Emergency endovascular graft repair of computed tomography-detected disruption of bilateral aorto-bi-iliac graft legs

Hiroto Kitahara*, Akihiro Yoshitake, Takashi Hachiya and Hideyuki Shimizu

Department of Cardiovascular Surgery, Keio University Hospital, Tokyo, Japan

* Corresponding author. Department of Cardiovascular Surgery, Keio University Hospital, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan. Tel: +81-8041995379; fax: +81-353793034; e-mail: kthhr11@gmail.com (H. Kitahara).

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Abstract

We report a case of endovascular repair of disruption of an aorto-bi-iliac graft detected by 4D computed tomography. An 83-year-old man with previous aorto-bi-iliac graft replacement was admitted to our institution with severe epigastric pain. A 4D computed tomography detected disruption within the fabric of both graft legs, and we performed emergency endovascular repair. The graft legs’ disruption sites were completely covered by stent grafts. On the 12th postoperative day, a balloon-expandable stent was added to diminish Type I endoleak. The patient was discharged in an ambulatory state on the 34th postoperative day.

Keywords: Dacron graft disruption • Aorto-bi-iliac graft replacement • Endovascular therapy • Emergency surgery

INTRODUCTION

Intrinsic Dacron graft disruption is a rare complication, occurring in approximately 3% of patients [1]. Although several cases of small-diameter graft disruptions, as used in an aorto-femoral bypass, have been reported, aorto-bi-iliac graft leg disruption is extremely rare. We report a case of endovascular repair of aorto-bi-iliac graft disruption, detected by 4D computed tomography (4D-CT). The patient gave permission to publish the features of his case, and his identity has been protected. This report was reviewed and approved by our institution’s Ethics Committee.

CASE REPORT

An 83-year-old man was admitted with severe epigastric pain. Ten years previously, he underwent an aorto-bi-iliac graft replacement for a ruptured abdominal aortic aneurysm using a 20 × 10 mm Gelsoft™ Plus, warp-knitted, Dacron graft (Vascutek Terumo, Scotland, UK). He had diabetes mellitus (HbA1c 6.5), chronic obstructive pulmonary disease and previous history of percutaneous coronary intervention. Contrast-enhanced CT showed extravasation of the contrast medium around the graft in the surrounding aortic sac (42 mm), which was larger than the previous CT finding (26 mm). The 4D-CT revealed disruptions within the fabric of the graft’s bilateral legs, 1.5 cm distal from the bifurcation in the right and 3 cm in the left leg (Fig. 1). There was no leakage on the distal anastomosis site. A sufficient landing zone for stent graft, >1 cm, was confirmed by 4D-CT. Endovascular repair was performed under general anaesthesia. Contrast leakage was not confirmed in aortography, which might be due to a time lag. Diameters of the previous graft legs were measured to be 12 mm (right) and 13 mm (left). An Endurant (Medtronic Vascular, Inc., Santa Rosa, CA, USA) stent graft’s legs were used, 13 mm (right) and 16 mm (left) in width. The stent-graft legs were delivered through the femoral arteries to cover the bilateral disruption sites. The tops of the stent grafts were delivered to the previous graft. These stent grafts were successively deployed within the graft. Aortography showed no leakage or obstruction. No blood transfusion was needed. The epigastric pain was completely diminished. On the 6th postoperative day, a routine CT scan detected a high-density area between the heads of the bilateral stent grafts. Correctional intervention was performed for Type 1 endoleak on the 12th postoperative day. An Express™ vascular LD stent (Boston Scientific, Marlborough MA, USA) 10 mm in width was used for adhering the stent graft to the Dacron graft more tightly. It was deployed within the right stent graft. Aortography detected no leakage. A postoperative CT scan detected well-positioned stent grafts with no leakage or obstruction (Fig. 2). The patient was discharged on the 34th postoperative day following resolution of surgical site infection. At the last follow-up (2.5 years), no complications had occurred.

DISCUSSION

To the best of our knowledge, this is the first report describing an endovascular repair for graft disruption following a 4D-CT. The authors stated that disruption occurred mostly along the dyed
guide or remeshing line. In the study by Shingu et al., open aortic repair for aorto-bifemoral graft disruption was described. The aneurysms existed in both legs of grafts; therefore, flexion and extension of the thigh may have affected the mechanical deterioration of the grafts [2]. In general, the mechanism of graft disruption is multifactorial and includes fabrication flaws, intraoperative damage (clamp, forceps), haematoma or infection-related deterioration and mechanical stress. There was suspicion that the original graft disruption was related to infection in the current case. We obtained blood cultures three times preoperatively, but all were negative. Considering the leak’s location, mechanical stress was not suitable. The cause of disruption might be due to the end of a product lifetime. Although his vital signs were stable, emergency surgery was applied due to severe pain and obvious leakage detected by 4D-CT. A 4D-CT could detect more accurately the location and direction vector of the leak, which helped us to differentiate from other types of leak (Type 2 endoleak). Moreover, there was no possibility to miss the timing of leakage. Endovascular repair was considered preferable to open surgery because the perioperative mortality rate for an elective revisional aortic surgery is 5.1% and increases to 88% in emergency situations [3]. Ofer et al. reported an elective endovascular repair for a left graft aneurysm 18 years after an aorto-bifemoral bypass for occlusive disease [4]. Sultan et al. reported 2 cases of endovascular aneurysm repair using aorto-uni-iliac graft and femoro-femoral crossover bypass for graft disruption [5]. In these cases, the disruption site was located generally in the aorto-femoral bypass graft, but the disruption site was not definitively localized. We were able to perform endovascular repair because preoperative 4D-CT detected the exact anatomical location of disruption and confirmed a sufficient landing zone. This currently rare complication may become more common, and patients require regular follow-up. Further investigations of similar graft disruptions cases to identify the efficacy of endovascular repair for graft disruption are needed.

Conflict of interest: none declared.

REFERENCES