

Successful Surgical Abdominal Aortic Debranching Preceding Stent Graft Implantation: A Case Report

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Thorac Cardiovasc Surg Rep 2018;7:e24–e26.

Abstract

Keywords

- ▶ TEVAR
- ▶ abdominal debranching
- ▶ celiac trunk
- ▶ perforated aortic aneurysm

Background Acute endovascular aneurysm repair with stent grafts (thoracic endovascular aortic repair [TEVAR]) is safe and feasible.

Case Description A 64-year-old female presented with a perforated aortic aneurysm of the thoracic descending aorta. Primary TEVAR resulted in good management of the perforation but a type Ib endoleakage remained postoperatively. To place another stent, abdominal debranching with saphenous vein bypass to the celiac trunk was required. In the same session, another endograft was inserted successfully.

Conclusion Abdominal debranching is a safe alternative to open aortic repair in acute thoracic and abdominal aneurysms, instead of waiting for a custom-made device.

Introduction

The incidence of rupture in descending thoracic aortic aneurysms is described as 5 per 100,000, with a mortality rate of 97 to 100%.¹ The predominant risk factor is hypertension.¹ Treatment with thoracic endovascular aortic repair (TEVAR) has demonstrated a lower morbidity and mortality than conventional surgery.² Aortic anatomy is sometimes a limitation for TEVAR but new options have become available in the last years. Endoleaks, however, present an unpredictable problem. Fenestrated or branched prostheses are an option, have to be custom-made, and are not helpful in an acute or subacute setting. Snorkels and chimneys can solve this problem but tend to have type I endoleaks, and a slightly higher complication rate than fenestrated endovascular aneurysm repair (EVAR).³ As an alternative, overstenting of major vessels is a good solution provided that debranching is performed before or during the procedure.

Case Description

A 64-year-old female with a history of hypertension, hypercholesterolemia, and obesity presented with back pain

and dyspnea. Earlier external diagnosis included spinal magnetic resonance imaging showing a descending thoracoabdominal aortic aneurysm. A computed tomography (CT) led to the diagnosis of a covered ventral aortic perforation of the descending thoracic aorta approximately 5 cm above the diaphragm (▶ Fig. 1).

Taking the possible landing zones right below the left subclavian artery and cranially above the celiac trunk into account, we placed a thoracic stent graft (Bolton Medical Relay NBS Thoracic Stentgraft 36 × 199 mm, Sunrise, Florida, United States) into the descending aorta. The stent graft was then extended with a second graft (Bolton Medical Relay NBS 38 × 154 mm). A type Ib endoleak was initially treated with balloon dilatation of the second prosthesis. Back pain receded. Postinterventional CT scan showed a small endoleak initially understood as type II (▶ Fig. 2).

Within 1 month the patient was hospitalized for recurrent pain. The endoleak now presented as severe type Ib. Sealing of the endoleak by extension with another short graft failed due to shortening of the stent during release and therefore missing its optimal position just above the celiac trunk by 5 mm. Thus, another extension was necessary. In a hybrid procedure, a venous bypass from the caudal abdominal aorta to the celiac

received
January 2, 2018
accepted after revision
May 2, 2018

DOI <https://doi.org/10.1055/s-0038-1660834>
ISSN 2194-7635.

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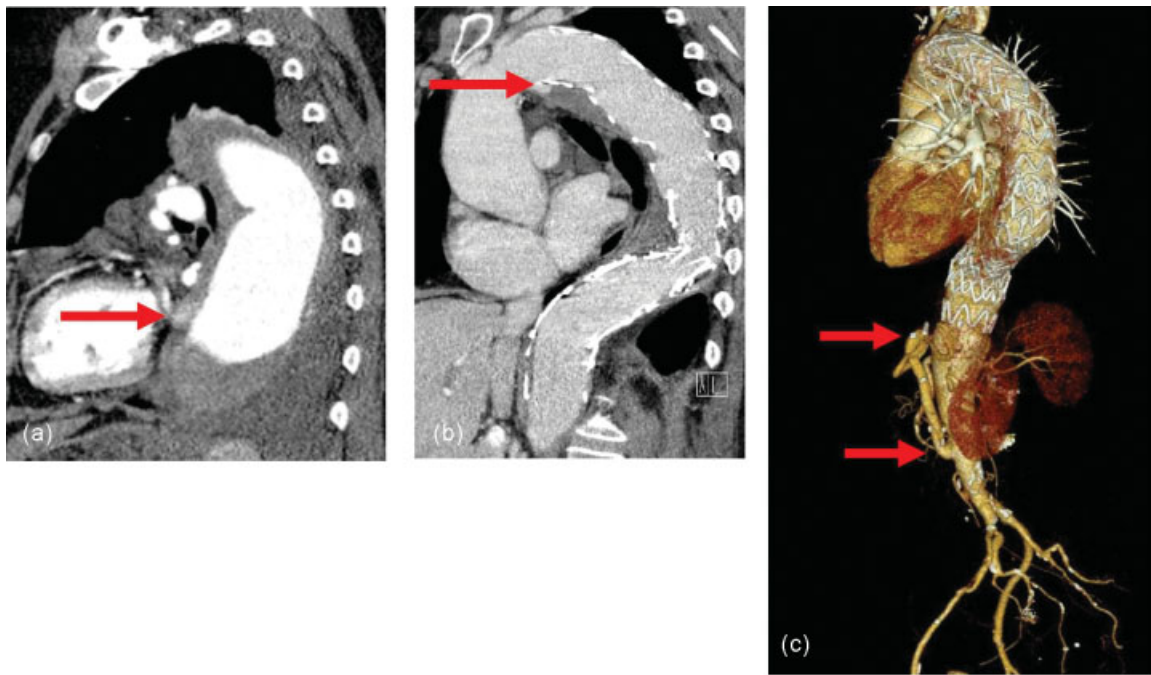


Fig. 1 (a) Initial computed tomography (CT) scan showing main part of the aneurysm in descending aorta, arrow points to perforation. (b) Aneurysm of the ascending aorta after 1 year. Arrow points to localized dilatation. (c) Result: Outer diameter of the aneurysm started to recede. Arrows show proximal and distal anastomosis of the celiac trunk bypass.

trunk was placed via median laparotomy followed by implantation of a fourth stent introduced via the abdominal aorta in the same session excluding the celiac trunk as expected (Bolton Medical Relay Plus $42 \times 105 \times 42$ mm). A peroneal palsy of the right foot was noted but decreased over time. The patient was discharged 2 weeks after the procedure, with planned follow-up at 3, 9, and 12 months and annual controls thereafter.

After 1 year, an aneurysm of the ascending aorta showed an increase in diameter of 1 cm reaching 5.6 cm in total extending to the landing zone of the first TEVAR (→ Fig. 1). We performed supracoronary replacement of the ascending aorta and aortic arch with a hybrid prosthesis (Jotec, Evita Open, 36 mm, Jotec, Hechingen, Germany) under circulatory arrest connecting the stented part of this graft with the TEVAR. After an uneventful postoperative course the patient was discharged home.

Discussion

We describe a case of overstenting the celiac trunk with a TEVAR after debranching in a large thoracoabdominal aneurysm with a contained rupture. Adequate and close follow-up in TEVAR is necessary to detect further problems. Positioning of a TEVAR is always delicate owing to potential impairment of major arterial branches.⁴ Particularly in patients with acute symptoms and a complicated anatomy abdominal debranching is a safe option and offers an avenue out of the dilemma of a prolonged and thus potentially risky waiting time for a custom-made prosthesis with fenestrations and/or chimneys.^{5,6} In case of acute rupture, the mortality for EVAR is described as 40% versus 62.5% in surgically treated patients.⁷ There is no long-term data about mortality and endoleaks in snorkels and chimneys. Patency of visceral grafts is described as 97% after 19.3 months and 30-day mortality is 0 to 34% in the literature.⁸⁻¹⁰ We chose a hybrid

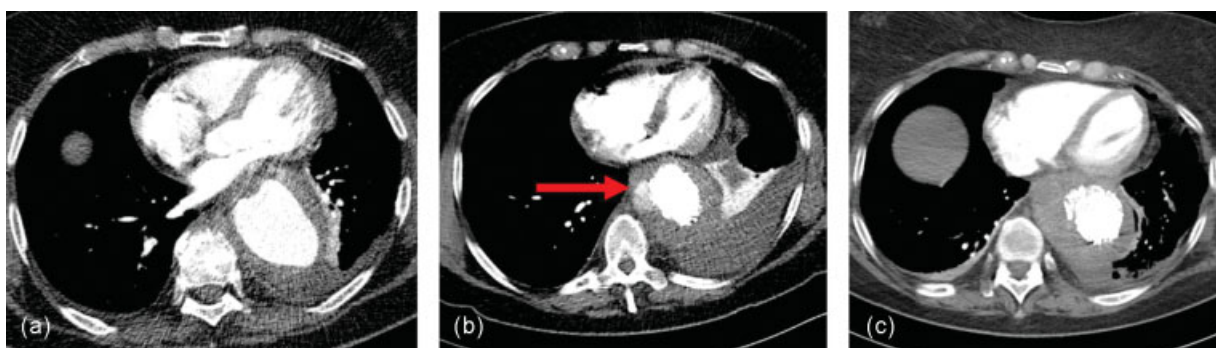


Fig. 2 (a) Before procedure. (b) After the first procedure. Arrow shows endoleak. (c) Final result after three procedures and aorticoceliac bypass. No enhancement of contrast medium. Thrombus is solid, total exclusion of aneurysm.

procedure in this young patient, expecting it to be the option with the best long-term outcome with no endoleaks.³ While available evidence is mostly anecdotal, the favorable outcome of our patient with abdominal bypass and TEVAR occluding the celiac trunk for treatment of a persisting endoleak is encouraging.

Note

The article was presented in annual meeting, DGTHG Leipzig, Germany, February 13, 2017.

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