Hybrid Thoracic Endovascular Aortic Repair for Intercostal Patch Aneurysm after Thoracoabdominal Aortic Replacement

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We report a case of hybrid thoracic endovascular aortic repair for intercostal patch aneurysm after thoracoabdominal aortic replacement. Eighteen years ago, a 63-year-old woman with Marfan syndrome had undergone thoracoabdominal aortic replacement with reimplantation of the intercostal artery in an island fashion. Follow-up computed tomography (CT) revealed a remaining intercostal patch aneurysm of diameter 60 mm 17 years after the last operation. Hybrid thoracic endovascular aortic repair for exclusion of this intercostal patch aneurysm was successfully performed, with visceral artery bypasses. Postoperative CT showed no anastomotic stenosis or endoleak.

Keywords: thoracic endovascular repair, thoracoabdominal aortic replacement, intercostal patch aneurysm

Introduction

During thoracoabdominal aortic replacement, the intercostal artery is reimplanted for spinal cord protection. Several reimplantation techniques have been reported, for example, the island method and that in which an interposition graft is used.1) Intercostal patch aneurysm is a rare but lethal complication of thoracoabdominal aortic replacement, which is reported more frequently in patients with Marfan syndrome.2) We successfully treated an intercostal patch aneurysm by using hybrid thoracic endovascular aortic repair (TEVAR) and report our findings in the present study.
fashion. Following anastomosis, the orifices of the visceral arteries were ligated. A 0.035-inch Radifocus guidewire (TERUMO Co, Tokyo, Japan) was inserted through the left leg of the graft, and an 8-French sheath was introduced over the guidewire. A Gore-Tag stent graft (WL Gore & Associates, Inc. Newark, DE, USA) was delivered and deployed to seal the intercostal patch aneurysm. Before and after the deployment, motor evoked potential monitor was done to check spinal cord ischemia. No endoleak was detected on digital subtraction angiography. No postoperative paraplegia occurred, and cerebrospinal fluid drainage catheter was removed on the postoperative day 3. Postoperative CT showed patent bypass grafts and no endoleak. One year after the surgery, no aneurysm formation has developed, and the aneurysmal sac size has decreased (Fig. 2).

The patient provided us permission to publish the features of her case, and her identity has been protected.

**Discussion**

In this case, an intercostal patch aneurysm after thoracoabdominal aortic replacement was successfully treated with hybrid TEVAR. Paraplegia is one of the most serious complications of thoracoabdominal aortic replacement, with an incidence of 5.1%. To reduce the incidence of this complication, the intercostal artery is reimplanted during the surgery for spinal cord protection. However, this process of reimplantation is also associated with a rare but lethal complication, namely, intercostal patch aneurysm. Kulik et al. reported that the incidence of intercostal patch aneurysms was 7.1%, and it was higher in patients with Marfan syndrome. Although interposition grafts can be used for reimplantation of the intercostal artery in patients with connective tissue diseases, like Marfan syndrome, the long-term patency of these grafts is currently unknown. In the present case, the intercostal artery was reimplanted in...
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When this is not possible, as in the present case (because of the small orifice of the intercostal artery), reimplantation in an island fashion should be performed keeping at least 2 cm of the graft between the edge of the patch and the nearest visceral bypass graft. Using this as a landing zone, TEVAR can be performed without the need to create any visceral artery bypasses.

In conclusion, we reported a successful case of hybrid TEVAR for an intercostal patch aneurysm in a patient with Marfan syndrome. Close follow-up is needed to detect this lethal complication.

Disclosure Statement

The authors declare no conflicts of interest associated with this study. Moreover, they had full control of study design, methods used, outcome parameters and results, data analysis, and written report production.

Author Contributions

Study conception: HK, HS, TH, AY
Data collection: AH, MK, YA, HO
Investigation: HK
Writing: HK
Critical review and revision: all authors
Final approval of the article: all authors
Accountability for all aspects of the work: all authors

Fig. 2 (A) Postoperative computed tomography showing no anastomotic stenosis or endoleak. Anterior view. (B) Lateral view.

References


an island fashion, because the orifices of the arteries were too small (<3 mm) for anastomosis with the graft. Until a few years ago, open surgery was the only treatment for intercostal patch aneurysms, and it did not produce favorable results. The recently introduced TEVAR, however, has been used to successfully manage intercostal patch aneurysms in several cases. Juthier et al. used TEVAR to correct intercostal aneurysms in the presence of suitable landing zones, while O’Connor et al. reported two cases of TEVAR for exclusion of visceral patch aneurysms with visceral artery bypasses. In the present case, we needed to create new visceral artery bypasses because there was no landing zone for TEVAR between the edge of the aneurysm and the orifice of the previous visceral artery graft. To the best of our knowledge, this is the first report describing successful TEVAR with visceral artery bypasses for an intercostal patch aneurysm. Since this experience, we have performed thoracoabdominal aortic replacement with reimplantation of intercostal arteries by using interposition grafts.