Superior Mesenteric Artery Syndrome After Successful Coil Embolization of a Ruptured Pancreaticoduodenal Artery Aneurysm: Report of a Case

YONG PIL CHO1, JAE-HONG AHN2, HYUK JAI JANG1, YONG HO KIM1, and SUNG GYU LEE3

Departments of 1Surgery and 2Diagnostic Radiology, University of Ulsan College of Medicine, Gangneung Asan Hospital, 415 Bangdong-ri, Sacheon-myeon, Gangneung-si, Gangwon-do 210-711, South Korea
2Department of Surgery, University of Ulsan College of Medicine, Seoul Asan Hospital, Seoul, South Korea
3Department of Surgery, University of Ulsan College of Medicine, Seoul Asan Hospital, Seoul, South Korea

Abstract
Superior mesenteric artery (SMA) syndrome is a rare condition in which the third part of the duodenum is trapped between the abdominal aorta and the SMA. Any disease process decreasing the angle between the aorta and the SMA can result in external compression of the duodenum and subsequent intestinal obstruction. Aneurysms of the pancreaticoduodenal arterial (PDA) and its branches are also rare and account for only 2% of all splanchnic artery aneurysms. We report a case of SMA syndrome that developed after successful coil embolization of a ruptured PDA aneurysm.

Key words Superior mesenteric artery syndrome · Embolization · Pancreaticoduodenal artery · Aneurysm

Introduction
Superior mesenteric artery (SMA) syndrome is caused by compression of the third part of the duodenum between the abdominal aorta and the SMA.1–7 Various disorders have been reported to cause a decrease in the vascular angle between the aorta and the SMA, resulting in obstruction of the duodenum.1–7 We report a case of SMA syndrome, which occurred after successful coil embolization of a ruptured pancreaticoduodenal artery (PDA) aneurysm.

Case Report
A 65-year-old woman was admitted to our hospital with a 12-h history of epigastric and back pain. On admission, she had signs of hypovolemic shock, with a blood pressure of 80/50 mmHg and a pulse rate of 91 beats/min, and her abdomen was diffusely tender. Laboratory data revealed a low hemoglobin level of 6.0 g/dl and a normal serum amylase level. The patient was stabilized with intravenous fluids and a blood transfusion. She denied any history of pancreatitis, alcohol abuse, vascular disease, or surgery, and she had not experienced rapid weight loss or noticed a change in bowel habits. A dynamic contrast-enhanced abdomen-pelvis computed tomography (CT) scan showed a voluminous retroperitoneal hematoma, diffusing into the peritoneal cavity, and a 1.5-cm focal vascular dilatation, probably of the pancreaticoduodenal arcade, which we thought to be a peripancreatic aneurysm. Thus, emergency abdominal arteriography was performed. The SMA arteriography confirmed a fusiform aneurysm, with active contrast leaking, arising from the arcade of the posterior, inferior PDA (Fig. 1). Concomitant stenosis of the celiac axis with retrograde flow in the gastroduodenal artery was also seen. After diagnostic arteriography, superselective transcatheter arterial embolization (TAE) of the aneurysm was done via the SMA using six microcoils (Tornado; Cook, Bloomington, IN, USA). This resulted in successful occlusion of the aneurysm without collateral filling, demonstrated by subsequent arteriography (Fig. 2). On the ninth day after TAE, the patient presented acutely with bile-stained vomiting, abdominal pain, and distension without rebleeding. An upper endoscopy showed extrinsic anterior compression in the third part of the duodenum with retroperistalsis and upper gastrointestinal tract series showed an abrupt vertical “cutoff” sign at the level of the third part of the duodenum. Microcoils were also seen at the level of the obstruction (Fig. 3). Postembolization abdomen-pelvis CT showed abrupt narrowing of a dilated duodenum coursing between the aorta and the PDA (Fig. 4). As we suspected a diagnosis of SMA syndrome associated with a ruptured PDA aneurysm, an exploratory laparotomy
was performed 20 days after the TAE, revealing a PDA aneurysm without pulsation firmly adhered to the surrounding structures including the third and fourth parts of the duodenum. Due to the extensively adhered and edematous duodenum, a gastrojejunal bypass was done.

**Discussion**

Superior mesenteric artery syndrome is a rare entity in which the third part of the duodenum is compressed by the overlying SMA. Identification of this syndrome