

A case of atherosclerotic inferior mesenteric artery aneurysm secondary to high flow state

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Inferior mesenteric artery aneurysms are very rare and they are among the rarest of visceral artery aneurysms. Sometimes, the distribution of the blood flow due to chronic atherosclerotic occlusion of some arteries can establish an increased flow into a particular supplying district (high flow state). A high flow state in a stenotic inferior mesenteric artery in compensation for a mesenteric occlusive disease can produce a rare form of aneurysm. We report the case of an atherosclerotic inferior mesenteric aneurysm secondary to high flow state (association with occlusion of the celiac trunk and severe stenosis of the superior mesenteric artery), treated by open surgical approach. (*J Vasc Surg* 2011;54:205-7.)

Visceral artery aneurysms are rare vascular lesions, with an incidence in the general population ranging from 0.1% to 2%.^{1,2} Among the visceral arteries, the inferior mesenteric artery (IMA) is the rarest localization (<1%).³ Several etiopathogenetic causes have been described in the literature.³ The chronic stenosis/occlusion of other celiac arteries can establish an increased flow into the IMA district (high flow state).⁴ The association of an increased velocity with a significant stenosis can lead to the weakness of the arterial wall and the subsequent formation of aneurysmal disease.^{4,5} We report the case of an atherosclerotic IMA aneurysm secondary to high flow state (association with occlusion of the celiac trunk and severe stenosis of the superior mesenteric artery), treated by open surgical approach.

CASE REPORT

A 69-year-old male was admitted to our department for an IMA aneurysm associated with diffuse atherosclerotic disease of aortomesenteric axis (occlusion of the celiac trunk, severe stenosis of the superior mesenteric artery, and severe stenosis of the IMA). His medical history was notable for smoking, chronic obstructive pulmonary disease, hypertension, paroxysmal supraventricular tachycardia, and previous left carotid endarterectomy with occlusion of the contralateral internal carotid artery. The patient was asymptomatic for abdominal pain.

A routine ultrasound scan, carried out to check the status of the aortoiliac district in an atherosclerotic patient, showed the presence of a poststenotic dilatation of the IMA; a computed tomography angiography of the aortoiliac axis confirmed the diagnosis (Fig 1) and demonstrated the concomitant presence of occlusion of the celiac trunk and severe stenosis of the superior

mesenteric artery. No bowel ischemic lesions were documented on CT scan examinations.

The patient was operated on under general anesthesia; the abdominal aorta and the IMA were exposed through a midline laparotomy with a transperitoneal approach. The intraoperative findings revealed a 2.5-cm aneurysm of the initial tract of the IMA with a long longitudinal extension (6-7 cm), partially involving the origin of two branch vessels for left colon vascularization.

The patient underwent aneurysm resection and tube graft in Dacron material (diameter, 6 mm). The source of the inflow for the graft was the first tract of the IMA. The colic vessels were not ligated and were not included in the distal anastomosis (Fig 2). The clamping time of the IMA was 14 minutes. Macroscopic examination of the aneurysmal sac demonstrated typical manifestations of the atherosclerotic disease.

The patient was discharged on the sixth postoperative day without bowel symptoms and with dual antiplatelet therapy (aspirin and ticlopidine). At 3-year follow-up, the patient was alive and without bowel symptoms. The tube graft was patent without signs of restenosis or arterial dilatations (Fig 3).

DISCUSSION

Aneurysms of the visceral vessels are uncommon but potentially fatal vascular lesions. The localization of the dilatative disease at the level of the IMA is extremely rare. The first case of IMA aneurysm was described by Peacock in 1861,⁶ and in 2003, Davidovic et al⁷ revised 32 cases reported in the literature. In these last several years, another 20 cases have been described for a total of 52 cases. The growth of the incidence of these rare conditions in the last several years could be explained with the increase of abdominal examinations performed (CT or ultrasound scans).

In fact, IMA aneurysms are commonly asymptomatic and diagnosis is usually incidental;⁸ however, some cases of aneurysmal rupture have been described.^{9,10} In our experience, the patient was asymptomatic, and the diagnosis was first made during a routine ultrasound scan performed to check the status of the aortoiliac district and then confirmed by CT scans.

The etiologies of reported IMA aneurysms have varied; several diseases have been described as a possible cause of the formation of IMA aneurysms (infection, polyarteritis

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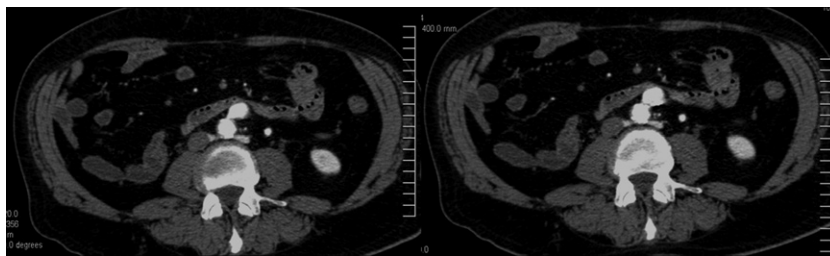


Fig 1. Preoperative CT scan demonstrating the atherosclerotic inferior mesenteric artery (IMA) aneurysm.

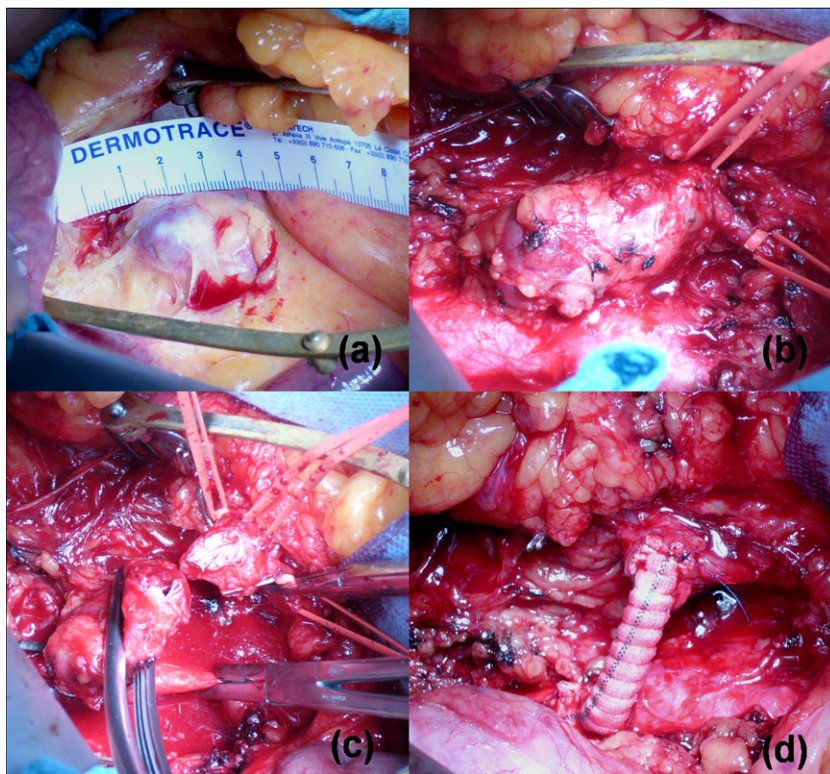


Fig 2. Intraoperative findings: 2.5-cm inferior mesenteric artery (IMA) aneurysm (a), its isolation with colic vessels (b), resection (c), and Dacron tube graft (d).

nodosa, mediolytic arteritis, Behçet disease, neurofibromatosis, mesenteric venocclusive disease). Atherosclerotic seems to play a secondary role in the pathogenesis of the formation of the IMA aneurysm when one of the above described diseases is present.

Instead, atherosclerosis plays a key role in the formation of IMA aneurysms when atherosclerotic plaques create stenosis/occlusion at the level of the celiac trunk and of the superior mesenteric artery. In this pathologic situation, there exists an increased turbulent blood flow in the district of the IMA (high flow state) to guarantee an adequate blood supply to bowel vascularization. The continuing increase of pressure at the level of the origin of IMA and the concomitant presence of atherosclerotic lesions could lead to the formation of dilatative disease in the first tract of this

artery. High flow state, in a stenotic IMA with subsequent formation of aneurysmal disease, has been previously described in the literature.^{4,5} Including the present case, 12 cases of atherosclerotic IMA aneurysm secondary to high flow state have been described.

All these 12 cases were surgically treated. Some authors¹¹ proposed to treat the stenosis/occlusion of the superior mesenteric artery by angioplasty and stenting before carrying out the resection of the IMA aneurysm. Other approaches were surgical revascularization of superior mesenteric artery and resection of the IMA aneurysm¹² or surgical revascularization of all three celiac arteries.⁴

We presume that revascularization of other celiac arteries is not necessary when a good blood supply is guaranteed by the IMA. In fact, in our case, preoperative CT scan

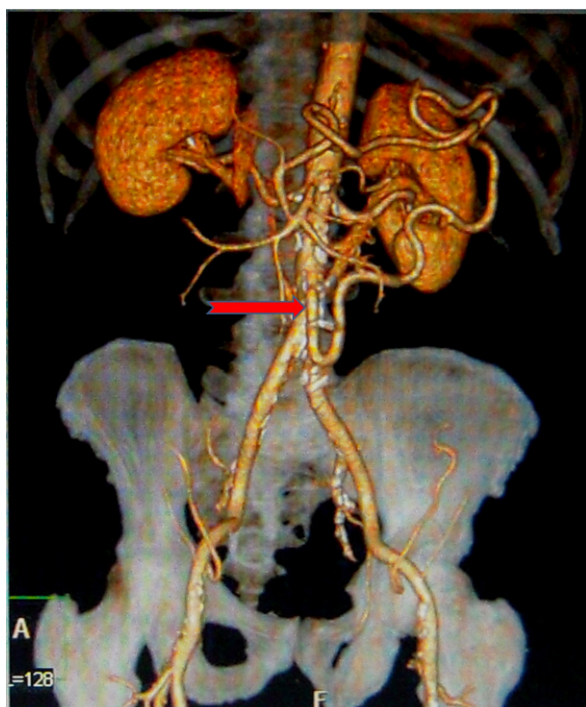


Fig 3. Three-year CT scan demonstrating the good patency of the graft (*arrow*) and the presence of a good Riolo arcade.

showed the presence of a good Riolo arcade with an excellent collateralization guaranteed by IMA into the district of the other celiac arteries (celiac trunk and superior mesenteric artery). Therefore, our operative management was resection of IMA and tube prosthetic graft, and we decided to not revascularize other celiac arteries.

In our case, the placement of a tube graft was necessary because of the longitudinal extension of the aneurysm until the origin of the first colic branches. Other authors performed resection and direct end-to-end anastomosis^{4,10} or resection of IMA aneurysm and reimplantation directly to the abdominal aorta.¹¹

We preferred to use prosthetic material to reduce the possibility of graft dilatations during the follow-up period (initial tract of IMA must be considered to be a high-pressure district).

On the basis of our knowledge, no case of IMA aneurysm was treated by endovascular techniques (covered stent graft, embolization). Endovascular treatment of visceral

artery aneurysms has not been validated in the long-term period and open surgery still represents the treatment of choice in these rare vascular lesions.¹³ Furthermore, open surgery offers the possibility to maintain all branches of the IMA required to maintain a good collateralization to the bowel. For this reason, in our opinion, in the presence of atherosclerotic IMA aneurysms secondary to high flow state (stenosis/occlusion of other celiac arteries), the IMA should be necessarily surgically reconstructed and revascularized, avoiding the ligation of all collateral branches.

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