Pancreatic Arcade Artery Aneurysm—A Rare Complication after Replacement of Thoracoabdominal Aortic Aneurysm

Mitsuru Sato, MD, PhD, Shunsuke Kawamoto, MD, PhD, and Yoshikatsu Saiki, MD, PhD

Division of Cardiovascular Surgery, Tohoku University Graduate School of Medicine, Sendai, Miyagi, Japan

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Corresponding author: Yoshikatsu Saiki, MD, PhD. Department of Cardiovascular Surgery, Tohoku University Graduate School of Medicine, 1-1 Seiryocho, Aoba-ku, Sendai, Miyagi 980-8574, Japan
Tel: +081-22-717-7222, Fax: +081-22-717-7227
E-mail: yoshisaiki@med.tohoku.ac.jp

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Aneurysm in the pancreatic arcade artery is an uncommon event, and is usually associated with the condition of median arcuate ligament syndrome. The stenosis at the base of the celiac axis has been presumed to be attributable to a relative increase in flow and pressure within the pancreatic arcade, resulting in subsequent development of the aneurysm. We, herein, present a rare case with rapid development of a pancreatic arcade artery aneurysm immediately after the replacement of a thoracoabdominal aortic aneurysm.

Keywords: pancreatic arcade artery aneurysm, median arcuate ligament syndrome, thoracoabdominal aortic aneurysm

Introduction

With the aneurysm in the pancreatic arcade artery, it is an uncommon event after thoracoabdominal aortic aneurysm (TAAA) repair. Generally, etiology of the disease includes celiac artery (CA) stenosis or occlusion, atherosclerosis, infection, and trauma. In some cases, compression by the median arcuate ligament can explain the mechanism of CA stenosis and subsequent aneurysmal formation. Regarding the formation, that mechanism has been speculated that once the CA becomes stenotic or occluded, a flow and pressure within the pancreatic arcade relatively increase, resulting in subsequent development of the aneurysm.

Case Report

A 64-year-old woman developed Stanford type B acute aortic dissection approximately 8 years before. The latest follow-up computed tomography (CT) scans revealed a progressive enlargement of the thoracoabdominal aorta with a maximal diameter of 54 mm at the diaphragmatic level. She was then admitted to our hospital for surgery. Preoperatively, dissecting lumen extended from the 11th thoracic vertebral to the 2nd lumbar vertebral level as depicted in Fig. 1A. There seemed to be a hypoplasia or narrowing at the base of the CA (Fig. 1B); however, there was no evidence of dissection into celiac artery itself and were no other associated abnormalities in the splanchnic arteries. The Adamkiewicz artery was detected and appeared to be derived from the left 10th intercostal artery (ICA). Replacement of the TAAA was scheduled on an elective basis.

Prior to the surgery, an epidural perfusion catheter and a cerebrospinal fluid drainage tube were inserted under fluoroscopy. Through a Stoney spiral incision, the pleural cavity was entered via the 6th intercostal space. After systemic heparinization, left heart bypass was commenced with left atrial drainage and left femoral artery return. Body temperature was cooled down to 32°C. The aorta was cross-clamped both at the 9th thoracic vertebral level and just proximal to the CA level. The descending thoracic aorta was then incised, and backflow from the patient’s ICAs was controlled with occlusion balloons. After the proximal anastomosis of the main graft to the native aorta was carried out, the 10th, 11th, and 12th ICAs were reconstructed. The abdominal aorta was cross-clamped at a level below the renal arteries, and was incised. The CA, superior mesenteric artery (SMA) and renal arteries were perfused respectively. There was an intimal tear located superior to the CA. The intimal flap was excised leaving sufficient width for anastomosis since the dissecting lumen ended at the base of CA. The CA, SMA, and right renal artery were reconstructed in an island fashion. Care was taken to obliterate the dissecting lumen without obstructing the orifice of the CA. The left renal artery was reconstructed individually. The patient was weaned from left heart bypass uneventfully after rewarming.

Immediate postoperative recovery was uneventful. However, on the 24th postoperative day, the patient manifested
high fever with unknown origin. Enhanced CT revealed a pseudoaneurysm formation in the inferior pancreaticoduodenal artery along with another pseudoaneurysm on the first branch of the jejunal artery. Selective angiography of the splanchnic arteries was undertaken (Fig. 2A). The CA was visualized with retrograde flow through the SMA suggestive of likely severe narrowing or occlusion of the CA. Aneurysms were confirmed in the inferior pancreaticoduodenal artery and at the first branch of the jejunal artery. The former was 16 mm in size with irregular form, and the latter was relatively small in size. These aneurysms were then successfully coil-embolized (Figs. 2B and 2C). The patient’s recovery was uneventful after the catheter intervention.
Discussion

Pancreatic arcade artery aneurysm accounts for 2% of all splanchnic artery aneurysms.\(^1\) The incidence of rupture has been variably reported to be between 50% and 65%.\(^1\) Etiology of the disease includes CA stenosis or occlusion, atherosclerosis, infection, and trauma.\(^1,2\) In some cases, compression by the median arcuate ligament can explain the mechanism of CA stenosis.\(^3,4\)

Once the CA becomes stenotic or occluded, retrograde blood supply from the SMA into the pancreatic arcade is increased. This hemodynamic alteration might evoke dilatation or aneurysmal change in the pancreaticoduodenal artery.\(^5\)

In our case, aortic dissection had extended to the base of the CA creating a moderate degree of stenosis preoperatively. Despite careful reconstruction of the abdominal branches, the CA developed occlusion postoperatively, which might have resulted in altered circulation within the pancreatic arcade. Our present case developed plural pseudoaneurysms. In view of this, an infectious etiologic process could not be ruled out. Nonetheless, coil embolization eliminated the two aneurysms with no evidence of a sustaining infection. We consider that occlusion of the narrowed CA as a consequence of surgical reattachment of the arterial branches is associated with the development of the above pseudoaneurysms.

Conclusion

In summary, although it is a very rare complication, it should be cared after TAAA repair requiring re-implantation of the celiac artery especially in a case with preoperative stenosis of celiac axis. Because re-implantation of the celiac artery may raise a risk to evoke pancreatic arcade artery aneurysm.

Disclosure Statement

The authors have no conflict of interest to declare.

Author Contributions

Study conception: MS, YS
Writing: MS
Critical review and revision: all authors
Final approval of the article: all authors
Accountability for all aspects of the work: all authors

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