SHORT REPORT

Surgical and Subsequent Endovascular Treatment of a False Aneurysm of the Aortic Arch

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Key Words: False aneurysm; Aortic Arch; Covered stent graft; Surgical bypass.

Introduction

Redo surgery of the aortic arch in elderly patients in poor health is associated with a high mortality. This region of the aorta cannot always be treated using endovascular stents. We report our experience with a surgical case of a false anastomotic aneurysm of the aortic arch, treated by open surgery and subsequent endovascular surgery.

Case Report

A 74-year-old patient with a persistent hiccough underwent a routine medical examination. He had undergone an aortic valve replacement in 1982 followed by a Bentall procedure and an aortic arch replacement in 1986 due to a dissection. Radiography and the thoracic computerized tomography revealed a false aneurysm of the distal anastomosis of the aortic arch, fed by a localized leak at the origin of the brachiocephalic trunk (Fig. 1). The neck between the leak and the brachiocephalic trunk was 0.7 cm. An endovascular procedure as the first option was considered because of the patient’s medical history and his precarious coronary condition.

First, via a cervical approach, the left subclavian artery was reimplanted into the left common carotid artery, a carotid–carotid bypass graft and exclusion of the left common carotid artery were achieved. A postoperative surgical haemostasis and a blood transfusion were both required. Postoperative complications included a left recurrent laryngeal nerve paralysis, pneumonia, and the onset of atrial fibrillation. Because of these complications we waited 6 months before carrying out the endovascular procedure.

At the second procedure an occlusion balloon was first placed in the left subclavian artery to prevent retrograde perfusion from the collaterals from feeding...
an endoleak. A Talent endoprosthesis (Medtronic/AVE, Santa Rosa, CA) was installed with its covered portion positioned immediately downstream of the brachiocephalic trunk ostium (Fig. 2). Postoperative follow-up proved uneventful. Transesophageal echocardiography and a CT scan at 1 week revealed successful exclusion of the false aneurysm and a Type 1 leak at the proximal portion of the endoprosthesis.

Three months later, the patient was well, despite the persistence of his hiccoughs for 1–2 h daily, while being treated with chlorpromazine. As a spontaneous thrombosis of the sac did not occur, we successfully undertook the embolization of the periprosthetic leak with the aid of coils (Fig. 3). The coils create artefacts on CT-scan, so follow-up imaging relies on serial colour-coded echocardiography. At 7 months the sac remains thrombosed and the patient’s condition is good. This case demonstrates that, in selected patients, treatment of aortic arch lesions using an endovascular approach can be realized with the prerequisite bypass surgery.

Discussion

The poor prognosis for certain lesions of the thoracic aorta, notably in patients with poor health, has led to the development of minimally invasive endovascular techniques for treatment. However, the endovascular treatment of lesions of the aortic arch is difficult because of the presence of vital supra-aortic branches which cannot be occluded. Consequently, solutions have been devised to resolve these challenges.

One solution consists of utilizing the Inoue branched stent graft. This group reports the use of a single-branched stent graft endoprosthesis (for the left subclavian artery) or a three-branched stent graft

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Fig. 2. Arteriography: placement of the covered stent graft endoprosthesis paving the origin of the left common carotid artery and left subclavian artery. Note the re-implantation of the left subclavian artery (white arrow) into the left common carotid artery and the carotid–carotid bypass graft (black arrow).

Fig. 3. Left: arteriography revealing a Type 1 leak at the proximal portion of the endoprosthesis feeding the false aneurysm (arrow). Right: arteriography during embolization with coils in the false aneurysm. Note the peroperative transesophageal echocardiography.
endoprosthesis (for the three supra-aortic branches). However, these stent graft endoprosthesis are very precisely tailored, and as such offer very little flexibility in positioning since their positioning is limited by the location of the branches. They are also therefore of limited use in an emergency.

Surgical transposition or surgical isolation and bypass of the supra-aortic branches allows, at a second operation, for the lining of the diseased area with a covered stent graft endoprosthesis. This technique takes longer because of the two interventions. However, it offers therapeutic possibilities that are much more varied: Criado et al. described the possibility of paving one, two, or three supra-aortic branches (flow to supra-aortic branches via a femoro-axillary bypass). A straight graft is used in all these cases; it is the surgical bypass that must be tailored to suit the chosen implantation zone for the covered stent graft. Moreover, imperfections in the surgical result, or in the positioning of the stent graft endoprosthesis may be remedied through an endovascular intervention.

In the case of lesions of the aortic arch, in patients in poor health, we believe that treatment by covered stent graft endoprosthesis is preferable to conventional surgery. We favour an extra-anatomic surgical bypass, followed by an endovascular second step.

References


Accepted 25 November 2003