Stent-graft detachment from aortic wall after stent-graft repair of acute aortic dissection

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Preliminary studies have demonstrated that stent-graft repair is an attractive method for treatment of aortic dissection. However, few reports have described long-term results. A 72-year-old woman with acute type B aortic dissection underwent stent-graft repair. The entry was closed, and the false lumen disappeared completely. The postoperative course was uneventful for 4 years 5 months, when detachment of the stent graft from the aortic wall was noted. Because the device appears to be stable, follow-up is on an outpatient basis. (J Vasc Surg 2003;38:1130-1.)

Stent-graft repair is now being used for treatment of both acute and chronic aortic dissection. Preliminary studies have demonstrated its feasibility and safety, although patient populations have been small.[1,2] We report a case in which a novel complication developed after stent-graft repair of acute dissection.

CASE REPORT

A 72-year-old woman was admitted to our hospital with sudden chest pain. Emergent computed tomography (CT) scans revealed that a Stanford type B aortic dissection. The diameter of the proximal descending thoracic aorta was 42 mm. The patient's blood pressure was well controlled immediately after prompt initiation of medical treatment with a vasodilator. Although there were no complications related to dissection, such as visceral ischemia, entry closure with a stent graft was indicated to avert aneurysmal expansion of the aorta as a late complication.

Aortograms obtained on the day after diagnosis showed that the entry tear was located 18 mm distal to the origin of the left subclavian artery (Fig 1). The aortic diameter immediately proximal to the origin of the left subclavian artery was 30 mm, at the level of the entry tear was 42 mm, and 7.5 cm distal to the left subclavian artery was 35 mm, as measured on CT scans. The diameter of the true lumen at the level of the entry tear was 22 mm, and 7.5 cm distal to the left subclavian artery was 18 mm, as measured on left anterior oblique aortograms.

A stent graft was placed on the third day after diagnosis. The stent graft used was constructed from a modified Z-stent covered with expandable polytetrafluoroethylene. Because the dissecting process extended to the level of the origin of the left subclavian artery, the aorta was deemed dilated somewhat, compared with the original diameter. Therefore we decided to use a stent graft, 30 mm in diameter and 7.5 cm long. The stent graft was successfully placed without complications. A completion aortogram showed complete closure of the entry tear, although the top end of the stent graft was not in close apposition to the aortic wall, but protruded into the aortic lumen at the lesser curvature (Fig 2). Follow-up CT scans showed complete thrombosis and shrinkage of the false lumen. The postoperative course was uneventful, and the patient was discharged on the 25th postoperative day.

The patient was well for 4 years 5 months, when she complained of dyspnea. Heart failure was suspected, and cardiac catheterization was performed. Aortograms of the proximal descending aorta, obtained at cardiac catheterization, showed detachment of the stent graft from the aortic wall at the lesser curvature, although it was still in apposition to the aortic wall at the greater curvature (Fig 3). The aortic diameter immediately proximal to the origin of the left subclavian artery, at the level of the entry tear, and 7.5 cm distal to the left subclavian artery was 30 mm, as measured on left anterior oblique aortograms. The diameter of the stent graft was 30 mm at the top end, the same as at stent-graft repair. The diameter of the stent graft in the middle and at the bottom end was 25 mm, also the same as at stent-graft repair.

Inasmuch as the stent graft appeared to be stable in the proximal descending aorta, and cardiac catheterization demonstrated no significant signs of heart failure, the patient was discharged and is currently being followed up as an outpatient.

DISCUSSION

Few reports have described clinical experience with stent-graft repair of acute aortic dissection. We first reported the feasibility and safety of endovascular stent grafting for treatment of acute dissection in 19 patients.[1] Complete entry closure was achieved in all patients, and overall survival was 80%. In addition, neither aortic rupture nor aneurysm formation was observed during a short follow-up. However, it has recently been reported that saccular aneurysms may develop in the descending thoracic aorta after stent grafting for treatment of acute dissection.[3] Some of these aneurysms were caused by mechanical irritation from the edges of Z-stents that had been improperly positioned against the aortic wall.

In the present case, detachment of the stent graft can be explained by shrinkage of the false lumen and poor apposition of the stent graft. The false lumen may potentially

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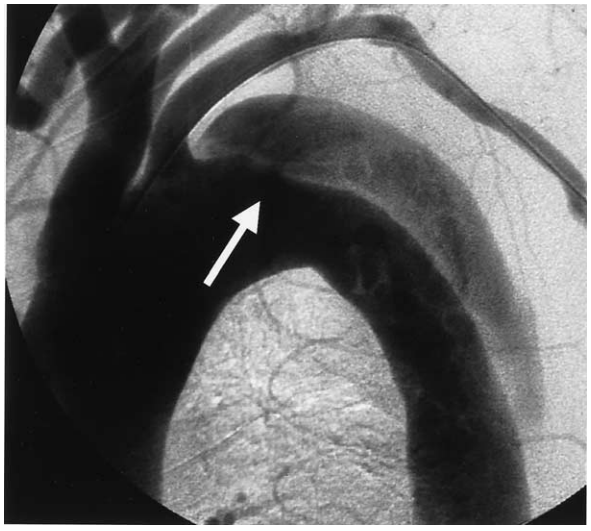

Fig 1. Aortogram obtained before stent-graft placement shows entry tear *(arrow)* in proximal descending thoracic aorta.

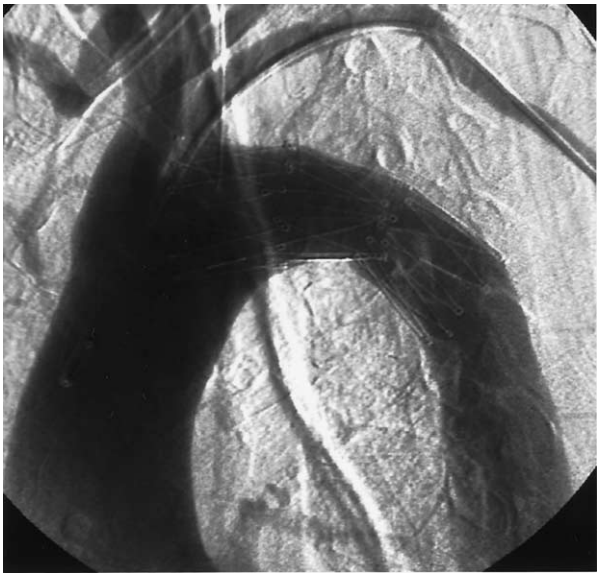

Fig 2. Aortogram obtained 3 weeks after stent-graft placement shows complete closure of entry tear, although top end of stent graft is not in close apposition to aortic wall, but protrudes into aortic lumen at lesser curvature.

become thrombosed and shrink after closure of the entry tear.[1,2] In the present case, the false lumen, located at the greater curvature of the proximal descending aorta, was completely thrombosed and disappeared. At the same time, the stent graft shifted toward the greater curvature, because

Fig 3. Aortogram obtained 4 years 5 months after stent-graft placement shows detachment of stent graft from aortic wall at lesser curvature.

the top end of the stent graft protruded into the aortic lumen at the lesser curvature and blood flow pressed it upward, together with the entire stent graft. Use of a more flexible stent graft, providing a closer fit to the proximal landing zone, might have prevented this complication. Another choice is to place the stent graft so that the top end reaches the undissected portion of the aorta after creation of a carotid-subclavian bypass graft.

Although it is not known why the stent graft failed to expand fully in the middle or at the bottom end, blood flow between the stent graft and the aortic wall might have had a role.

In conclusion, close follow-up for as long as possible should be mandatory, even in patients with successful repair of acute dissection with stent grafts, if Z-stent grafts are used, particularly if the stent grafts are placed in curved segments.

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