Open Surgical Repair Using the Femoral Vein for a Mycotic Superior Mesenteric Artery Aneurysm

Min Namkoong, M.D.¹, Seok Beom Hong, M.D.¹, Hwan Wook Kim, M.D.¹, Keon Hyon Jo, M.D.¹, Jang Yong Kim, M.D.²

¹Department of Thoracic and Cardiovascular Surgery and ²Division of Vascular Surgery, Department of Surgery, Seoul St. Mary’s Hospital, College of Medicine, The Catholic University of Korea

Superior mesenteric artery (SMA) aneurysms are rare and often fatal. A 72-year-old man had previously been admitted to the emergency room with epigastric pain and heart murmur. The echocardiographic diagnosis was vegetation on the aortic and mitral valves, with moderate regurgitation from both valves due to infective endocarditis. No aneurysm was detected on abdominal computed tomography, and emergency double-valve replacement was performed. On postoperative day 25, the patient experienced abrupt abdominal pain, and computed tomography revealed a mycotic SMA aneurysm. Open surgical repair of the SMA aneurysm was performed using the femoral vein, and the patient's postoperative course was uneventful.

Key words: 1. Superior mesenteric artery aneurysm 2. Endocarditis 3. Femoral vein 4. Sternotomy

Case report

A 72-year-old man visited the emergency room with a 1-month history of poor oral intake and general weakness, as well as a 2-hour history of periumbilical pain. The patient had no medical history except hemorrhoidectomy, which had been performed 2 years earlier. Upon admission, the patient's vital signs were stable. Laboratory testing revealed leukocytosis (11,190 white blood cells per microliter) and an elevated C-reactive protein level (7.48 mg/L). A physical examination demonstrated epigastric tenderness and heart murmur, and abdominal computed tomography (CT) showed hepatomegaly and splenic infarction, but no signs of an aneurysm (Fig. 1A). Transthoracic echocardiography revealed 10-mm and 8-mm areas of vegetation on the aortic and mitral valves, with moderate regurgitation in both valves. Thus, the patient underwent an emergency double-valve replacement (aortic valve: Carpentier-Edwards 19 mm [Edwards Lifesciences, Irvine, CA, USA]; mitral valve: Carpentier-Edwards 29 mm [Edwards Lifesciences]). Enterococcus casseliflavus was identified in the blood culture, although culture of the surgical specimen revealed negative findings. The patient received antibiotic treatment in the general ward and did not experience any specific complications.

On the 25th day after surgery, the patient experienced abrupt abdominal pain and a pulsatile mass was found in the abdomen. Abdominal CT revealed an unruptured 3.5×5-cm mycotic superior mesenteric artery (SMA) aneurysm (Fig. 1B). Emergency
surgery was performed, although bowel ischemia and aneurysm rupture were not observed (Fig. 2A).

Careful dissection of the aneurysm was performed to preserve the intestinal vascular arcades. After clamping the SMA base, the aneurysm was opened and the thrombus was removed. Two jejunal branches from the SMA were identified inside the aneurysm, and color change occurred after ligation of the jejunal branch. We planned to harvest a vein for interposition at the branching point from the SMA to the jejunal branch. We chose to not use the great saphenous vein because of size mismatch (a small diameter). Thus, we harvested approximately 10 cm of the femoral vein by sharp dissection and hand-tie (Fig. 2B). End-to-end anastomosis was performed on the SMA and the jejunal branch using a femoral vein graft. After the femoral vein graft interposition, the color of the bowel returned to normal (Fig. 2C). SMA angiography was performed to confirm flow at the anastomosis site. Slight stenosis was found at the distal branch and a percutaneous transluminal angioplasty balloon was inserted. After confirming that the flow had improved, the aneurysmal sac was closed using an omental patch. To prevent postoperative venous hypertension and leg edema at the donor site, a compression stocking was applied and early ambulation was performed. The patient was discharged 45 days after the repair without any complications and with good leg and digestive function. A follow-up CT after 1 year revealed that the patency of the graft had been maintained (Fig. 3).
Discussion

Splanchnic artery aneurysms are rare, and SMA aneurysms only account for approximately 5% of all splanchnic artery aneurysms. These cases have a high mortality rate (38%–50%) that is related to intractable complications, such as internal ischemia and aneurysm rupture [1,2]. Infectious aneurysm is a complication of infective endocarditis that is caused by septic embolism, although it typically involves an intracranial vessel [3]. However, the occurrence of an SMA aneurysm is also often associated with infective endocarditis. In such cases, the patient may present with upper abdominal pain and fever, which is related to the compressive mass effect of the aneurysm. SMA aneurysms must be treated promptly to avoid death or complications, such as expansion and eventual rupture, thrombosis, and distal embolization causing intestinal ischemia [4]. Therefore, abdominal pain in a patient with a recent history of infective endocarditis should be closely evaluated using CT and/or ultrasonography. In the present case, the correct diagnosis was confirmed using CT.

Although early treatment is important in these cases, there are no guidelines for treating infective endocarditis and SMA aneurysm. The current treatment for a mycotic SMA aneurysm involves resection of the potentially infected aneurysm and autologous tissue reconstruction [5].

An autologous graft, usually of the saphenous vein, can be used to reconstruct the SMA [6]. However, the saphenous vein was too small in the present case, so we elected to use the femoral vein. In this context, an autologous superficial femoral vein is appropriate for in situ arterial reconstruction, as it has been associated with advantages in an infected field [7].

Interestingly, most reported cases of mycotic SMA aneurysms have been diagnosed at the same time as infective endocarditis. Furthermore, SMA aneurysm has generally been treated before cardiac surgery [8]. However, the SMA aneurysm in the present case was not detected at the diagnosis of infective endocarditis, and appears to have occurred after cardiac surgery.

In conclusion, patients with infective endocarditis can experience mycotic aneurysms in non-intracranial vessels. Thus, these patients should be evaluated for aneurysms before and after cardiac surgery. In addition, the subsequent development of abdominal pain, fever, and a pulsatile mass should elicit suspicion of a mycotic SMA aneurysm. Artery reconstruction using the femoral vein should be considered when the saphenous vein is not available for autologous grafting.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

References

1. Lai KM, Rosenthal D, Wellons ED, Bijak A, Franklin JS. Mycotic superior mesenteric aneurysm. J Vasc Surg 2007;45:191.
2. Aerts PD, van Zitteren M, van Kasteren ME, Buining AG, Heyliger JM, Vriens PW. Report of two in situ reconstructions with a saphenous spiral vein graft of
Coxiella burnetii-infected aneurysms of the abdominal aorta. J Vasc Surg 2013;57:234-7.
3. Shiraishi M, Ohki S, Misawa Y. Mycotic superior mesenteric pseudoaneurysm draining into a vein. Interact Cardiovasc Thorac Surg 2011;12:91-3.
4. Lorelli DR, Cambria RA, Seabrook GR, Towne JB. Diagnosis and management of aneurysms involving the superior mesenteric artery and its branches: a report of four cases. Vasc Endovascular Surg 2003;37:59-66.
5. Liao WP, Loh CH, Wang HP. Mycotic aneurysm of superior mesenteric artery branch presenting as pulsatile abdominal mass. Am J Emerg Med 2006;24:128-9.
6. Zhao J. Massive upper gastrointestinal bleeding due to a ruptured superior mesenteric artery aneurysm duodenum fistula. J Vasc Surg 2008;48:735-7.
7. Daenens K, Fourneau I, Nevelsteen A. Ten-year experience in autogenous reconstruction with the femoral vein in the treatment of aortofemoral prosthetic infection. Eur J Vasc Endovasc Surg 2003;25:240-5.
8. Chu PH, She HC, Lim KE, Chu JJ. Mycotic aneurysm of the superior mesenteric artery in a young woman. Int J Clin Pract 2005;59:614-6.