Aortic dissection after open repair of an infrarenal aortic aneurysm

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INTRODUCTION: A case of thoracic-abdominal dissection after open surgical exclusion of an infrarenal aortic aneurysm is presented.

CASE PRESENTATION: A 62-year-old woman was diagnosed with an infrarenal abdominal aortic aneurysm with a rapid increase in maximal diameter. She underwent surgery for aneurysm exclusion by an end-to-end aorto-aortic bypass with Dacron collagen (Intervascular; WL Gore & Associates Inc, USA). After 15 days, she was admitted to the emergency department with intense epigastric and lumbar pain. Computed tomography angiography with contrast revealed an aortic dissection with origin in the proximal bypass anastomosis and cranial extension to the thoracic aorta. The true lumen at the level of the eighth thoracic vertebra was practically collapsed by the false lumen. The celiac trunk, and the mesenteric and renal arteries were perfused

by the true lumen. After the acute phase of the aortic dissection, surgical repair was planned. Two paths of false lumen were found – one at the thoracic aorta and the second in the proximal bypass anastomosis. Surgical repair comprised two approaches. First, a Valiant Thoracic stent graft (Medtronic Inc, UK) was implanted distal from the left subclavian artery, expanding the collapsed true lumen and covering the false and dissected lumen. Second, an infrarenal Endurant abdominal stent graft (Medtronic Inc) was implanted. This second device was complemented with an aortic infrarenal extension using a Talent abdominal stent graft (Medtronic Inc) in the infrarenal aortic neck to achieve a hermetic seal. The postoperative clinical course was uneventful, and her symptoms were completely resolved in six months.

CONCLUSION: Arteritis must be taken into account in young patients with high inflammatory markers. Covered stents and endoprosthetic devices seem to be effective methods to seal the dissected lumen.

Key Words: Aortic dissection; Arteritis

Aortic dissection is a rare complication after open repair of an infrarenal aortic aneurysm. We present a case of thoracic-abdominal dissection after open surgical exclusion of an infrarenal aortic aneurysm.

CASE PRESENTATION

A 62-year-old woman native to the Maghreb (North Africa), with a history of hypertension, asthma and Sjögren's syndrome under treatment with corticosteroids, was diagnosed with an infrarenal abdominal aortic aneurysm (AAA). The AAA had undergone a rapid increase in maximal diameter (more than 1 cm in the previous 12 months) with aneurysms of the celiac trunk (18 mm) and splenic artery.

The patient underwent surgery for aneurysm exclusion by an end-to-end aorto-aortic bypass with Dacron collagen (16 mm; Intervascular, WL Gore & Associates Inc, USA). Histological findings of the aortic wall revealed atherosclerosis type V. She was discharged home without complications.

After 15 days, she was admitted to the emergency department of the Hospital Universitario de Bellvitge (Barcelona, Spain) with intense epigastric and lumbar pain. On physical examination, the blood pressure in the right and left arm was 190/102 mmHg, and the heart rate was 80 beats/min. The vascular examination was normal, with symmetrical carotid, radial, posterior tibial and dorsalis pedis pulses. Laboratory data on admission showed a high level of creatinine (118 µmol/L) with normal values of pH (7.40), hemoglobin (1.04 g/L) and hematocrit (33%).

Computed tomography angiography with contrast revealed an aortic dissection with possible origin in the proximal bypass anastomosis (Figure 1) and cranial extension to the thoracic aorta, ending at the level of the eighth thoracic vertebra (Figure 2). The true lumen at the level of the eighth thoracic vertebra was practically collapsed by the false lumen. The celiac trunk, and the mesenteric and renal arteries were perfused by the true lumen (Figure 3).

The patient was admitted to the critical care unit. Initial treatment with perfusion of morphine and sodium nitropruside, and labetalol and nitroglycerine, was used to control hypertension and back pain. Afterward, blood pressure was controlled with three antihypertensive drugs (captopril 50 mg every 6 h, hydralazine 50 mg every 6 h and nifedipine 30 mg every 12 h) given orally. Renal function was normal with an unaltered isotopic nephrogram.

After the acute phase of the aortic dissection, the patient presented with continuous postprandial abdominal pain compatible with intestinal ischemia. Progressive weight loss made enteral feeding necessary.

Surgical repair of the aortic dissection was planned, and aortoangiography was performed to complete the study. Two paths of false lumen were found – one at the thoracic aorta and the second (with an intense flow) in the proximal bypass anastomosis (Figure 4).

Surgical repair comprised two approaches. First, distal from the left subclavian artery, a Valiant Thoracic stent graft

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Figure 1) Aortic dissection (arrow) with the origin in the proximal bypass anastomosis

Figure 2) The true lumen collapsed by the false lumen (arrow)

Figure 3) The celiac trunk and mesenteric arteries perfused by the true lumen

(Medtronic Inc, UK) (TF3636C 150X) was implanted, expanding the collapsed true lumen and covering the false and dissected lumen (Figure 5). Second, an infrarenal Endurant stent graft (Medtronic Inc; 2828C80) was implanted. This second device was complemented with an aortic infrarenal

Figure 4) Two paths of false lumen were found

Figure 5) Thoracic stent graft

extension using a Talent stent graft (Medtronic Inc; 2828W29) in the aortic infrarenal neck to achieve a hermetic seal (Figure 6).

During the postoperative clinical course, the patient showed good tolerance to oral feeding. Her symptoms completely resolved in six months, with normal blood pressure controlled with only one antihypertensive drug.

DISCUSSION

Aortic dissection after open surgical repair of an aortic infra-renal aneurysm is a rare complication. In the present case, a woman with multiple aneurysms in the abdominal aorta developed a retrograde aortic dissection unleashed by surgical repair of an AAA. The aortic neck manipulation during the surgery caused an intimal-medial disruption and the false lumen that was created cranially dissected the aorta. Other cases of iatrogenic dissections have been reported but are usually related to endovascular procedures (1,2), not open surgery.

An additional risk factor was Sjögren's syndrome, which is associated with vasculitis. The patient was diagnosed three years previously based on clinical presentation, positive histopathological findings in the salivary glands, and antinuclear antibodies (1:160) and anti-Ro antibodies in her serum. Sjögren's syndrome is an idiopathic inflammatory chronic disease that predominates in women in a ratio of 9:1. It features proliferation of T cells into the lymph glands and hyperstimulation of B cells.

Vasculitis eventually leads to medial degeneration and a thin appearance (3-5) of the aortic wall, resulting in aneurysms and dissections (6,7). The most common rheumatological causes of aortitis are large-vessel vasculitis, giant cell arteritis and Takayasu's arteritis. In these disorders, a chronic inflammatory infiltrate of the aortic medial and adventitial vasa vasorum is present, with many lymphocytes, macrophages and multinucleated giant cells (6,8-10). Giant cell arteritis patients have 2.4 times the risk of developing aortic aneurysms compared with the general population (3,11,12).

The origin of the dissected flap is located in the abdominal aorta in 5% to 10% of patients, and in the descending thoracic aorta in 25% of cases (13).

In our case, there were two communication links between the true lumen and the false lumen (Figure 4); these usually occur secondary to hemodynamic stress. These spontaneous fenestrations usually appear in the ostium of aortic vessels (14,15). The true lumen was collapsed by the false lumen at the eighth thoracic vertebra (Figure 2) and was responsible for the high blood pressure and intestinal ischemia because of poor distal perfusion (malperfusion syndrome). This syndrome complicates aortic dissections in 31% or fewer patients (16-18).

In the surgical approach to chronic complications, endovascular management is minimally invasive, safe and effective; mortality and neurological complication rates are lower than in open surgery. Long-term efficacy needs to be further evaluated (19). In the present case, using endovascular therapy, the infra-renal false lumen was excluded, the true thoracic lumen was expanded and symptoms were resolved, thereby avoiding further surgery.

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Figure 6) Infra-renal stent graft

CONCLUSION

Atypical presentation of an abdominal aortic dissection in a woman with an inflammatory disease makes the arteritis a significant etiopathogenic mechanism of aortic intimal weakness. Arteritis must be taken into account in patients younger than 50 years of age with high inflammatory markers and who have aortic aneurysms of uncertain cause (20).

Covered stents and endoprosthetic devices seem to be effective methods to seal the dissected lumen (1,19,21).

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