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ENDOVASCULAR STENT-GRAFTING VIA THE AORTIC ARCH FOR CHRONIC AORTIC DISSECTION COMBINED WITH CORONARY ARTERY BYPASS GRAFTING

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Endovascular stent-grafting is a new method for repairing an aneurysm of the descending aorta. In most cases, the stent-graft is inserted percutaneously through a catheter via the femoral artery. We describe a patient with triple coronary vessel disease and chronic aortic dissection in the descending aorta, who underwent operation simultaneously for the treatment of the coronary artery disease and the dissecting aneurysm with an endovascular stent-graft introduced into the descending thoracic aorta via a small incision on the aortic arch.

Clinical summary. The patient was a 74-year-old woman with unstable angina. Coronary catheterization and aortography revealed severe triple vessel disease, an abdominal aortic aneurysm, and the thoracic aortic dissection that extended from the left subclavian artery to the end of the abdominal aorta with an intimal laceration in the descending thoracic aorta below the left subclavian artery (Fig 1, *A*). Although endovascular stent-grafting via the femoral artery was preferable, there was an abdominal aortic aneurysm and kinking of both iliac arteries. Therefore, endovascular stent-grafting via the femoral artery was dangerous, and simultaneous coronary artery bypass grafting and endovascular stent-grafting via the arch aorta was preferable. The operation was performed with a median sternotomy. Extracorporeal circulation was established with aortic cannulation through the ascending aorta and venous drainage by way of the right atrium. During cooling of the body temperature to 25°C, coronary artery bypass grafting was performed with the left internal thoracic artery, the saphenous vein to the left anterior descending artery, and the left circumflex coronary artery, respectively. Hypothermic circulatory arrest was instituted at a rectal temperature of 25°C. The small aortotomy was performed on the anterior wall of the aortic arch and extended to the root of the left subclavian artery. A stent-graft was constructed from a self-expanding Gianturco stainless-steel Z stent (Cook, Inc, Bloomington, Ind) and a thin-walled woven Dacron vascular graft (porosity 250 mL; Intervascular, Inc, Clearwater, Fla). The Z stent was covered with the distal part of the vascular graft with a diameter of 24 mm and fixed to the graft wall with several interrupted sutures. The stent-graft was introduced into a sheath catheter with a 30F diameter. The sheath catheter was then inserted into the descending thoracic aorta, and the stent-graft was delivered into the true lumen of the descending aorta

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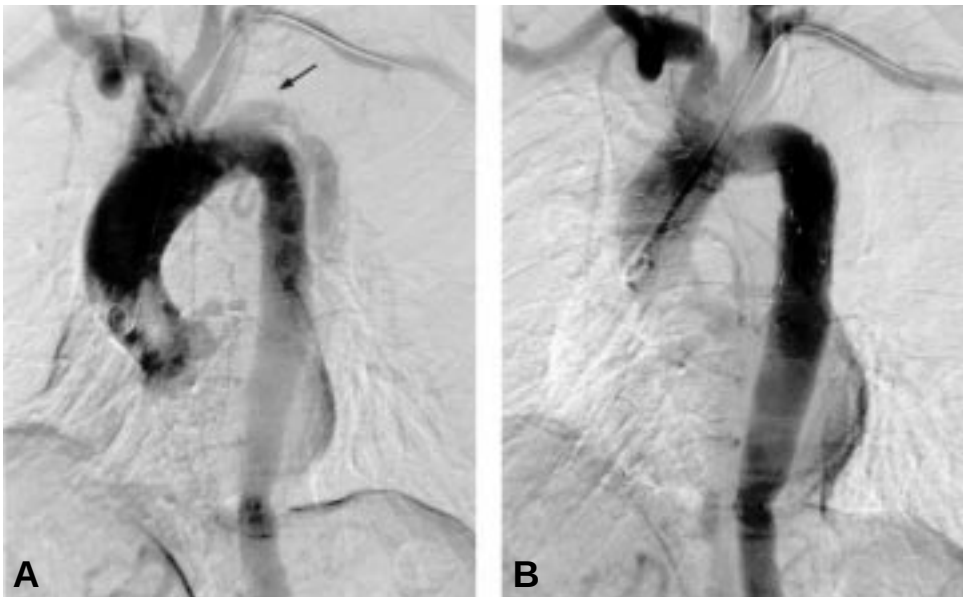

Fig 1. Preoperative and postoperative aortography. **A**, Preoperative angiography showed thoracic aortic dissection extending from the left subclavian artery to the end of the abdominal aorta with an intimal laceration in the descending thoracic aorta below the left subclavian artery (*arrow*). **B**, Postoperative aortography revealed that the dissecting lumen was closed by the endovascular stent-graft.

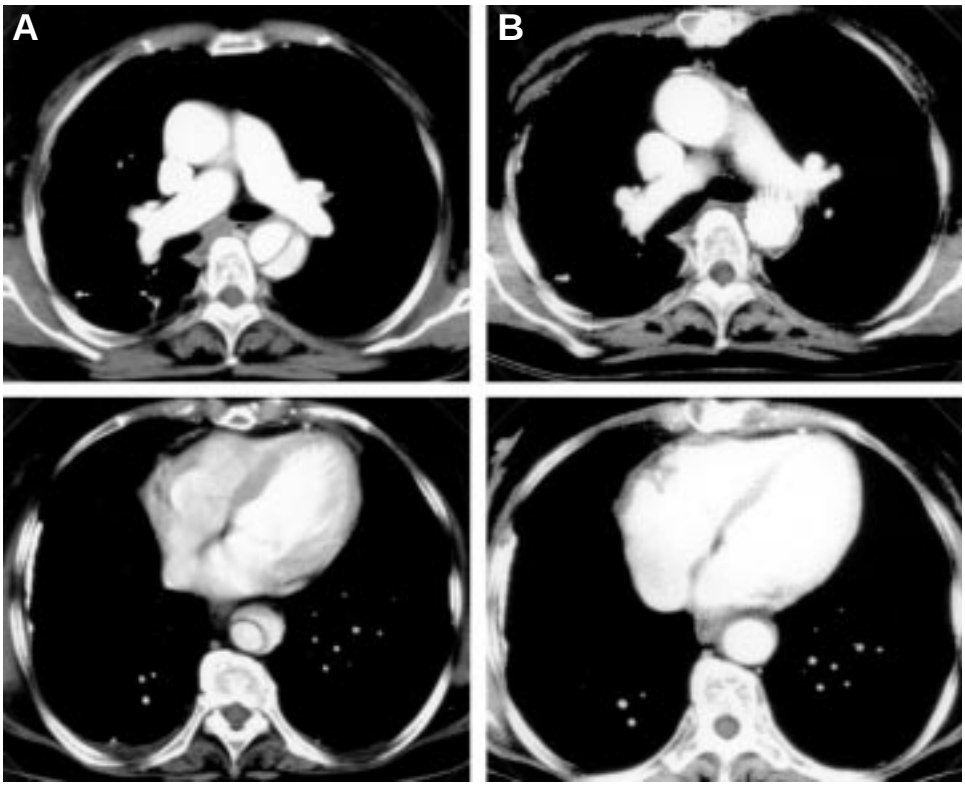

Fig 2. Contrast-enhanced computed tomography scans. **A**, Preoperative contrast-enhanced computed tomography scans demonstrated aortic dissection in the descending aorta. **B**, Contrast-enhanced computed tomography scans after the stent-graft repair showed complete elimination of the false lumen through the descending aorta.

beyond the entry of the aortic dissection under the guide of transesophageal echocardiography. After the stent-graft was delivered, the graft was trimmed in size, and the posterior wall of the proximal end of the stent-graft was sutured onto the posterior wall of the aortic arch just distal to the left subclavian artery. The incision orifice of the aortic arch was closed with the anterior wall of the endovascular graft by interrupted buttress sutures. The body was rewarmed, and the heart pulsated spontaneously. Extracorporeal circulation time and aortic crossclamping time were 294 minutes and 162 minutes, respectively.

The postoperative course was uneventful. Aortography revealed that the dissecting lumen was closed by the endovascular stent-graft (Fig 1, *B*,) and all bypass grafts were patent without stenosis. Contrast-enhanced computed tomography showed total elimination of the false lumen and enlargement of the true lumen in the descending thoracic aorta (Fig 2). She also underwent an operation to treat the abdominal aortic aneurysm 25 days after the endovascular stent-grafting and was discharged from our hospital 20 days after the abdominal aortic operation without any complications.

Discussion. Endovascular stent-grafting for aneurysms of the descending thoracic aorta is less invasive than the standard prosthetic replacement. Mitchell and associates[1] reported the feasibility of endovascular stent-grafting for aneurysms of the descending thoracic aorta through a catheter inserted from the femoral artery. They also applied stent-grafting in the treatment of aortic dissections with obliteration of the true lumen.[2] However, this method is very difficult in the case of abdominal aortic aneurysm and iliac arterial kinking.[3] In addition, this case required coronary artery bypass grafting. Accordingly, we applied endovascular stent-grafting by way of the the aortic arch for aortic dissection in the descending aorta during coronary artery bypass grafting. This alternative method has many advantages, including decreased bleeding from the small aortotomy, shortage of operative time, and no damage to the left recurrent nerve. In type B aortic dissection, stent-graft coverage of the proximal entry point may be sufficient, with subsequent thrombosis of the false lumen, as suggested by previous clinical experience in operative graft replacement. This approach could be used for the entire aneurysmal enlargement of the descending thoracic aorta instead of the second stage of an elephant trunk–type of repair, allowing completion of this procedure in a much shorter operative time.

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