SHORT REPORT

Extraanatomic Visceral Bypass for Consecutive Endovascular Treatment of a Thoracoabdominal Aortic Aneurysm

R. Gottardi, 1 D. Zimpfer, 1 T. Holzenbein, 2 M. Schoder, 3 M. Funovics, 3 J. Lammer, 3 E. Wolner, 1 M. Grimm 1 and M. Czerny 1*

Departments of 1Cardiothoracic Surgery, 2Vascular Surgery and 3Interventional Radiology, University of Vienna Medical School, Vienna, Austria

Endovascular stent-graft placement is an accepted treatment for various diseases of the thoracic aorta. However, visceral rerouting, in order to gain sufficient distal length to safely deploy the stent-graft in patients with distal aneurysm extension, has not been reported often in the literature.

We report on the case of an 82-year-old patient with two aneurysms of the descending aorta and involvement of the celiac trunk. The patient was treated by an autologous renal to hepatic artery bypass and consecutive stent-graft placement.

In selected patients, extraanatomic visceral bypass and consecutive stent-graft placement can be a less invasive alternative to conventional approaches.

Keywords: Endovascular stent-graft placement; Thoracic aorta; Visceral rerouting.

Introduction

Conventional surgical repair of thoracoabdominal aortic aneurysms is associated with substantial risk, especially in elderly patients with multiple comorbidities. 1 Endovascular stent-graft placement is a safe and effective treatment in various diseases of the thoracic aorta. 2 The main aim of rerouting of the arch vessels is to gain sufficient proximal length to safely deploy the stent-graft. However, few reports of visceral extraanatomic bypass grafting in order to gain sufficient distal length to safely deploy the stent-graft are available. 3

Report

We report on the case of an 82-year-old patient with two sequential aneurysms. The first aneurysm had an extension from the mid-third of the descending aorta up to the thoracoabdominal transition, the second aneurysm originated 5 cm distally involving the celiac trunk (Fig. 1). Both aneurysms had a maximum diameter of 7 cm at the time of diagnosis. Due to the patient’s age and significant comorbidities, a conventional surgical approach was deemed not suitable. Therefore, an alternative approach was chosen.

After a subcostal arch incision and opening of the peritoneum, the visceral structures were everted medially and the retroperitoneum was opened. The right renal artery was circumferentially dissected and encircled with vessel loops. Afterwards the hepatic artery was exposed. The common hepatic, gastroduodenal and proper hepatic arteries were circumferentially dissected and slung with vessel loops. Simultaneously, a segment of the great saphenous vein was harvested. After systemic heparinization with 80 IU/kg body weight, the right renal artery was clamped, longitudinally opened and an anastomosis between the right renal artery and the great saphenous vein was performed. Afterwards, the common hepatic artery was clamped, longitudinally opened and the second anastomosis between the common hepatic artery and the great saphenous vein was performed.
Finally, the celiac trunk was ligated at its origin and the wound closed in layers.

After a recovery period of 23 days, the patient was taken to the interventional radiologists’ suite. After achievement of general anesthesia, the right common femoral artery was dissected free. Initially, a 5-French calibrated angiographic pigtail catheter was advanced via the right brachial artery into the ascending aorta to reconfirm characterization of the morphology and extent of the aneurysms. After systemic heparinization with 80 IU/kg bodyweight, a common femoral artery arteriotomy was performed and the delivery system was advanced under fluoroscopic guidance until the tip reached the proximal portion of the descending aorta. Afterwards, a 37/200 mm and a 37/100 mm Excluder prosthesis (Gore, Phoenix, AZ, USA) were inserted into the thoracoabdominal aorta. Follow up CT-scan after 8 weeks revealed regular perfusion of the visceral vessels and no signs of an endoleak (Fig. 2).

Discussion

To our knowledge, this is the first report in the literature where an extraanatomic visceral bypass has been performed in order to gain a sufficient distal
landing zone to safely deploy a stent-graft for exclusion of a thoracoabdominal aortic aneurysm. The main advantage of this combined approach is the avoidance of conventional repair. Risk factors for serious adverse events after conventional repair remained constant over the last decade. Due to the patients’ age, and substantial comorbidities such as coronary artery disease, impaired left ventricular function and diabetes, a conventional approach was deemed not suitable in this particular case. Endovascular stent-graft placement has developed as a safe and effective treatment modality in various diseases of the entire thoracic aorta. Recently, sophisticated surgical procedures have enabled extension of endovascular stent-graft placement even into the ascending aorta after entire supraaortic rerouting. However, experience with regard to visceral rerouting for distal extension of stent-graft placement in thoracoabdominal aortic aneurysms is rare. Hepato-renal bypass grafting has been developed in order to restore renal blood flow in patients with renal artery occlusive disease revealing favourable patency rates. We modified this concept and hypothesized that the opposite direction of blood flow should be equally effective. No elevation of serum creatinine levels or serum hepatic enzymes has been observed. We have chosen an autologous conduit (great saphenous vein) for this extraanatomic bypass procedure as our department has a strong preference using autologous graft material and this method may prevent late complications such as chronic arrosion of the intestine. Additionally, patency rates may be superior compared to alloplastic graft material and the invasiveness of the procedure is not extended as the required segment of the saphenous vein is short and the harvesting is carried out easily.

Summarizing, this combined approach enables successful treatment in elderly and multimorbid patients with thoracoabdominal aortic aneurysms involving the origin of the celiac trunk, which would not have been treated to date due to the calculated excessive high risk.

References


Accepted 16 November 2005