**Hemosuccus Pancreaticus: Clearly identified by timely duodenoscopy, multiplanar volume reformation of CT image and celiac angiography**

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**Abstract**

Although hemosuccus pancreaticus (HP) rarely causes gastrointestinal bleeding, it should be considered in cases of unexplained gastrointestinal bleeding. We report a case of hemosuccus pancreaticus in a 68-year-old man. The patient has a long-standing history of anemia with a causal relation to drinking alcohol. He consulted 3 medical institutions, but the source of bleeding could not be identified. The patient was admitted to our hospital after an episode of melena. Upper endoscopy was performed and fresh blood was observed to be oozing from the papilla of Vater. Computed tomography image processing using multiplanar volume reformation and angiography revealed pseudoaneurysm of the gastroduodenal artery. The pseudoaneurysm was embolized by transcatheter embolization using steel microcoils.

**Key words** Hemosuccus pancreaticus, Chronic pancreatitis, TAE, Pseudoaneurysm

**Introduction**

Endoscopy is a standard procedure in cases of gastrointestinal bleeding, and allows identification of the bleeding source in most cases. However, a definite origin of hemorrhage sometimes remains undetectable, despite repeated endoscopies. We present the case of a patient with asymptomatic chronic pancreatitis who experienced recurrent gastrointestinal bleeding caused by hemosuccus pancreaticus (HP).

**Case Report**

A 68-year-old man with a long-standing history of excessive alcohol consumption underwent a routine medical examination in May 2000, and asymptomatic anemia (hemoglobin (Hb), 10.5 g/dl) was identified. In May 2001, Hb was 8.3 g/dl, and he consulted a clinic due to deterioration of anemia. Upper and lower endoscopy were performed, but revealed no bleeding source. In August 2001, he consulted another clinic, and upper and lower endoscopy were again performed to no avail. On September 18, the patient noticed tarry stool and was admitted to hospital. Laboratory studies revealed iron-deficiency anemia (Hb, 5.0 g/dl), presumably caused by chronic gastrointestinal bleeding. However, upper and lower endoscopic examinations were again normal, and no definite origin of hemorrhage was detected. Blood transfusions were provided, symptoms improved, and the patient was discharged from the hospital.

He was admitted to our hospital 16 days later, due to tarry stool continuing for 3 days, weakness...
and dizziness. On admission, the patient appeared to be in relatively good general and nutritional condition (weight, 62 kg; height, 1.64 m). Blood pressure was stable (110/62 mmHg), but he was slightly tachycardic (heart rate, 98 beats/min). Significant findings on physical examination were pallor and melena, guaiac-positive stools. No evidence of abdominal pain was apparent.

Initial Hb was 6.6 g/dl, with a hematocrit of 20.0%. Blood urea nitrogen level was 23.0 mg/dl and total protein level was 5.5 g/dl. Serum creatinine, amylase and lipase levels were normal. Levels of tumor markers CA19-9 and CEA were also within normal ranges.

Initial endoscopy showed a small amount of fresh blood in the duodenum. However, no obvious bleeding source such as peptic ulcer, tumor or angiodysplasia was recognized. Enhanced computed tomography (CT) and abdominal ultrasonography (US) showed that the gallbladder and bile duct seemed normal, and no vessel abnormalities were apparent. Despite the absence of a history of chronic pancreatitis, CT showed diffuse calcifications with an irregularly dilated duct in the pancreas (Fig. 1). Scintigraphy with technetium-99-labeled erythrocytes did not show any origin of bleeding.

On hospital day 6, after an episode of painless melena, a second upper endoscopy was immediately performed, revealing fresh blood oozing from the papilla of Vater (Fig. 2). Hemobilia was thus suspected. Endoscopic ultrasonography (EUS) was performed, but did not demonstrate any findings of hemobilia such as blood or clotting in the gallbladder or bile duct. Signs of chronic pancreatitis such as dilated pancreatic duct and pancreatic stones in the pancreatic head were demonstrated. We thus suspected that bleeding originated from the pancreatic orifice of the papilla Vater. Furthermore, CT image processing using multiplanar volume reformation (MPVR) was performed for vessels around the pancreas. MPVR of the gastroduodenal artery revealed a suspected pseudoaneurysm (Fig. 3). On the suspicion of HP with pseudoaneurysm rather than hemobilia, angiography of the celiac artery was performed. A small irregularity was seen along the gastroduodenal artery. Superselective angiography of the gastroduodenal artery was subsequently performed, revealing a small pseudoaneurysm of the artery similar to that seen on MPVR (Fig. 4).

Consideration of all these results led to a diagnosis of HP with chronic pancreatitis, due to pseudoaneurysm of the gastroduodenal artery. The pseudoaneurysm was successfully embolized using transcatheter embolization with steel microcoils. The postoperative course was uneventful. Clinical follow-up after 24 months revealed that the patient experienced no further episodes of bleeding.
Discussion

Hemorrhage into the pancreatic duct causes blood flow through the duct and papilla into the duodenum, and is called “hemosuccus pancreaticus” (HP), as introduced by Sandblom in 1970. In most cases, the underlying illness is chronic pancreatitis. The cause of bleeding is usually rupture of an aneurysm in a visceral artery in the presence of chronic pancreatitis. Other uncommon causes are pancreatolithiasis and pseudocysts of the pancreas. HP represents a very rare cause of gastrointestinal bleeding, but should be considered in cases of unexplained gastrointestinal bleeding, particularly if the patient displays chronic pancreatitis. However, diagnosis is complicated by intermittent hemorrhaging from a source that is not readily accessible by endoscopy.

In the present case, anemia with no definite bleeding was initially the only clinical sign. The patient underwent repeated endoscopies at several medical institutions, and diagnosis was difficult in the present patient. The pancreas was considered a potential source of bleeding only after numerous diagnostic procedures. Blood oozing from the papilla confirms a diagnosis of HP, but this situation is rare. Assuming a diagnosis of HP is thus crucial. HP should be suspected if blood is seen in the second portion of the duodenum without evidence of a common source of bleeding, particularly in patients with chronic pancreatitis. Enhanced CT to estimate blood flow should be performed immediately as imaging for suspected HP. In the present case, enhanced CT did not reveal obvious pseudoaneurysm, but MPVR did. If HP is suspected, MPVR is useful. Hyperamylasemia may sometimes be detected, and abdominal pain is often associated with bleeding. These findings add to the suspicion of HP. The patient in the present case displayed neither hyperamylasemia nor marked abdominal pain, and these factors complicated identification of diagnosis.

Previous reports regarding HP in western countries remain mostly limited to case reports and short reviews. We reviewed 41 cases of HP in Japan (Igaku Chuo Zassi: from 1974 to 2001). Mean age of patients is 50.9 years (range, 29–83 years), and patients are commonly male (37 males, 4 females). Long-term alcohol abuse is often present (70.7%), and most of these cases experience abdominal pain related to bleeding (73.2%). Because long-term alcohol abuse is related to chronic pancreatitis, the coincidence of alcohol abuse with HP is highly likely in this case. Hyperamylasemia has been identified in 20 cases (48.8%). However, normal amylase levels have been present in 13 cases (31.7%), including the present case. Bleeding artery is most frequently from the splenic artery (13 cases).
from other abdominal vessels leading to HP is less common,\textsuperscript{6,11} but the gastroduodenal artery was the source of bleeding in 6 cases. Similarly, other reports have described the splenic artery and its branches as the most common sources of bleeding (45%), followed by the gastroduodenal artery (17%) and pancreatoduodenal artery (16%).\textsuperscript{4,12} Several arteries around the pancreas with pancreatitis may cause HP. In addition, HP has been attributed to ruptured pseudoaneurysm in 25 cases (62.5%). Therapy for HP involves surgical resection in most cases (26 cases), including distal pancreatectomy (15 cases), pancreatoduodenectomy (6 cases), ligation of aneurysm (3 cases), total pancreatectomy (1 case) and drainage of pseudocyst (1 case). As an alternative, successful selective arteriographic embolization has been reported in 10 cases. Transcatheter arterial embolization (TAE) can be performed safely and offers several advantages over surgery, such as precise localization of the aneurysm, assessment of collateral flow, low risk for patients who are not suitable candidates for surgery, and easier approach to aneurysms for which surgical exposure would be difficult.\textsuperscript{13,14} TAE thus seems to offer the first choice therapy for HP.

In conclusion, HP rarely presents as gastrointestinal bleeding, but should be considered in cases of unexplained gastrointestinal bleeding, particularly if the patient displays chronic pancreatitis. In addition, diagnosis of HP can be incidental if the patient presents with no clinical signs or history of chronic pancreatitis.