SHORT REPORT

Endovascular Repair of Spontaneous Infrarenal Aortic Dissection Presenting as Severe Lower Extremity Ischaemia

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We report a 90-year old man who presented with severe lower extremity ischaemia due to spontaneous dissection of a non-aneurysmal infrarenal abdominal aorta. The aortic lesion was treated using an aorto-uni-iliac stent-graft with contralateral common iliac artery occlusion and femoro-femoral cross-over bypass. The patient underwent digital amputation and debridement of the foot four weeks post-operatively. At 12 months follow-up, he remains symptom-free with an excluded dissection, patent reconstruction and healed foot.

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Introduction

Acute spontaneous non-infective symptomatic pathology of the non-aneurysmal infrarenal abdominal aorta is extremely rare. Dissection confined to the infrarenal aorta accounts for less than 1% of all aortic dissections¹ and may present with abdominal pain, lower extremity ischaemia or rupture.² To date, there have been three reported cases of endovascular repair of spontaneous infrarenal aortic dissection, two performed for asymptomatic lesions and one for a symptomatic lesion causing abdominal and back pain.³,⁴ We describe, to our knowledge for the first time, successful endovascular repair of a spontaneous infrarenal aortic dissection presenting as severe lower extremity ischaemia.

Case Report

A 90-year old man with controlled hypertension presented to our institution with a four-week history of sudden-onset lower extremity ischaemic rest pain. There was no history of myocardial infarction or atrial fibrillation. The patient was haemodynamically stable and apyrexial with no palpable lower extremity pulses and patchy gangrene affecting the left foot. Contrast-enhanced computed tomographic angiography (CTA) demonstrated a focal dissection of the infrarenal aorta with severe compromise of the true lumen (Fig. 1). The maximum diameter of the aorta and common iliac arteries were 19mm and 11mm, respectively. As the iliac and infra-inguinal vessels were intact, the lower extremity ischaemia was considered to be secondary to micro-embolisation from the aortic dissection.

After obtaining informed consent, the patient was taken to the operating room where both common femoral arteries (CFA) were exposed under local anaesthesia. A Zenith aorto-uni-iliac endovascular stent graft (EVSG) (William A. Cook Ltd), with proximal diameter 24 mm, distal diameter 12 mm and length 147 mm, was introduced via the right CFA and deployed in a satisfactory position. The contralateral common iliac artery (CIA) was occluded with a 16 mm diameter Zenith iliac occluder plug (William A. Cook Ltd). Completion angiography demonstrated complete exclusion of the dissection. Under general

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anaesthesia, a right to left femoro-femoral cross-over bypass graft was inserted using 8 mm polytetrafluoroethylene. Peripheral pulses were palpable at the end of the procedure and post-reconstruction CTA confirmed complete exclusion of the dissection (Fig. 2). The patient made an uncomplicated but slow recovery and was discharged on post-operative day 17. Four weeks after discharge, the patient underwent amputation of the left hallux and debridement of the plantar aspect of the foot. CTA at 6 months demonstrated continued exclusion of the dissection. At 12 months, the patient remains symptom-free with a patent reconstruction and a healed foot.

Discussion

To date, there have been three reports of endovascular repair of infrarenal aortic dissection. Ferko et al. treated two patients with asymptomatic dissections, one with a straight aortic EVSG and the other with an aorto-uni-iliac EVSG, contralateral CIA occlusion and femoro-femoral cross-over bypass: both patients were alive without complications at three and 16 months follow-up. More recently, Porcellini et al.
reported successful repair of a symptomatic dissection causing abdominal and back pain using a bifurcated Talent stent-graft (Medtronic AVE, Santa Rosa, CA) with intentional occlusion of one limb of the device and femoro-femoral cross-over bypass: the patient was alive and symptom-free at six months follow-up. The present report describes, to our knowledge, the first successful case of endovascular repair of a symptomatic isolated infrarenal aortic dissection causing severe lower extremity ischaemia. The extreme age of our patient was the principal indication for using an endovascular rather than an open surgical approach. The main anatomical limitation to endovascular repair was the relatively small diameter of the non-aneurysmal infrarenal aorta and aortic bifurcation. The smallest diameter commercially-available EVSG for the treatment of abdominal aortic aneurysms is 24 mm and an aortic bifurcation diameter of at least 21 mm is generally required for implantation of a bifurcated device to reduce the risk of graft limb occlusion. In the present case, the infrarenal aortic diameter of 19 mm was considered insufficient for a bifurcated device and so an aorto-uni-iliac stent-graft was the only other endovascular option available to us at the time. Other endovascular options would have included the off-label use of (a) a 24 mm diameter aortic extension cuff, (b) a short 22 mm diameter thoracic stent-graft, or (c) overlapping Zenith iliac limb extensions (diameter from 18 to 24 mm; length from 37 to 88 cm). These options require exposure of only one femoral artery and would have avoided the need for an extra-anatomical bypass. Use of an uncovered stent was considered inappropriate in view of the potential risk of rupture of the dissection and the fact that, in the absence of another identifiable cause, the patient’s lower extremity ischaemia was considered to be due to micro-embolisation from the dissection.

Infra-renal aortic dissection is a rare condition which affects a group of patients who are frequently elderly with significant co-morbidity. Endovascular stent-grafting provides an acceptable low-risk alternative to open aortic surgery in this difficult clinical situation.

References

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