 2000; 356: 653-655 [PMID: 10968442 DOI: 10.1016/S0140-6736(00)02611-8]
7. Yasuda I, Nakashima M, Iwai T, Hisa H, Inoue H, Kato H, Kanno A, Kubota K, Irisawa A, Igarashi H, Okabe Y, Kitano M, Kawakami H, Hayashi T, Mukai T, Sata N, Kida M, Shimosegawa T. Japanese multicenter experience of endoscopic necrosectomy for infected walled-off pancreatic necrosis: The JENIPaN study. Endoscopy 2013; 45: 627-634 [PMID: 23807806 DOI: 10.1055/s-0033-134027]
8. Varadaraju S, Phadnis MA, Christein JD, Wilcox CM. Multiple transluminal gateway technique for EUS-guided drainage of symptomatic walled-off pancreatic necrosis. Gastrointest Endosc 2011; 74: 74-80 [PMID: 21612778 DOI: 10.1016/j.gie.2011.03.1122]
9. Mukai S, Itoi T, Sofuni A, Itohita F, Kurihara T, Tsuchiya T, Ishii K, Tsaji S, Ikeuchi N, Tanaka R, Umeda J, Tonozuka R, Honjo M, Moriyyasu F. Novel single transluminal gateway transcytic multiple drainages after EUS-guided drainage for complicated multilocular walled-off necrosis (with videos). Gastrointest Endosc 2014; 79: 531-535 [PMID: 24287280 DOI: 10.1016/j.gie.2013]
10. Balthazar EJ, Robinson DL, Megibow AJ, Ranson JH. Acute pancreatitis: value of CT in establishing prognosis. Radiology 1990; 174: 331-336 [PMID: 2296641 DOI: 10.1148/radiology.174.2.2296641]
11. Gardner TB, Chahal P, Papachristou GI, Vege SS, Petersen BT, Gostout CJ, Topazian MD, Takahashi N, Sarr MG, Baron TH. A comparison of direct endoscopic necrosectomy with transmural endoscopic drainage for the treatment of walled-off pancreatic necrosis. Gastrointest Endosc 2009; 69: 1085-1094 [PMID: 19243764 DOI: 10.1016/j.gie.2008.06.061]
12. Arvanitakis M, Delhaye M, Bali MA, Matsos C, De Maertelaer V, Le Moine O, Deviere J. Pancreatic-fluid collections: a randomized controlled trial regarding stent removal after endoscopic transmural drainage. Gastrointest Endosc 2007; 65: 609-619 [PMID: 17324413 DOI: 10.1016/j.gie.2006.08.038]
13. Bang JY, Wilcox CM, Trevino J, Ramesh J, Peter S, Hasan M, Hawes RH, Varadaraju S. Factors impacting treatment outcomes in the endoscopic management of walled-off pancreatic necrosis. J Gastroenterol Hepatol 2013; 28: 1725-1732 [PMID: 23829423 DOI: 10.1111/jgh.12328]

P- Reviewer: Wronski M S- Editor: Qi Y L- Editor: A E- Editor: Zhang DN
