Hybrid repair of rare type IIIb endoleaks from an abdominal endograft: repeatedly undetected endoleaks

Yoshimasa Seike*, Toshiya Nishibe, Hitoshi Ogino and Nobusato Koizumi

Department of Cardiovascular Surgery, Tokyo Medical University, Tokyo, Japan

* Corresponding author. Department of Cardiovascular Surgery, Tokyo Medical University, 6-7-1 Nishishinjuku, Shinjuku-ku, Tokyo 160-0023, Japan. Tel/fax: +81-03-33426111; e-mail: ys46421g@ncvc.go.jp (Y. Seike).

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Abstract

We report a rare case of massive type IIIb endoleaks from an abdominal endograft, which were difficult to diagnose and required hybrid repair (including open surgery). The patient had previously undergone three catheter interventions for type Ia and II endoleaks after abdominal endografting. However, the abdominal aortic aneurysm gradually enlarged and required hybrid treatment (including an open repair), to successfully perform aneurysmorrhaphy and additional endograft insertions for the massive type IIIb endoleaks.

Keywords: Hybrid repair • Type IIIb endoleak • Abdominal endograft

INTRODUCTION

We present a case of rare type IIIb endoleaks that remained undetected on various examinations. During the open repair, significant type IIIb endoleak was found arising from the nitinol stent suture lines of the main body and legs of a Talent endograft.

CASE REPORT

An 81-year old man presented with an abdominal aortic aneurysm (AAA). His medical history included pulmonary emphysema and pancreaticoduodenectomy for pancreatic cancer. Computed tomography (CT) revealed AAA with a diameter of 51 mm. A Talent endovascular device (Medtronic AVE, Santa Rosa, CA, USA) was implanted in February 2011, and intraoperative angiography revealed no endoleaks. However, the follow-up CT revealed a type Ia endoleak and a 32-mm proximal cuff (Medtronic AVE) was successfully inserted.

In November 2012, CT revealed enlargement of the AAA sac (62 mm) without detectable endoleak (Fig. 1a). Subsequent angiography revealed a type II endoleak arising from the lumbar arteries, which was treated via catheter embolization with N-butyl cyanoacrylate (NBCA). In May 2013, CT revealed further enlargement of the AAA (65 mm) and a type II endoleak arising from the inferior mesenteric artery (IMA) to the lumbar arteries. Therefore, we performed catheter embolization with NBCA for the lumbar arteries and coil embolization for IMA. However, 8 months later, CT revealed further growth of the AAA sac (68 mm) without detectable endoleak (Fig. 1b) or abdominal ultrasound. Therefore, surgical conversion was selected.

The AAA was approached via a median laparotomy. Epiaortic ultrasonography revealed no remarkable endoleaks, although strong pulsation was observed in the AAA. As faint-type IIIb endoleak was detected at the level of the main body (via angiography after systemic heparinization), a 32-mm proximal cuff (W. L. Gore & Associates, Inc., Flagstaff, AZ, USA) was inserted into the main body, immediately above the flow divider of the Talent endograft. After deployment, the pulsation of the AAA sac weakened, although it did not disappear completely. Therefore, with an aortic occluding balloon on standby, the AAA sac was opened longitudinally. Multiple and considerable oozing type of bleeding was observed from the many fabric holes at the nitinol stent suture lines of the Talent endograft legs, and this were difficult to control surgically (Fig. 2). We then inserted excluder contralateral limbs (W. L. Gore & Associates, Inc.) into the bilateral legs of the previous endograft, and these successfully controlled the type IIIb endoleaks. The AAA sac was then closed via tight plication sutures. The postoperative course was uneventful, and the follow-up CT revealed showed no endoleaks in the AAA sac.

DISCUSSION

Type IIIb endoleaks are extremely rare complications of endovascular aneurysm repair (EVAR) that occur during the follow-up and are mainly caused by fabric defects [1]. High incidences of late complications after EVAR have been reported by several studies, including the first generation grafts [2, 3], although this complication appears to be less common with new-generation grafts. Previous studies have reported incidences of type III endoleaks ranges from 0.3 to 2.9%, and type IIIb endoleaks have reportedly occurred in several stent graft systems [2, 3].

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Talent endovascular devices are supported along their entire length with self-expanding nitinol stents that are joined by a nitinol spine. In our patient, the type IIIb endoleaks arose from the nitinol stent suture lines along the main body and legs of the endograft, although it is unclear why the suture line leakage occurred. Unfortunately, no similar reports have described this phenomenon. Nevertheless, it appears to be related to excessive pressure caused by ballooning after the deployment and subsequent suture break, due to a manufacturing defect. In addition, the patient’s age, post-surgical status (for a malignant tumour) and thrombocytopaenia appear to have delayed neointima formation inside the endograft, which might be related to the occurrence of these types of IIIb endoleaks. Moreover, all low-profile endograft designs with suture placement carry a risk of this complication, as the repetitive motion between the stent and graft may cause damage to the fabric, due to suture failure and suture-generated holes, and ultimately cause fibre separation.

The important aspect of this case was the difficulty that we encountered in diagnosing this rare complication of EVAR. The endoleaks that were caused by the suture line leakage produced pulsatile movements in the AAA, although these were too small to visualize clearly with any of the standard modalities (e.g. abdominal ultrasonography, CT or angiography). A previous study has reported that angiography was the most useful modality for diagnosing endoleaks [4], although this modality did not reveal the multiple oozing bleeding sites in the endograft fabric along the nitinol stent suture lines.

Type IIIb endoleaks should be treated in cases of enlarged AAA after EVAR, because direct endoleaks are associated with a risk of AAA rupture [2]. In this context, the adequate treatment (open vs endovascular) should be selected based on both the anatomical features and the patient’s background. As we had no evidence of endoleak before the hybrid repair, we performed the open surgical treatment to clarify and/or control the endoleaks. Subsequently, all
of the endoleaks were excluded from the endovascular treatments, and the AAA sac was plicated via aneurysmorrhaphy [5].

CONCLUSION

We encountered a rare type IIIb endoleak from a Talent abdominal endograft, which was difficult to diagnose before the open repair. In cases of an enlarging AAA sac, even in the absence of definitive endoleaks, the presence of type IIIb endoleaks should be considered.

Conflict of interest: none declared.

REFERENCES