Sutureless Surgical Techniques for Arch Aneurysm Repair in a Patient with Behçet’s Disease

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In patients with vasculo-Behçet’s disease, endovascular stent graft is a reasonable treatment from the viewpoint of prevention of an anastomotic pseudo-aneurysm. We report a case of total arch replacement combined with open stent grafting technique to the downstream aorta and graft inclusion into sino-tubular junction as sutureless surgical techniques for an arch aneurysm in a 42-year-old woman with Behçet’s disease. Postoperative computed tomography (CT) showed that the aortic aneurysm had completely disappeared in 11 months after the operation. Open stent grafting technique was effective to prevent anastomotic pseudo-aneurysm formation.

Keywords: open stent grafting, Behçet’s disease, thoracic aneurysm

Introduction

In patients with vasculo-Behçet’s disease, endovascular stent graft is a reasonable treatment from the viewpoint of prevention of an anastomotic pseudo-aneurysm. However, long-term outcomes of endovascular stent graft in patients with Behçet’s disease are still unclear. We report a case of total arch replacement combined with open stent grafting technique to the downstream aorta and graft inclusion into sino-tubular junction (STJ) as sutureless surgical techniques for an arch aneurysm repair in a patient with Behçet’s disease.

Case Report

A 42-year-old woman was presented with chest pain and caused by a fusiform aneurysm with a maximum transverse diameter of 58 mm on the aortic arch identified by computed tomography (CT) angiography (Fig. 1). Four years ago, she was diagnosed with the incomplete type of Behçet’s disease without ulceration of vulva and ocular symptoms and she was given colchicine 1 mg/day prednisolone 15 mg/day, and cyclosporin 170 mg/day. We scheduled for an urgent operation for an arch aneurysm with a high risk of rupture.

Then median sternotomy cardiopulmonary bypass was established by arterial perfusion from the ascending aorta. During moderate hypothermia at a rectal temperature of 28°C, selective cerebral perfusion was established after aortic cannula in the ascending aorta was removed. We recognized punched-out lesion on the left sinus valsalva (Fig. 2) by chance when the ascending aorta was transected. After the aortic arch was transected between the left common carotid artery and the left subclavian artery, we performed the open stent grafting technique for distal repair. A stent graft that was prepared as 26 mm in diameter and 12 cm in length using a prosthetic vascular graft (J graft, Japan Lifeline Co., Tokyo, Japan) distally fixed with 2 pieces of Gianturco Z-stents (Cook Medical Inc., Bloomington, Indiana, USA) was placed into the descending aorta. After opening stent grafting, a four branched graft was anastomosed to the stump of the distal aortic.
arch. Antegrade systemic perfusion from the fourth branched graft and re-warming were started. The left subclavian artery, left common carotid artery and brachiocephalic artery were anastomosed to distal each of four branched grafts that were wrapped using biological pericardial patch for the purpose of preventing recurrent anastomotic pseudo-aneurysm. After patch closure of punched-out lesion on the left sinus valsalva was performed using biological pericardium (Fig. 2), a straight graft of 5 cm part inserted into the STJ was fixed to each three commissure that was suspended using a 4/0 polypropylene with a felto strip outlayer. Then the tube graft was sutured by interrupted horizontal mattress anastomosis using a 4/0 polypropylene with a felto strip outlayer.

The postoperative course was considerably good, and the patient was discharged on the 15th day of the operation without complication. She received continuous oral steroid and immunosuppressant and experienced no recurrences. Postoperative CT showed that the aortic aneurysm had completely disappeared with no recurrence of aneurysm in 15 months after the operation (Fig. 1).

Fig. 1 Computed tomography (CT) angiography (A: preoperative, B: postoperative). (A) A fusiform aneurysm (white arrow) with a maximum diameter of 58 mm on the aortic arch was identified. (B) An arch aneurysm had completely disappeared (white arrow). There were no pseudoaneurysm formations on the aortic root and distal stent graft (black arrow).

Fig. 2 Punched-out lesion on the left sinus valsalva. (A) Punched-out lesion was recognized on the left sinus valsalva (*). (B) Punched-out lesion was covered with biological pericardium (black arrow).

Fig. 3 Schema of sutureless surgical techniques by open stent grafting and graft inclusion technique. Through the aortic arch between the left common carotid artery and the left subclavian artery, the open stent grafting technique was performed (black arrow). A four branched graft was anastomosed to the stump of the distal aortic arch. The neck arteries were wrapped using biological pericardium (**). A straight graft inserted into the sino-tubular junction (*) was fixed with a felto strip outlayer.
Comments

In patients with vasculo-Behçet’s disease, a higher recurrent rate of aneurysms after open surgery has been reported. Endovascular stent graft treatment, that is, a favorable treatment for preventing anastomotic pseudoaneurysm formation has recently become a surgical option for these patients because of acceptable outcomes. However, the aortic wall continuously experiences mechanical stress from self-expandable stents after endovascular stent graft, in special, the stent edge, which is in contact with the aortic wall, may penetrate it and form a pseudo-aneurysm at the margin of the stent graft. Park, et al. has reported a recurrent aneurysm at the distal margin of a previously inserted stent graft in a patient with Behçet’s disease. In addition, there are few reports of endovascular stent grafting treatment for aortic arch aneurysm in a patient with Behçet’s disease. In case of arch aneurysm, a mechanical stress at the proximal margin of the stent graft is so high that leads to a pseudo-aneurysm formation. Open stent grafting technique has recently become an alternative surgical technique for complicated arch repair. This technique has the benefit of preventing type I endoleak by proximal suture and anastomotic pseudoaneurysm by distal stent grafting. As the site of proximal stump is directly anastomosed to the four branched prosthesis, there is no risk of anastomotic aneurysm. An actual site of the proximal anastomosis was on the STJ that was anastomosed by horizontal mattress sutures like the technique for aortic root dissection. However, the tube graft with native root aorta was anastomosed to the four branched graft finally. Therefore, suture line was not directly affected to aortic pressure force. In addition, we wrapped grafts around the anastomoses to neck arteries. Aortic root replacement with translocated coronary bypass was performed as a suture less technique for punched-out lesion on the left sinus valsalva. However, we did not perform root replacement because a punched-out lesion was recognized by chance when the ascending aorta was transected in this case. Therefore, we thought more careful follow-up by CT scan should be required. In conclusion, open stent grafting technique to the downstream aorta and graft inclusion into STJ as sutureless techniques for an arch aneurysm repair in a patient with Behçet’s disease might be useful to prevent anastomotic pseudo-aneurysm formation.

Disclosure Statement

None.

References