Clinical Case Report

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Superior mesenteric artery branch pseudoaneurysm rupture mimicking acute pancreatitis in a patient with acute type B aortic dissection

A case report

Jing Wang, MD, PhD[a], Dianbo Cao, MD, PhD[a], Qian Tong, MD, PhD[b,*]

Abstract

Rationale: Visceral arterial pseudoaneurysms are rare but important vascular entities because of their inclination to cause life-threatening hemorrhage. They were commonly reported to be associated with trauma, infection, inflammatory disease, or occurred as postoperative complication. To date, there has been no published report of a superior mesenteric artery (SMA) branch pseudoaneurysm rupture mimicking acute pancreatitis in a patient with acute type B aortic dissection.

Patient concerns: The patient's medical history, clinical information, imaging findings including follow-up computed tomography angiography (CTA), and treatment are reported. A 51-year-old male presenting with epigastric pain and fever was found to have an enlarged pancreatic head and obscure fatty space around it on abdominal nonenhanced CT. He has medical history of anaphylactoid purpura and uncontrolled hypertension. His serum lipase and amylase were both within normal limits. Thoracoabdominal CTA following a sudden blood pressure drop attributed to the accurate diagnosis.

Diagnoses: He was diagnosed with acute type B aortic dissection involving SMA and retroperitoneal hemorrhage secondary to SMA branch pseudoaneurysm rupture.

Interventions: The patient was successfully treated by thoracic endovascular aortic repair without additional branch intervention.

Outcomes: Follow-up CTA at 3 months later demonstrated that the endoprothesis is well positioned with no endoleaks, and SMA branch pseudoaneurysm disappeared.

Lessons: We report a rare and complicated case presenting with SMA branch pseudoaneurysm rupture and acute type B aortic dissection. CTA is vital in the diagnosis of such vessel pathology. We must inspect carefully to ensure that no small lesions are missed.

Abbreviations: CT = computed tomography, CTA = computed tomography angiography, DSA = digital subtraction angiography, rVAAs = ruptured visceral artery aneurysms, SMA = superior mesenteric artery, TEVAR = thoracic endovascular aortic repair, VAPAs = visceral arterial pseudoaneurysms.

Keywords: aneurysm, dissecting, aneurysm, false, aneurysm, ruptured

1. Introduction

Visceral arterial pseudoaneurysms (VAPAs) are rarely encountered clinical entity which could be asymptomatic or present with abdominal pain. In any given VAPA, there is around 50% risk of rupture due to lack of an intact vessel wall, which result in high mortality risk. So timely and precise diagnosis and urgent treatment are extremely essential. Computed tomography angiography (CTA) is widely used for the diagnosis of aortic dissection and aneurysms, even in place of digital subtraction angiography (DSA).[1,2] Here, we present a patient complaining of epigastric pain and fever who had an anaphylactoid purpura and hypertension history. His blood pressure dropped suddenly when he was hospitalized with conservative treatment. Emergent thoracoabdominal CTA revealed acute type B aortic dissection involving superior mesenteric artery (SMA) and retroperitoneal hemorrhage secondary to SMA branch pseudoaneurysm rupture. Then he was successfully treated by thoracic endovascular aortic repair (TEVAR) without additional branch intervention. To date, this is the first case report regarding ruptured SMA

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The study was approved by the Medical Ethics Committee of the First Hospital of Jilin University, and informed written consent was obtained from the patient for publication of this case report and accompanying images.

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branch pseudoaneurysm complicated by acute type B aortic dissection.

2. Patient consent

The study was approved by the Medical Ethics Committee of the First Hospital of Jilin University, and informed written consent was obtained from the patient for publication of this case report and accompanying images.

3. Case report

3.1. History

A 51-year-old male came to the emergency department with chief complaints of epigastric pain and fever lasting for 3 days. He did not describe any constitutional symptoms but did complain intermittent nausea and vomiting. He was not experiencing chest pain or shortness of breath. His medical history was significant for anaphylactoid purpura with bloody stool 1 year before, and long-termed uncontrolled hypertension. He had a 30-year history of cigarette smoking and alcohol consumption.

3.2. Clinical information

His initial vital signs were documented as follows: blood pressure 230/120 mm Hg; heart rate 120 beats per minute (bpm); SpO_2, 80% on room air; respiratory rate, 24 breaths per minute; and temperature, 37.6°C. His pulses were equal bilaterally in all extremities. Significant physical findings reported from the physical examination were generalized abdominal tenderness without peritoneal signs on palpation and Murphy's sign. Laboratory investigation revealed white blood cell count of 17.98×10^9/L with elevated neutrophils percentages, hemoglobin 142 g/L and platelet 128×10^9/L. Serum D-dimer concentration was elevated at 1976.00 ug/L (range:0–232 ug/L). Coagulation studies including prothrombin time, partial thromboplastin time, and international normalized ratio were normal, and urea, creatinine, and electrolytes were all within normal range. He had a normal basic metabolic panel, bilirubin, aspartate transaminase, alanine transaminase. Serum lipase and amylase was also within normal range.

3.3. Clinical process including imaging findings and treatment

Ultrasound of abdomen at the emergency department was done, which depicted distended gall bladder with wall thickening and multiple stones. The head of pancreas was enlarged with ill-defined margin, infiltration of peripancreatic fat. An abdominal CT scan was subsequently performed because of high suspicion for acute pancreatitis. Abdominal nonenhanced CT showed enlargement of pancreatic head and peripancreatic fat stranding (Fig. 1). No pancreatic ductal dilatation or discrete peripancreatic fluid collection was observed. No stone was seen in adjacent common bile duct. Although conservative treatment including fasting, blood pressure control, acid suppression, protease inhibitor administration, oxygen inhalation, antibiotics, and fluid infusion was introduced, his symptoms did not improve significantly. A repeated CT was required to define abdominal pain 18 hours later. Thoracic and abdominal CT revealed cardiomegaly, heterogeneous density in aortic arch and right subclavian artery wall thickening (Fig. 2), and ill-demarcated hyperattenuation with CT value of 50 to 60 Hu at pancreatic head (Fig. 3). One hour after this examination, the patient presented with severe abdominal pain and sudden blood pressure drop to 58/41 mm Hg with heart rate of 136 bpm. Nitroprusside was discontinued and anti-shock treatment including Voluven administration was initiated. Due to persistent hypertension history, abrupt drop of blood pressure and low hemoglobin value of 90 g/L, peritoneal hemorrhage was highly suspicious. Some incoagulable blood from abdomen was got on ultrasound-guided abdominal puncture. Homotypic packed red blood cells of 2 U were immediately given. In combination with nonenhanced

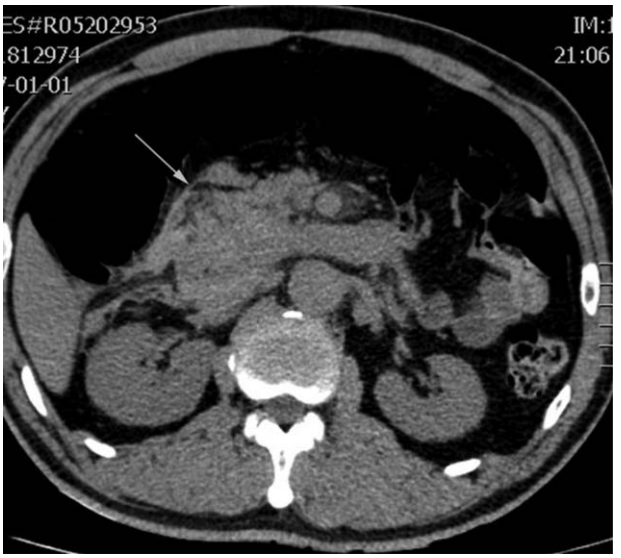

Figure 1. Noncontrast CT of the abdomen showed enlargement of pancreatic head and peripancreatic fat stranding. CT = computed tomography.

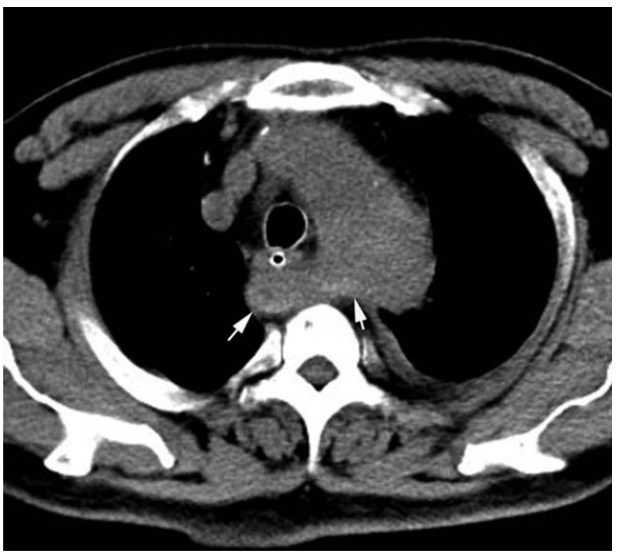

Figure 2. Thoracic CT done at 18 h later revealed cardiomegaly, heterogeneous density in aortic arch and right subclavian artery wall thickening. CT = computed tomography.

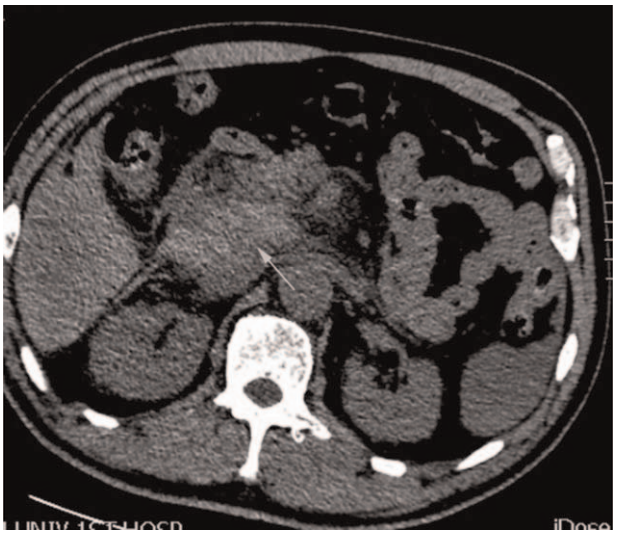

Figure 3. Abdominal CT done at 18 h later showed hyperattenuation with CT value of 50 to 60 Hu at pancreatic head. CT = computed tomography.

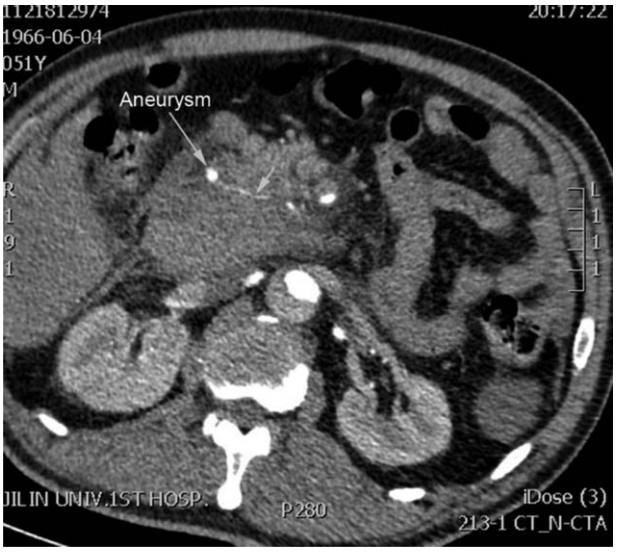

Figure 5. Thoracoabdominal CTA demonstrated aortic dissection involving SMA and retroperitoneal hemorrhage secondary to SMA branch pseudoaneurysm rupture. CTA = computed tomography angiography, SMA = superior mesenteric artery.

thoracic and abdominal CT findings, thoracoabdominal CTA identified diagnosis, namely acute type B aortic dissection involving SMA and retroperitoneal hemorrhage secondary to SMA branch pseudoaneurysm rupture (Figs. 4–6). After discussion of multiple disciplinary teams, TEVAR was recommended. An open approach to the right common femoral artery was done under general anesthesia. A Medtronic-Valiant 38-34-160 thoracic endograft (Santa Rosa, CA Medtronic) was implanted distally to the left subclavian artery. Following angiogram showed complete exclusion of false lumen without endoleaks. There was no elevated lipase or amylase level on following repeated blood tests.

3.4. Follow up

Follow-up CTA at 3 months later demonstrated that the endoprothesis was well positioned with no endoleaks (Fig. 7), and SMA branch pseudoaneurysm disappeared (Figs. 8 and 9). There remained double channels of mesenteric superior artery. Retroperitoneal fluid collection was already completely dissolved and there demonstrated a normal pancreas imaging appearance.

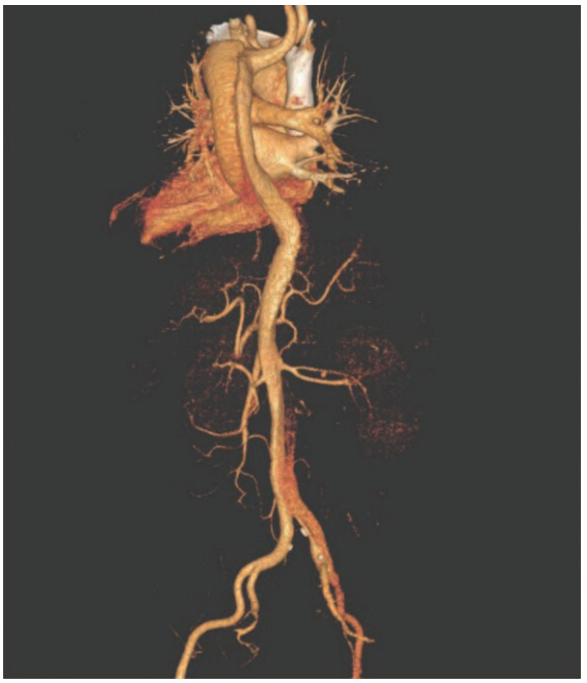

Figure 4. Thoracoabdominal CTA identified acute type B aortic dissection. CTA = computed tomography angiography.

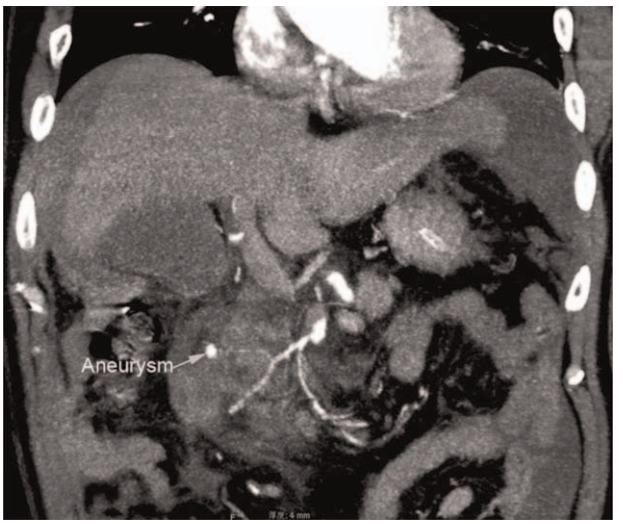

Figure 6. Thoracoabdominal CTA demonstrated aortic dissection involving SMA and retroperitoneal hemorrhage secondary to SMA branch pseudoaneurysm rupture. CTA = computed tomography angiography, SMA = superior mesenteric artery.

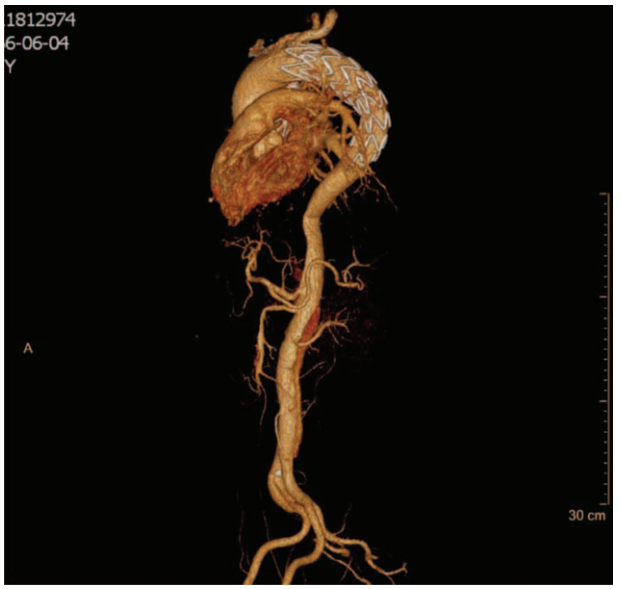

Figure 7. CTA at a 3-month follow up showed that the endoprothesis was well positioned with no endoleaks. CTA = computed tomography angiography.

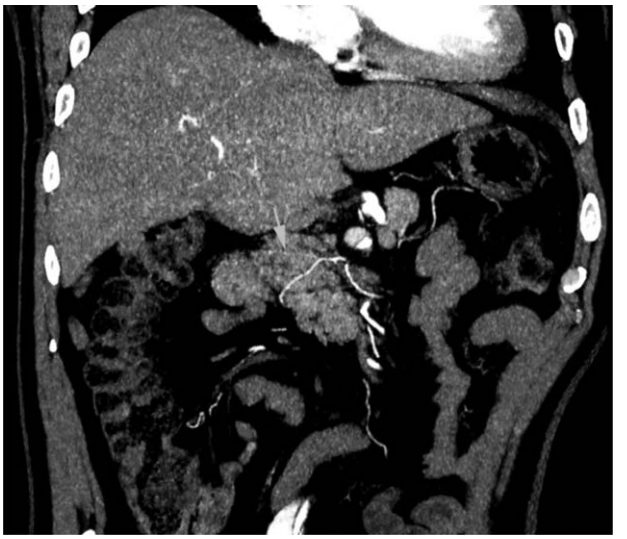

Figure 9. Follow-up CTA at 3 months later showed SMA branch pseudoaneurysm disappeared. CTA = computed tomography angiography, SMA = superior mesenteric artery.

4. Discussion

SMA and branches pseudoaneurysms are the rarest type of VAPAs, while splenic artery pseudoaneurysms are most common ones. SMA and branches pseudoaneurysms account for approximately 6% to 8% of all VAPAs, and its incidence is as low as 0.01%.[3,4] It was reported that VAPAs associated with trauma, infection, inflammatory diseases (usually pancreatitis), or occurred as postoperative complication.[3] Pancreatitis and trauma are identified as the most commonly causes of SMA pseudoaneurysms. In pancreatitis, the proposed vascular injury mechanism involves pancreatic autodigestion enzymes being released to the perivascular space, resulting in enzymatic digestion of arterial wall.[5] Less common causes of SMA pseudoaneurysms include infective endocarditis or uncontrolled hypertension.[6,7] Although extremely rare, Apixaban, an oral anticoagulant, has been proposed to contribute to pseudoaneurysm formation by slow and continuous bleeding that results in the formation of the pseudoaneurysm.[8] Our present patient had a medical history of anaphylactoid purpura and uncontrolled hypertension. Anaphylactoid purpura is a common allergic disease and its main pathology is systemic, immune-mediated vasculitis. It involves small and medium-sized vessel walls with immune complexes deposition.[9] Expect for purpura on the skin, its clinical presentation include some hemorrhagic symptoms such as hematemesis and bloody diarrhea.[9] So we suppose the vessel wall in our patient may be predisposed to hemorrhage or extravasation. Poorly controlled hypertension is the most common risk factor of aortic dissection.[10] In patients with aortic dissection, uncontrolled hypertension is associated with severe complications (eg, dissection extension, aortic expansion, and aortic rupture). Blood pressure controlling is essential in type B aortic dissection patient.[10] In present case, we presume that uncontrolled hypertension acted as an important pathogenesis on the predisposed vessel wall, leading to the formation of aortic dissection and SMA branch pseudoaneurysm rupture.

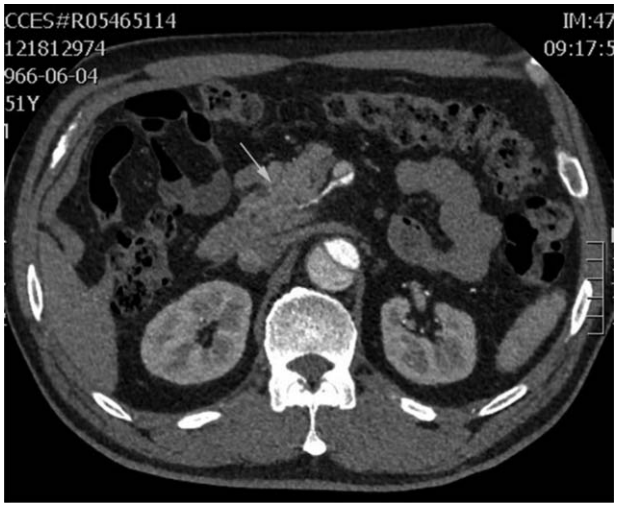

Figure 8. Follow-up CTA at 3 months later showed SMA branch pseudoaneurysm disappeared. CTA = computed tomography angiography, SMA = superior mesenteric artery.

Based on his complaint of acute abdominal pain, enlarged pancreatic head and obscure fatty space on abdominal ultrasound and noncontrast CT, the provisional diagnosis of an acute pancreatitis was made. Acute pancreatitis is acute inflammation of pancreas whose severity varies from mild to life-threatening. Elevated lipase levels have been known to be extremely sensitive and specific for diagnosis of acute pancreatitis, but in our patient series of lipase tests remained at normal level. In this condition, thoracoabdominal CTA provided more information to make the exact diagnosis named acute type B aortic dissection and retroperitoneal hemorrhage secondary to ruptured SMA branch pseudoaneurysm. The obscure fatty space around pancreatic head was hemorrhage from pseudoaneurysm rupture but not encapsu-

lated fluid from acute pancreatitis. There have been a few case reports of acute ischemic pancreatitis related to aortic dissection.[11,12] The exact mechanism is not clear yet, but the ischemia-reperfusion injury theory is accepted by some authors. Aortic dissection complicated by acute pancreatitis is an uncommon but really possible scenario. But in present case, according to evolution process of disease, treatment outcome, and follow-up images, we can exclude the diagnosis of acute pancreatitis. Enlarged pancreatic head and obscure fatty space are only reactive findings of a small amount of hemorrhage at that time.

CTA is widely used for the diagnosis of aortic dissection and aneurysms, even in place of DSA.[1,2] CTA can not only clearly show the characteristics of arteries such as true and false lumen but also clarify branch vessel involvement, which is essential for diagnosis and classification. In present case, CTA confirmed the diagnosis, provided important information for therapy and was used for follow-up screen. We must observe carefully to ensure that no small lesions are missed. Subtle findings from non-enhanced thoracic CT images may be important clue suggesting great vessel pathology and reaching a timely diagnosis.

Ruptured visceral artery aneurysms (rVAAs) including pneudoaneurysms have significant mortality. Open and endovascular interventions are elective repair for rVAAs. TEVAR is the first-line treatment choice for complicated type B aortic dissection.[13] TEVAR can result in favorable or positive aortic remodeling including false lumen regression, true lumen expansion, complete thrombosis of false lumen, and stable perfusion of abdominal aortic branches,[13–15] which bring long-term benefits for patients. In the present case, SMA branch pseudoaneurysm disappeared after TEVAR with additional branch intervention. We ascribe it to the favorable remodeling of stable abdominal perfusion and improvement of refractory hypertension after TEVAR.

To date, there has been no published report of a SMA branch pseudoaneurysm rupture mimicking pancreatitis in a patient with acute type B aortic dissection. Our patient was successfully treated by TEVAR without additional branch intervention. We should take it into consideration in the emergency setting of acute abdomen pain, and notice its relationship and differences with acute pancreatitis.

Author contributions

Conceptualization: Jing Wang.
Data curation: Dianbo Cao.
Methodology: Jing Wang, Qian Tong.
Resources: Dianbo Cao.
Supervision: Qian Tong.
Writing – original draft: Jing Wang.
Writing – review and editing: Jing Wang, Dianbo Cao, Qian Tong.

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