Late-stage, nonanastomotic rupture of double-velour Dacron graft after descending aortic replacement

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Dacron arterial prostheses, which have proven to be efficient and durable conduits, have been widely used in cardiovascular surgery. However, late graft failures involving infection, anastomotic pseudoaneurysm, aneurysmal dilatation, or graft rupture are known to occur with them. We report an interesting case of rupture of a double-velour knitted Dacron graft that had been implanted in the descending aorta over 20 years previously.

Clinical Summary

A 67-year-old man who had been diagnosed with Marfan syndrome underwent a Bentall operation for annulo-aortic ectasia and aortic regurgitation in 1982. In the same year, he had acute aortic dissection of DeBakey type IIIb, and the descending aorta was replaced with a 20-mm Cooley double-velour knitted Dacron graft (Meadox Medicals, Inc, Oakland, NJ). In 2000, a dissecting abdominal aortic aneurysm was replaced with a collagen-impregnated knitted bifurcated Dacron graft. He continued to be carefully followed up in the outpatient clinic. In 2005, computed tomographic (CT) scan revealed marked enlargement of the descending aortic graft from 39 mm to 50 mm in diameter over a 16-month period. In addition, the distal anastomosis in the previous operation site exhibited stenosis, with a diameter of 11 mm (Figure 1). We planned replacement of the dilated graft with partial cardiopulmonary bypass through a left thoracotomy. At operation, a longitudinal laceration of the prosthetic graft was found at the site of proximal anastomosis from the previous operation (Figure 2). This finding coincided with that on preoperative CT scan (Figure 1), although definitive diagnosis of the graft rupture had not been possible before the operation. Organization of fibrous tissue was noted at the site of anastomosis, causing narrowing of the lumen. The stenotic portion was removed completely and a gelatin-impregnated triaxial knitted Dacron prosthesis (Terumo-Vascutek, Renfrewshire, Scotland, UK) was implanted. Due to bleeding tendency, we used this graft with zero porosity. The postoperative recovery was uneventful.

Discussion

Cooley, Subram, and Houchin¹ evaluated 1040 Meadox-Cooley double-velour knitted Dacron grafts and obtained no evidence of dilation or aneurysmal change in 911 grafts over a 4-year follow-up period. However, Nucho and Gryboski² described the occurrence of dilatation or aneurysmal change and rupture of double-velour knitted Dacron grafts over a longer follow-up period and reported that aneurysms of double-velour knitted Dacron grafts resulted from degeneration of the graft fiber. In addition, Kawata and associates³ described another mechanism of degeneration of round black yarn used as the guideline, which caused nonanastomotic rupture of a double-velour Dacron thoracic aortic graft.

In the present case, graft rupture occurred in the late stage, 23 years after the initial operation. Rupture was probably caused by degeneration of graft fibers over a long period of time, as in the mechanism described above. Additionally, the severe stenosis at the distal site of anastomosis might have been related to the rupture. This graft failure was

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Figure 1. Three-dimensional CT scan reveals enlargement of the descending aorta graft to 50 mm in diameter. In addition, the distal site of anastomosis exhibits stenotic change, with a diameter of 11 mm. The *white arrow* indicates a longitudinal tear of the graft.

found on regular yearly follow-up CT scans. Moreover, 3-dimensional CT scan clearly revealed the site of tearing of the graft. Regular evaluation is necessary for all patients with double-velour knitted Dacron grafts, even in the late stage after surgery, and CT scan is a useful modality for follow-up of thoracic aortic prostheses.

Figure 2. Organization of fibrous tissue was found at the site of anastomosis (*white arrows*). At the proximal site of the stenosis, the graft was longitudinally torn (*black arrows*).

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