

Outflow of N-butyl-2-cyanoacrylate into the Pancreatic Duct: Transcatheter Arterial Embolization for Hemosuccus Pancreaticus

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Abstract

A 54-year-old Japanese woman, hospitalized for recurrent chronic alcoholic pancreatitis, manifested bloody stools. An esophagogastroduodenoscopy revealed active bleeding from the papilla of Vater. Contrast-enhanced computed tomography (CECT) revealed a pseudoaneurysm in the pancreatic pseudocyst (hemosuccus pancreaticus). Angiography demonstrated pseudoaneurysm of the dorsal pancreatic artery branch. We selected N-butyl-2-cyanoacrylate (NBCA) as an embolus material because of the existing coagulopathy and difficulty in selecting the arterial branch. The administered NBCA outflowed into the pancreatic duct over the pseudoaneurysm. However, transcatheter arterial embolization (TAE) was successful, and no complication or rebleeding was observed after TAE. CECT showed NBCA cast in the pancreatic duct; however, the chronic pancreatitis improved. NBCA may be used to regulate hemosuccus pancreaticus in emergency settings; however, interventional radiologists must carefully consider the complications caused by NBCA.

Key words: transcatheter arterial embolization, hemosuccus pancreaticus, N-butyl-2-cyanoacrylate, complication

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Introduction

Hemosuccus pancreaticus (HP) is a rare condition that causes gastrointestinal bleeding. Surgery and transcatheter arterial embolization (TAE) are effective interventional strategies, though TAE has been the selected treatment in recent years if patients are hemodynamically stable[1]. In TAE for HP, a micro-coil is used as the embolus material because of its ease of handling. However, other embolic materials such as N-butyl-2-cyanoacrylate (NBCA) may be needed depending on the lesion site, technical difficulty, and presence of coagulopathy. Herein, we present an informative case of HP that manifested outflow of NBCA into the pancreatic duct during TAE.

Case Report

A 54-year-old Japanese woman was previously hospitalized in another hospital because of recurrent chronic alcoholic pancreatitis and liver cirrhosis. During hospitalization, she manifested bloody stools. Initially, the condition was managed conservatively, and she was transfused with red blood cells. However, manifestation of bloody stools persisted and caused progressive anemia. Results of laboratory examination showed anemia and coagulopathy because of active bleeding and liver cirrhosis. The laboratory findings were as follows: hemoglobin, 7.0 g/dL; platelets, $5.7 \times 10^9/\mu\text{L}$; prothrombin time-international normalized ratio, 2.32; activated partial thromboplastin time, 51.6 s; and fibrinogen,

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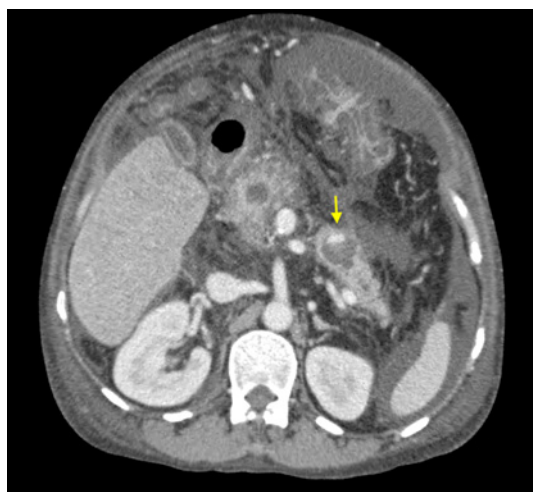


Figure 1. Contrast-enhanced computed tomography shows a pseudoaneurysm in the pancreatic pseudocyst.



Figure 2. Celiac artery angiography did not show the branch of the dorsal pancreatic artery because of backflow from the pancreatic arcade due to median arcuate ligament syndrome.

91.0 mg/dL. An esophagogastroduodenoscopy revealed active bleeding from the papilla of Vater. Contrast-enhanced CT (CECT) revealed a pseudoaneurysm in the pancreatic pseudocyst (**Figure 1**). She was transferred to our hospital for TAE. The CECT revealed that there was narrowing of the celiac artery because of median arcuate ligament syndrome and that the bleeding site was the branch of the dorsal pancreatic artery. The patient underwent an emergency TAE.

The access route was secured with an 18-gauge needle and a 5-Fr/25-cm sheath via the right femoral artery. The bleeding site could be reached via two sites-via the celiac artery or via the superior mesenteric artery. We decided to approach via the celiac artery owing to its short distance to the bleeding site. Celiac artery angiography was performed using a shepherd hook catheter; the branch of the dorsal pancreatic artery could not be detected because of backflow from the pancreatic arcade due to median arcuate ligament syndrome (**Figure 2**). We tried to select the target vessel using a micro-guidewire (CHIKAI Black, ASAHI INTECC, Nagoya, Japan) and 1.7-Fr micro-catheter (Progreat λ 17, TERUMO CLINICAL SUPPLY, Kakamigahara, Japan) based on CT information. This approach was successful; angiography revealed the pseudoaneurysm, and outflow of the administered contrast agent into the pancreatic duct over the pseudoaneurysm was observed (**Figure 3**). We selected a mixture of NBCA and lipiodol (1:1) as the embolic agent because of existing coagulopathy and difficulty with cannulation. Although we injected the NBCA emulsion carefully, it outflowed into the pancreatic duct over the pseudoaneurysm (**Figure 4A**). Although hemostasis was achieved, NBCA cast remained in the pancreatic duct (**Figure 4B**). Follow-up CT 3 days after TAE revealed persistent NBCA cast in the pancreatic duct and pseudocyst (**Figure 5A, B**). However, blood amylase and lipase levels decreased immediately after TAE, and chronic pancreatitis improved. The presentation of bloody stools and progressive anemia re-

solved eventually. The patient was transferred to another hospital for rehabilitation 32 days after TAE.

Discussion

Lower et al first reported HP as upper gastrointestinal bleeding due to pseudoaneurysm rupture of the peripancreatic artery or bleeding from the pseudocyst into the pancreatic duct[2]. The natural course of a pseudocyst can cause HP either by a hemorrhagic pseudocyst or by communicating with and eroding a pericyclic artery that results in fragile pseudoaneurysm[3]. Chronic pancreatitis is the most common cause of hemorrhagic pseudocyst and pseudoaneurysm in about 90% of the reported cases.

Definitive diagnosis of HP is the visualization of active blood flow from the duodenal papilla via the pancreatic duct by upper endoscopy. This pathognomonic feature is rarely observed because bleeding is mostly intermittent. CECT and subsequent angiography are most useful for definite diagnosis because these can be used to visualize pseudoaneurysm of the peripancreatic artery even in the absence of extravasation of contrast agent. For patients with stable hemodynamic status, minimally invasive TAE is the first choice of treatment, followed by angiography[1].

Many reported cases have used micro-coil as the embolic material[4-6]; occasionally, covered stent has also been used[7]. Limited reports have stated the use of NBCA. Our patient had ruptured pseudoaneurysm of the branch of the dorsal pancreatic artery, which communicated with the pancreatic duct. Therefore, NBCA may form casts that could consequently occlude the pancreatic duct because of communication with the bleeding site. Thus, NBCA is generally difficult to use as embolic material in patients with HP. However, we selected NBCA for the following reasons: poor general condition of the patient with existing coagulopathy

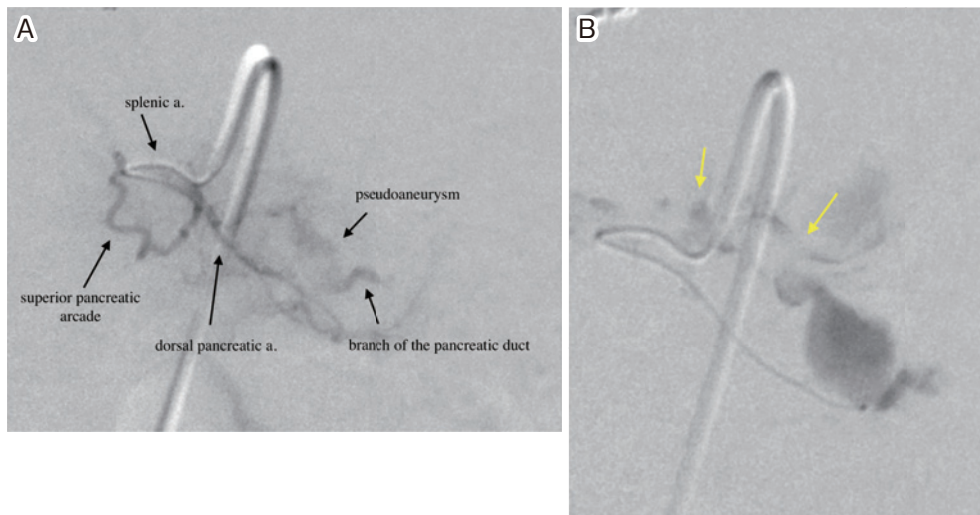


Figure 3. Dorsal pancreatic artery angiography shows a pseudoaneurysm (A) and subsequent selected angiography shows the injected contrast agent from the pseudocyst into the pancreatic duct (B). Arrows show the pancreatic duct. Abbreviation: a., artery.

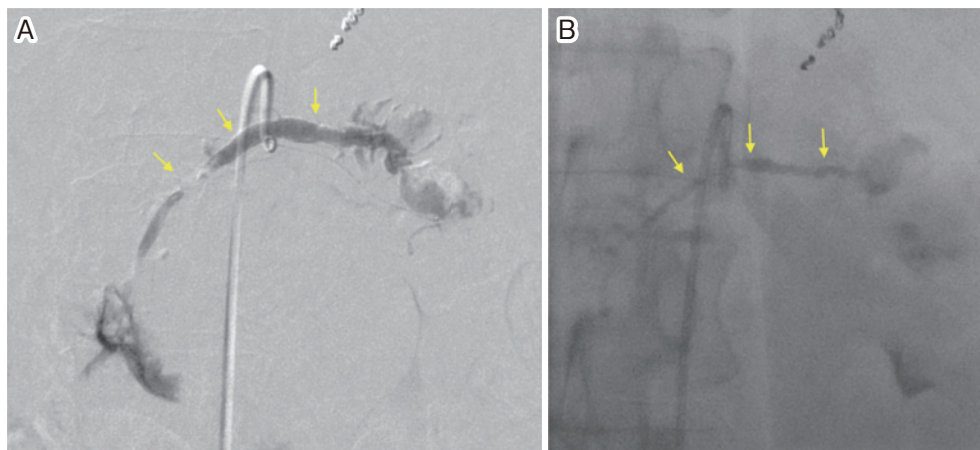


Figure 4. Outflow of a mixture of NBCA and lipiodol (1:1) into the pancreatic duct over the pseudoaneurysm is seen. (A) NBCA cast remained in the pancreatic duct. (B) Arrows show the pancreatic duct.

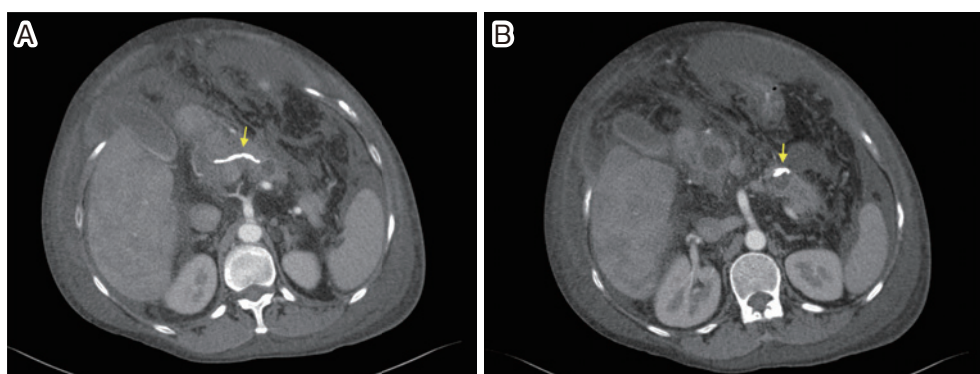


Figure 5. Contrast-enhanced computed tomography shows the persistence of the NBCA cast at the intrapancreatic duct (A) and intra-pseudocyst (B) after transcatheter arterial embolization.

and the difficulty in reaching the bleeding site because of median arcuate ligament syndrome. We planned to embolize only the pseudoaneurysm and inflow vessel using NBCA,

but we had to allow NBCA outflow into the pancreatic duct owing to the technical difficulty. Fortunately, no complication--such as obstructive pancreatitis--was observed

in this case. It has been reported that no complications such as pancreatitis were observed following embolization of the pancreatic duct with NBCA and a micro-coil for pancreatic fistula; this may be because the range of embolization is partial on the caudal side[8]. Similarly, part of the pancreatic duct may have been patent in our case.

In many cases, pseudoaneurysms and pancreatic ducts are considered to be connected. Therefore, administering NBCA for HP would increase the risk of pancreatitis. In such cases, if the coagulation status is normal and there is no urgency, using micro-coils is the safest option. When using NBCA, at the very least, flow control of NBCA should be performed using a balloon catheter for the parent artery or inflow vessel. In addition, it may be safer to use the micro-coil as a scaffold. It has been reported that flow control by epinephrine is also effective and safe[9]. To prioritize hemostasis, since this patient was hemodynamically unstable, we decided to administer NBCA without using a balloon catheter or micro-coils. However, we think that we should have tried the above techniques first and then administered NBCA directly if unsuccessful.

Use of NBCA in patients with HP may be a practical choice in emergency settings. This case report describes an informative case for interventional radiologists and recommends using NBCA after careful consideration of its potential risks.

Conflict of interest: The authors declare that they have no conflicts of interest.

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