Sudden endograft collapse due to type B aortic dissection after open conversion of endovascular aortic repair

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Abstract

A 58-year-old man was admitted for sudden numbness of the right leg and abdominal pain 6 months following late open conversion for endotension after endovascular aortic repair. Computed tomography demonstrated residual endograft collapse due to Stanford type B dissection. Emergent right axillobifemoral bypass was performed to perfuse the lower extremities. We performed subsequent total arch replacement with secondary thoracic endovascular aortic repair.

Keywords: Open conversion • Aortic dissection • Endograft collapse

INTRODUCTION

Endovascular aortic repair (EVAR) is the gold standard treatment for abdominal aortic aneurysms (AAA). Although safe, EVAR requires additional interventions in up to 30% of patients [1]. Although most endograft failures can be managed endovascularly, 2.1% require conversion to open surgery to reduce mortality. We report an extremely rare case of acute Stanford type B aortic dissection (TBAD) secondary to residual endograft collapse after conversion to open surgery.

CASE REPORT

A 58-year-old man underwent EVAR using a 26-mm Zenith Flex AAA stent graft (Cook Medical, Bloomington, IN, USA) for a 54-mm infrarenal aortic aneurysm without an intraoperative endoleak. Regular follow-up computed tomography (CT) scans for 8 years did not demonstrate a leak. The aneurysm enlarged from 54 to 73 mm, and endotension was diagnosed. We subsequently performed open AAA repair using 20-mm InterGard Quatro graft (MAQUET, Rastatt, Baden-Württemberg, Germany), in which 2 proximal stents were preserved. Six months postoperatively, the patient complained of sudden abdominal pain and paresthesia in the right leg. Emergent CT scan demonstrated TBAD, which collapsed the residual stent graft and occluded the right leg of the Quatro graft (Fig. 1). The false lumen of the aneurysm originated from the left subclavian artery and extended to Zone 2. We performed emergent axillobifemoral bypass and completed revascularization within 5 h of limb ischaemia. No complications were observed. CT performed on postoperative day 1 demonstrated self-expansion of the residual stent graft and widening of the true lumen. To close the entry and exclude the dissecting aneurysm extending from the aortic arch to the descending aorta, we performed total arch replacement using a conventional elephant trunk procedure on POM 2 after extranatomic bypass (EAB), followed by thoracic endovascular aortic repair (TEVAR) on postoperative month (POM) 6 (Fig. 2).

DISCUSSION

Twelve cases of dissection-induced endograft collapse after EVAR have been documented in the PubMed database [2-5], and some cases of leg malperfusion after open surgery have been reported. However, endograft collapse after open conversion is extremely rare and, to the best of our knowledge, it has not been reported previously. Cross-clamping of the stent graft in open conversion may lead to mild mechanical stress on the endothelium of the aorta; however, it should not have directly caused dissection in our case because the entry point was far from the endograft, i.e. at the origin of the left subclavian artery. Among 12 cases, 2 resulted in immediate mortality following rupture [4]. Of the 5 patients who underwent emergent TEVAR, 1 succumbed to non-disease-related intracranial haemorrhage [5]. Furthermore, early mortality due to the necrosis of the visceral organs occurred in 2 of the 5 patients who underwent EAB [4]. Lower-extremity amputation due to intraoperative rupture was performed in 1 patient [3]. Overall, mortality related to endograft collapse due to TBAD was as high as 42% (5/12). Although apparent results indicate
that the prognosis of the TEVAR group was better than that of the EAB group, some important anatomical and technical issues underlie emergent TEVAR. We operated a dissecting arch aneurysm, which could increase the risk of retrograde Stanford type A aortic dissection during TEVAR. Previous reports have also demonstrated that passing a guidewire through a collapsed endograft is technically difficult and often needs subsequent distal thrombectomy, which is associated with delayed reperfusion [5].

However, EAB is associated with immediate reperfusion of both lower extremities by the bypass flow itself and by retrograde pressurization of the true lumen that re-expand the endograft [2]. Emergent open arch repair is also a reasonable option; however, it takes much longer to achieve reperfusion of the lower extremities.

Our study demonstrated that an additional endograft should be placed, often with thrombectomy, if ischaemia is not critical.
and emergent endovascular intervention is anatomically feasible, because it simultaneously achieves entry closure and revascularization. Contrastingly, if limb ischaemia is critical and requires immediate revascularization, EAB is the most efficient option, although it needs additional procedure for entry closure in the future.

Conflict of interest: none declared.

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