Thromboexclusion Treatment for Recurrent Aortic Aneurysm: Still an Option in Select Cases

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Flow reversal and thromboexclusion constitute a valuable alternative for aortic surgeons to have within their technical armamentarium for the treatment of aortic aneurysmal disease. Although not usually a preferred treatment for general aortic pathologies, this technique can be considered as a treatment option in select situations, such as mycotic aneurysm, a hostile surgical field, and a poor condition of the patient. Here, we present a case of extra-anatomic bypass and thromboexclusion for recurrent aortic aneurysm after previous extra-anatomic bypass and thromboexclusion surgery.

Key words: 1. Aortic aneurysm 2. Thromboexclusion

Case report

A 78-year-old man was admitted to Seoul St. Mary’s Hospital with excruciating chest pain accompanied by an increasingly large aneurysm located on the proximal anastomosis of an extra-anatomic bypass graft.

He had successfully undergone a conventional aortic graft replacement 30 years prior, with the graft extending from the mid-thoracic aorta to the supra- celiac abdominal aorta through a left thoracoabdominal incision. This procedure was performed to treat a thoracoabdominal aortic aneurysm, which was categorized as extent V according to Safi’s modification of the Crawford classification system.

The patient was hospitalized again 1 year later after complaining of fever and massive hemoptysis, which he had been experiencing for 3 days. Computed tomography (CT) imaging showed a newly developed aneurysm above the proximal graft as well as left lower lobar hemorrhage, suggesting an aortobronchial fistula; therefore, surgery was decided upon and performed.

Thoracotomy revealed severe pleural adhesion and peri-graft fluid collection with non-viable surrounding mediastinal tissues, as well as an aneurysm adjacent to the proximal graft eroding into the adjacent segmental bronchus. After thoracotomy, a left lower lobe resection was performed. In addition, to avoid anastomosis around the infected area, an extra-anatomic aortic bypass was performed from the mid-descending thoracic aorta above the infected graft to the infrarenal abdominal aorta. The distal anastomosis was done via a separate midline lower laparotomy. The pathologic and microscopic exams revealed a mycotic aneurysm and an aortobronchial fistula.

The patient was discharged uneventfully, but another proximal descending thoracic aortic aneurysm, which had been growing slowly, was detected 2 years after the second operation (Fig. 1). The patient
remained asymptomatic over the course of close follow-up at our outpatient clinic. However, 5 years later, the patient visited the emergency room again with severe hemoptysis and chest pain. CT imaging showed a large descending thoracic aortic aneurysm with an impending rupture (Fig. 2),
so we opted to perform another extra-anatomic bypass and thromboexclusion. The patient had no fever, no leukocytosis, and no elevation of C-reactive protein levels, and blood and sputum cultures were negative. Due to the presence of dense pleural adhesion from repeated surgery, we decided to perform the second extra-anatomic aortic bypass via sternotomy, starting from the ascending aorta and extending through the pericardium and diaphragm to the extraperitoneal abdominal area, where the previous extra-anatomic bypass graft had been placed. The descending thoracic aorta was suture-ligated immediately distal to the left subclavian artery, and a separate lateral mini-laparotomy was performed at the site of the distal anastomosis.

An immediate postoperative CT scan revealed an incomplete thromboexclusion of the aneurysm at the descending thoracic aorta (Fig. 3A). However, 2 years later, a follow-up CT scan demonstrated complete thromboexclusion of the previous proximal descending thoracic aortic aneurysm and of two-thirds of the extra-anatomic bypass graft from the second operation (Fig. 3B).

The patient provided written informed consent for the publication of clinical details and images.

**Discussion**

The extra-anatomic bypass graft provided an alternative path for blood flow and circumvented the pathological aorta. Therefore, the excluded blind distal aorta, including the diseased aortic segment, exhibited stagnant reverse flow leading to progressive thromboexclusion, potentially permitting a period of circulatory adaptation of the spinal cord via collateral vessel formation [1-3]. The main advantages of flow reversal and thromboexclusion are reduced invasiveness and a lower incidence of postoperative paraplegia than occurs after conventional graft replacement [2].
Currently, owing to refinements of the surgical technique, meticulous postoperative care, the more widespread use of biologic prosthetic vascular grafts, and increased sophistication of the extracorporeal bypass, the resection and graft replacement of a diseased aorta is typically a standard surgical approach regardless of the site and extent of the condition, particularly in high-risk patients with extensive, complex aortic disease [1].

However, in the cases of infected or severely calcified aortas that cannot accommodate the suture needle or aortic cross-clamp; hostile surgical fields that cannot be approached directly; or severe concurrent morbidity such as poor cardiac reserve, renal failure, or chronic obstructive pulmonary disease, extra-anatomic bypass and thromboexclusion is still an expedient alternative method of treatment [4,5].

In summary, we report a case of repeated extra-anatomic bypass and thromboexclusion treatment for recurrent aortic aneurysm after initial extra-anatomic bypass and thromboexclusion surgery. Under certain circumstances, patients might benefit from extra-anatomic bypass and thromboexclusion surgery via sternotomy, especially when graft replacement via thoracotomy is difficult given a previous history of infection or redo surgery.

Conflict of interest

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

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