The Double-Barreled Endografting Technique in a Patient With Chronic Type B Aortic Dissection

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Thoracic endovascular aortic repair has become widely accepted as a useful, less invasive procedure for type B aortic dissections by covering the primary entry.[1] However, depending on the location of the primary entry, it is often difficult to cover the entry from the true lumen without hybrid procedures.[2] Here, we describe a successful endovascular treatment using a double-barreled endografting technique for chronic type B aortic dissection, which excludes the dilated false lumen by endografting into the false lumen without covering the primary entry.

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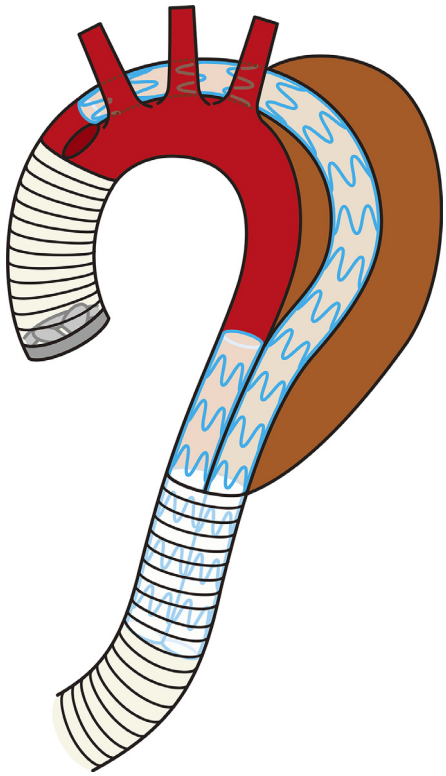
Keywords: Thoracic endovascular aortic repair, Chronic type B aortic dissection, Marfan syndrome



The dilated false-lumen was excluded by endografting without primary entry covering.

Central Message

We performed a novel thoracic endovascular aortic repair named the double-barreled endografting technique in a patient with Marfan syndrome with chronic type B aortic dissection.

CLINICAL SUMMARY

A 62-year-old woman with Marfan syndrome and a history of multiple aortic surgeries visited our hospital due to a residual dissected aortic arch aneurysm. She had suffered acute type A dissection 13 years earlier and underwent graft replacements of the ascending aorta 13 years ago, aortic root with a mechanical valve 5 years ago, and distal descending aorta with a prosthetic graft of 26 mm 3 years ago.

Computed tomography (CT) demonstrated a partially thrombosed false lumen and a maximum diameter of 65 mm. All supra-aortic vessels originated from the true lumen, and the primary entry of 9 mm in diameter was located in the distal ascending aorta. Supra-aortic debranching with redo sternotomy was considered to cover the entry. However, further sternotomy was considered to be inappropriate for this patient due to cachexia with a body weight of 35 kg and limited activities of daily living in a wheelchair. Therefore, total endovascular treatment was planned.

The procedure was performed under general anesthesia. Two guidewires were inserted from the bilateral iliofemoral system into the ascending aorta: one through the true lumen and the other through the false lumen. For the exclusion of the dilated false-lumen, the stent-grafts (Excluder Aortic Extender and CTAG; W.L. Gore and Associates, Flagstaff, AZ) were deployed from the aortic arch just distal to the primary entry to the prosthetic graft in the descending aorta (Fig. 1). Furthermore, CTAG was deployed into the true lumen with the distal end placed into the prosthetic graft to avoid the true-lumen collapse. The stent-graft diameter was selected by oversizing 10–20% of the native aorta. Intraoperative angiography showed good flow in both lumens and no endoleaks (Video 1). Extubation was performed in the hybrid operating

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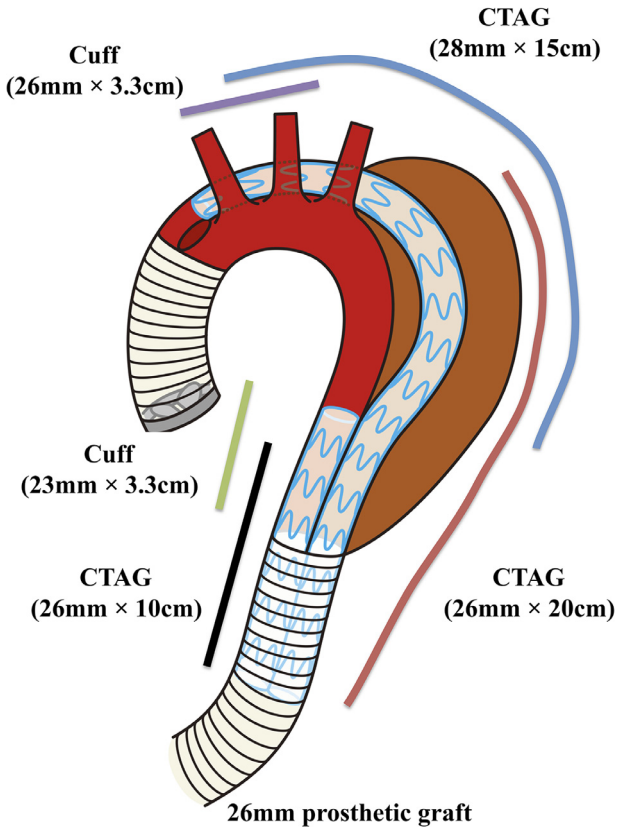


Figure 1. Procedural diagram. Endografts were inserted into the true and false lumens, and the dilated false lumen was excluded without primary entry coverage. Cuff, Excluder Aortic Extender.

room, and the postoperative course was uneventful. One week postoperatively, CT demonstrated patent false-lumen endografts and complete exclusion of the dilated false lumen (Fig. 2). The patient's course remained uneventful at four months after the procedure.

DISCUSSION

The midterm results of thoracic endovascular aortic repair for chronic type B aortic dissection have been described as favorable.[1,3] However, depending on the location of the primary entry, supra-aortic debranching is necessary to cover the entry from the true lumen.[2] Especially in cases that require Zone 0 landing, sternotomy is required for rerouting of all supra-aortic vessels, which is still an invasive procedure for high-risk patients.

Recently, some techniques targeting the false lumen in addition to the primary entry closure have been reported to occlude the false lumen and promote complete false-lumen exclusion.[4,5] On the other hand, the technique described here enables excluding the dilated false lumen by endografting into the false lumen without covering the primary entry.

The current technique has some anatomical limitations. Since the dilated false lumen was excluded only in the false lumen, sufficient proximal and distal landing zones in the false lumen were essential. In this case, the false lumen in the aortic arch was not dilated and had sufficient length to be used as the proximal landing zone. In addition, the prosthetic graft in the descending aorta could be used as the distal landing zone by endografting to both lumens in a parallel fashion. The postoperative CT demonstrated patent false-lumen endografts and complete exclusion of the dilated false lumen. These findings suggest that this technique could be performed successfully, but further follow-up is necessary.

In conclusion, we describe the novel "double-barreled endografting" technique for chronic type B aortic dissection that completely excludes the dilated false lumen by endografting into both lumens without covering the primary entry, representing a useful endovascular option for high-risk patients, if anatomical requirements were fulfilled.

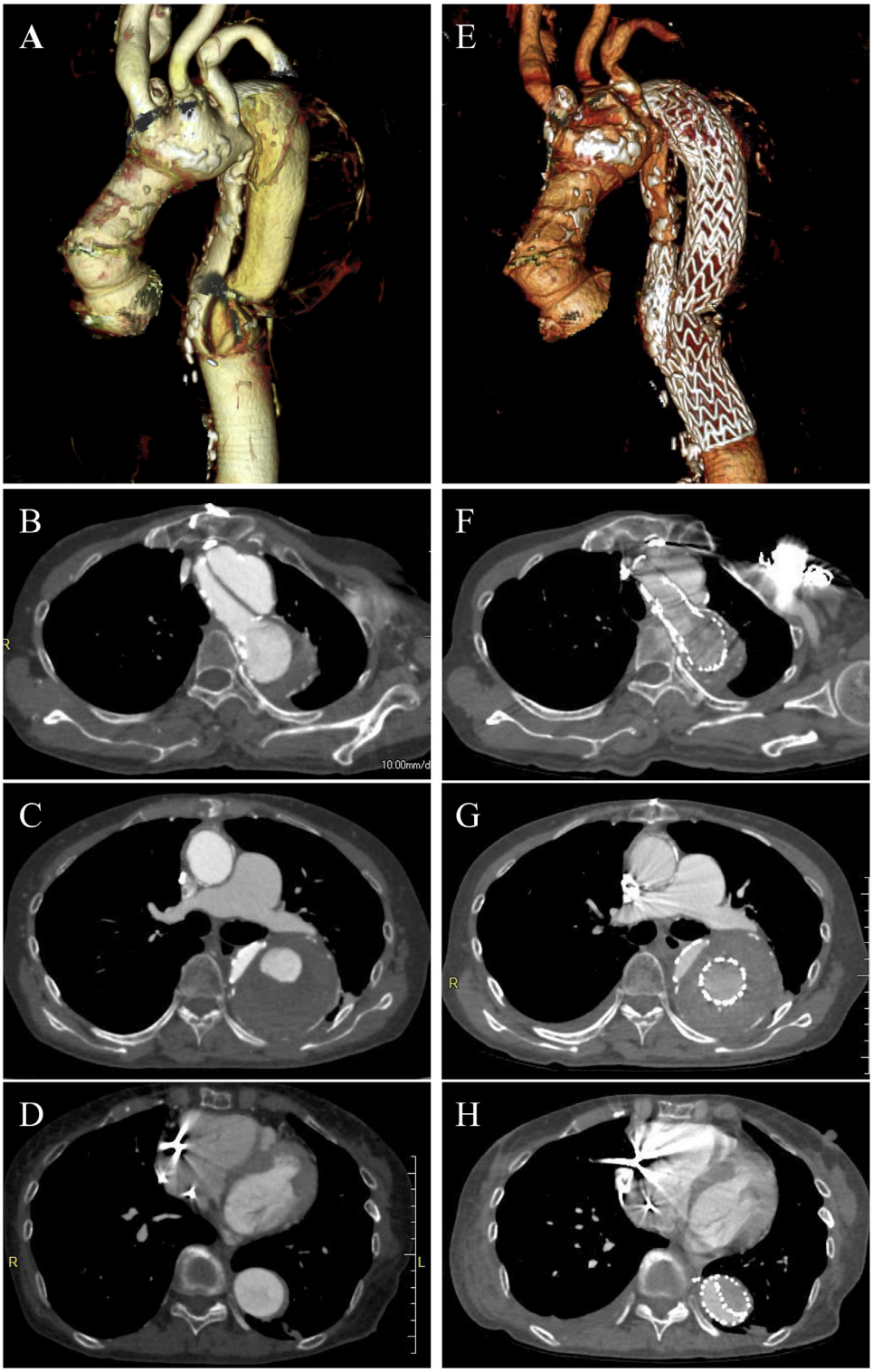
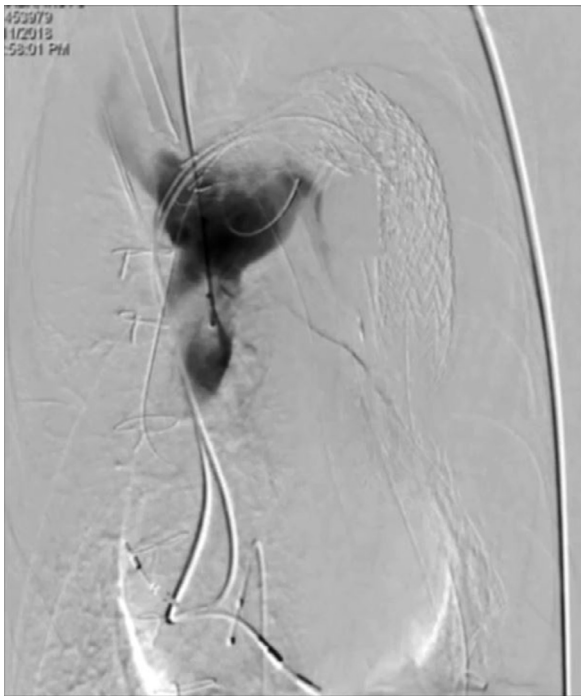


Figure 2. Preoperative (A—D) and postoperative (E—H) computed tomography. The false-lumen endografts were patent (F—H), and the dilated false lumen was excluded with no endoleaks (G).

SUPPLEMENTARY MATERIAL

The following is the supplementary data to this article:



Video S1. Intraoperative angiography.

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