Scheduled re-entry coil embolization before entry coverage of thoracic endovascular stent grafting for aneurysmal chronic type B aortic dissection

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Abstract

Endovascular treatment for type B dissections is controversial. This therapy aims at complete occlusion and thrombosis of the false lumen of the aneurysm. We report a case where cessation of flow was achieved using covered stent grafts in conjunction with coil embolization of the false lumen. The use of scheduled coil re-entry embolization of the false lumen before endovascular entry coverage using a stent graft is a novel approach that could become a treatment option for aneurysmal type B dissection.

Keywords: Coil embolization • Chronic type B aortic dissection • Endovascular stent graft

INTRODUCTION

Recently, type B dissections complicated by malperfusion, rupture or persistent pain have been treated with endovascular therapy [1, 2]. Endovascular therapy for uncomplicated type B dissection with aneurysmal progression is controversial because the thrombogenic environment is incomplete in the false lumen owing to retrograde flow through the residual re-entry tear [3, 4]. We present an endovascular approach using a combination of coil re-entry embolization before entry coverage in a patient with a chronic type B dissection and aneurysmal progression.

CASE REPORT

A 75-year old man with controlled hypertension received medical treatment of a type B aortic dissection associated with an abdominal arteriosclerotic aneurysm in 2004. A follow-up CT angiogram 4 years later demonstrated enlargement of the abdominal aortic diameter up to 7.0 cm, with a residual dissection measuring 5.5 cm in the thoraco-abdominal aorta. The diameter of the descending aorta was 60 mm or less. In 2008, we thought that there was no indication for complete thoraco-abdominal repair. We performed repair of the abdominal arteriosclerotic aneurysm, with reconstruction of the right renal artery at the site of the re-entry tear. A follow-up CT angiogram 3 year later, in 2011, demonstrated enlargement of the thoraco-abdominal aortic diameter to 6.5 cm. The site of the entry tear was 4 cm distal to the left subclavian artery. The re-entry tear remained at the level of the celiac artery (Fig. 1A). The false lumen supplied the celiac artery almost exclusively, while the true lumen fed the superior mesenteric and left renal arteries. We scheduled coverage of the entry tear combined with coil embolization of the re-entry in order to thrombose the false lumen completely.

The day before coverage of the entry tear, we performed coil embolization of the re-entry at the coeliac artery site. Introducing a guide catheter into the false lumen through the entry tear using a left brachial arterial approach, the first coil was anchored at the origin of coeliac artery throughout the re-entry using two 14 mm × 20 cm Interlock coils (Boston Scientific, Cork, Ireland). Nine Nester coils (8–15 cm; Cook, Bloomington, IN, USA) and four Interlock coils (14 mm × 30 cm and 10 mm × 30 cm; Boston) were then piled up on the re-entry. We recognized that the re-entry and the origin of the coeliac artery were occluded from the false lumen; the distal flow in coeliac artery was supplied through a collateral network from the superior mesenteric artery (Fig. 2). On the next day, endovascular exclusion of the false lumen was performed via right common femoral artery exposure. A 37-15 Gore TAG (W. L. Gore & Associates Inc., Flagstaff, AZ, USA) was placed 3 cm distally from the origin of the left subclavian artery with proximal balloon dilatation but without distal balloon dilatation. Angiography on completion of the surgery revealed no filling of the false lumen from the proximal tear. The patient tolerated this procedure well. A CT angiography scan 2 months postoperatively showed a complete thrombosis of the false lumen with a reduction in aneurysm size to 5.8 cm (Fig. 1B).

DISCUSSION

Recently, endovascular treatment in order to prevent antegrade flow into the false lumen in cases of complicated acute type B aortic dissection has been performed with good results [1, 2].
However, entry tear coverage using stent grafting for chronic or uncomplicated type B aortic dissection was controversial, despite thrombosing the false lumen adjacent to the most vulnerable part of the aorta, because the thrombogenic environment in the false lumen was not complete owing to retrograde flow through the residual re-entry tear [4]. Tsai et al. showed that the natural course of false lumen partial thrombosis in an acute type B aortic dissection has a worse prognosis than that of a completely patent false lumen [3]; therefore, complete exclusion of the false lumen with re-entry coverage is required.

The coils allowed us to mitigate flow in the false lumen by creating a complete thrombogenic environment, rendering the coeliac re-entry tear less influential in aneurysm progression. Coil embolization of the coeliac artery requires intraoperative verification that the distal flow in the coeliac artery is supplied through the collateral network of the superior mesenteric artery.

The technique of re-entry coil embolization can be achieved antegrade via the false lumen through a patent entry tear. Coil embolization for persistent false lumen after stent graft repair of type B aortic dissection has also been reported [5]. From the viewpoint of the natural course of the false lumen partial thrombosis after entry coverage in type B aortic dissection, scheduled coil re-entry embolization before endovascular entry coverage using a stent graft could become a treatment option for aneurysmal type B dissection.

CONCLUSION

The strategy of combining coil re-entry embolization before the entry coverage using stent grafting may prove useful for endovascular false lumen occlusion in patients with chronic dissection and aneurysmal progression.

REFERENCES