

# Hemosuccus Pancreaticus Due to Rupture of a Gastroduodenal Artery Pseudoaneurysm

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**H**emorrhage from the pancreatic duct, referred to as hemosuccus pancreaticus or pseudohemobilia, is a rare cause of gastrointestinal (GI) bleeding. This potentially life-threatening complication of pancreatitis may pose a significant diagnostic and therapeutic dilemma, especially in patients who do not exhibit symptoms such as abdominal pain, jaundice, or GI bleeding. This article describes the case of a man with a past medical history of alcoholic pancreatitis who was found to have hemosuccus pancreaticus after presenting with GI bleeding.

## CASE PRESENTATION

A 69-year-old man with a history of hypertension, peptic ulcer disease, and chronic alcoholism presented with abdominal pain and dark, tarry stools for 2 to 3 days. Past medical history included 3 episodes of alcoholic pancreatitis. He had no previous history of hematemesis, melena, or jaundice. Physical examination was significant for upper abdominal tenderness and positive hemoccult stool.

The patient was admitted to the hospital where he required multiple blood transfusions for a rapidly decreasing hematocrit. Laboratory testing revealed elevated serum amylase and lipase levels; coagulation studies and serum bilirubin were normal. Esophagogastroduodenoscopy revealed mild gastritis, and no ulcers were visualized; however, blood was seen gushing from the second part of the duodenum. The patient underwent a Heineke-Mikulicz pyloroplasty, and exploratory laparotomy showed a mass at the head of the pancreas.

GI bleeding recurred, and because the cause of the bleeding could not be found, the patient was transferred to our facility. Upon arrival in the medical intensive care unit, the patient became hemodynamically unstable. On examination, epigastric tenderness was noted. Once the patient was resuscitated, computed tomography (CT) with contrast of the abdomen was performed, which revealed a pseudocyst with enhancement. CT angiography showed the presence of a pseudoaneurysm of the gastroduodenal artery

(**Figure 1**). The pseudoaneurysm was coiled and embolized (**Figure 2**), which stopped the bleeding. The patient clinically improved, and the amylase and lipase levels decreased.

## HEMOSUCCUS PANCREATICUS

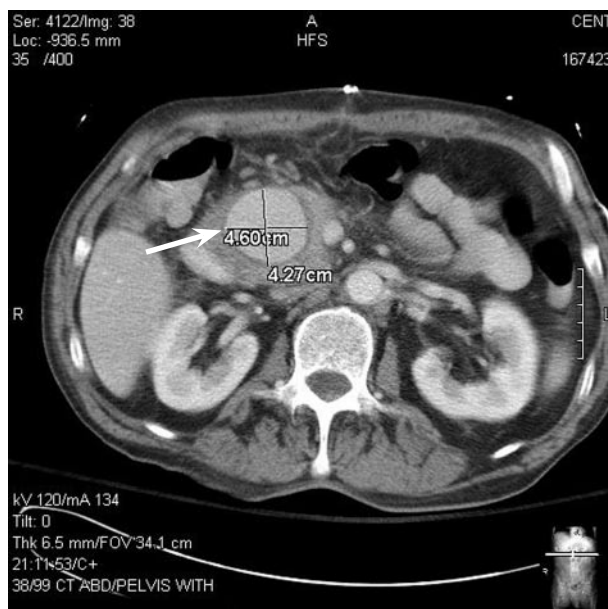
The association between pseudoaneurysm formation and pancreatitis is well-established.<sup>1,2</sup> Pseudoaneurysm occurs in 3.5% to 10% of cases of pancreatitis.<sup>3-5</sup> However, rupture of a pseudoaneurysm is a relatively rare but life-threatening complication of chronic pancreatitis,<sup>3-5</sup> occurring in 6% to 8% of patients with pseudocysts and accounting for less than 1% of cases of upper GI hemorrhage. If massive bleeding is untreated, the mortality rate is approximately 90%, whereas the mortality rate ranges from 25% to 37% in treated cases.<sup>6</sup> An English literature search revealed 4 reported cases of hemosuccus pancreaticus from rupture of a gastroduodenal artery pseudoaneurysm, as occurred in the case patient.

## Etiology and Pathophysiology

Causes of hemosuccus pancreaticus include pancreatitis, vascular malformation, pancreatic tumors (cystadenocarcinoma and osteoclastoma), pancreatic divisum, and iatrogenic or accidental trauma.<sup>7-9</sup> In patients with pancreatitis, pancreatic enzymes may erode the peripancreatic vessels that cross tissue planes and boundaries, resulting in pseudoaneurysm formation. Chronic exposure of the arterial wall to digestive enzymes and the associated scarring and granulation on the pseudocyst create traction on the vessel, which may trigger GI hemorrhage. The arteries involved in GI hemorrhage in order of frequency include the splenic (40%), gastroduodenal (30%), pancreaticoduodenal (20%), gastric (5%), and hepatic arteries (2%).<sup>4,5,10</sup> A pseudoaneurysm can rupture into the pseudocyst, GI

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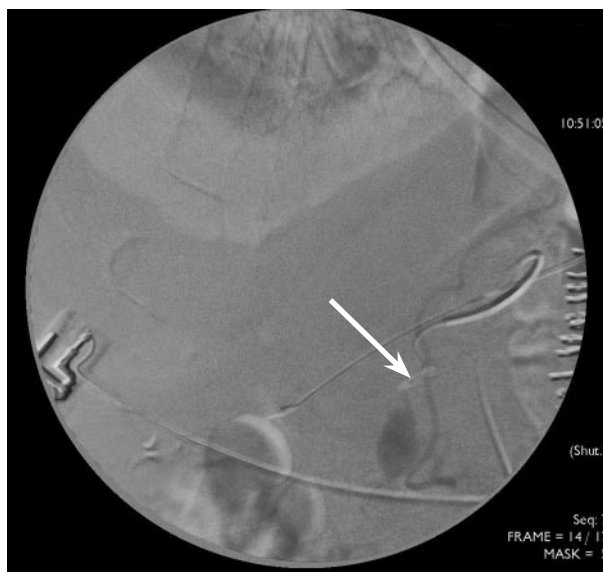
**Figure 1.** Computed tomography scan of the abdomen and pelvis showing a pseudoaneurysm arising from the gastroduodenal artery (arrow).

tract, peritoneal cavity, or pancreatic parenchyma.<sup>11,12</sup> For instance, one etiology of hemosuccus pancreaticus is massive bleeding through the duct of Wirsung due to breakage of a splanchnic artery pseudoaneurysm into a pancreatic pseudocyst.

Hemosuccus pancreaticus has been reported after abdominal trauma.<sup>7,13,14</sup> Kim et al<sup>13</sup> described hemosuccus pancreaticus from rupture of a hepatic artery pseudoaneurysm, which resulted from intramural injury to the pancreas and duodenum caused by a penetrating gunshot to the abdomen. Abdominal injury caused mild pancreatitis and perivascular inflammation, which resulted in pseudoaneurysm formation. Several cases of visceral pseudoaneurysm formation and rupture into the GI tract have been reported after abdominal surgery (eg, after pancreatoduodenectomy for pancreatic cancer,<sup>15</sup> gastrectomy,<sup>16</sup> and cholecystectomy<sup>17</sup>). Postoperative pseudoaneurysms form as a result of direct injury to the arterial wall, which weakens the artery and makes it susceptible to perioperative local infection, causing the formation of a pseudoaneurysm.

### Clinical Manifestations

Hemosuccus pancreaticus can present as upper abdominal pain, pulsatile epigastric mass, jaundice,<sup>18</sup> anemia, hematemesis, or melena. GI pseudoaneurysm rupture may result in either occult bleeding<sup>6</sup> or massive bleeding. Symptoms depend on the severity and



**Figure 2.** Visceral angiogram showing coiling of the neck of pseudoaneurysm arising from the gastroduodenal artery (arrow).

speed of blood loss and the site of bleeding.<sup>11,12,19,20</sup> Occult bleeding is characterized by chronic blood loss marked by anemia and intermittent melanic stools. Blood from the leaking pseudoaneurysm traverses the pseudocyst and enters the GI tract via the pancreatic duct, biliary tree, or fistulous connection with the GI lumen. Bleeding may stop as a clot forms in the cyst or by obstruction of the outflow tract to the GI lumen. Massive bleeding is characterized by increased abdominal pain, a rapid decrease in hematocrit, GI bleeding, and hemodynamic instability.

### Diagnosis

Diagnosis of hemosuccus pancreaticus requires a thorough medical history and high level of suspicion. In patients with pancreatitis, other causes of GI bleeding should be ruled out, including coexistent peptic ulcer disease, stress gastritis, variceal bleeding, and intestinal ischemia secondary to enzymatic mesenteric vessel digestion.<sup>6</sup>

For patients with upper GI bleeding, upper endoscopy is the initial test to determine the origin of bleeding. If bleeding or clotting is present at the ampulla of Vater, hemosuccus pancreaticus is the likely cause of the hemorrhage. Diagnosis should be confirmed with endoscopy with a side-viewing duodenoscope, color Doppler sonography, contrast-enhanced CT, or visceral angiography. Contrast-enhanced CT is the diagnostic modality of choice; it is excellent for demonstrating pancreatic pathology; and may also

demonstrate features of chronic pancreatitis, pseudocysts, and pseudoaneurysm.<sup>21</sup> However, angiography is regarded as the gold standard for the diagnosis of splanchnic aneurysms.<sup>22</sup>

### Treatment

Selective transarterial embolization with coils is safe and effective for immediate hemostasis, with a success rate of approximately 80% to 100%.<sup>4,12,19–23</sup> Recurrent bleeding can be treated by repeat embolization. As compared with surgery, the advantages of managing a bleeding pseudoaneurysm with angiography are: the ability to precisely localize the pseudoaneurysm and assess collateral blood flow; a lower risk of morbidity and mortality in patients who are not good operative candidates; and a less invasive approach to the pseudoaneurysm. Surgical interventions, such as ligation of the bleeding vessel or excision of the aneurysm, should be considered if embolization fails or is contraindicated.

Potential complications of gastroduodenal artery/visceral artery pseudoaneurysm include rupture into the pseudocysts or GI lumen with GI bleeding, recurrent bleeding, and anemia. It is important to be aware that vascular complications can be catastrophic, resulting in massive bleeding, hemodynamic instability, and secondary shock with a high mortality rate. Bleeding is often life-threatening, with average blood loss of 2500 mL. Bleeding pseudocysts in the head of the pancreas carry a higher operative mortality rate (43%) as compared with pseudocysts in the body and tail (16%), irrespective of the mode of repair.<sup>24</sup>

### CONCLUSION

Hemosuccus pancreaticus is an obscure cause of GI bleeding and should be suspected when more common causes of bleeding have been satisfactorily ruled out. Abdominal pain, jaundice, and/or GI bleeding may not be seen in every patient. Untreated massive bleeding can cause secondary shock and is associated with a high mortality rate. Contrast-enhanced CT angiography along with arterial embolization should be performed regardless of whether the patient shows signs of active bleeding.

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