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journal homepage: [www.casereports.com](http://www.casereports.com)External aortic wrap for repair of type 1 endoleak<sup>☆</sup>

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## ABSTRACT

**INTRODUCTION:** Type 1 endoleak is a rare complication after endovascular abdominal aortic aneurysm repair (EVAR) with a reported frequency up to 2.88%. It is a major risk factor for aneurysmal enlargement and rupture.

**PRESENTATION OF CASE:** We present a case of a 68 year old gentleman who was found to have a proximal type 1 endoleak with loss of graft wall apposition on routine surveillance imaging post-EVAR. An initial attempt at endovascular repair was unsuccessful. Given the patient's multiple medical co-morbidities, which precluded the possibility of conventional graft explantation and open repair, we performed a novel surgical technique which did not require aortic cross-clamping. A double-layered Dacron wrap was secured around the infra-renal aorta with Prolene sutures, effectively hoisting the posterior bulge to allow wall to graft apposition and excluding the endoleak. Post-operative CT angiogram showed resolution of the endoleak and a stable sac size.

**DISCUSSION:** Several anatomical factors need to be considered when this technique is proposed including aortic neck angulation, position of lumbar arteries and peri-aortic venous anatomy. While an external wrap technique has been investigated sporadically for vascular aneurysms, to our knowledge there is only one similar case in the literature.

**CONCLUSION:** Provided certain anatomical features are present, an external aortic wrap is a useful and successful option to manage type 1 endoleak in high-risk patients who are unsuitable for aortic clamping.

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## 1. Introduction

Endovascular abdominal aortic aneurysm repair (EVAR) has been increasingly performed as a less invasive alternative to open repair of abdominal aortic aneurysm pathology.<sup>1</sup> Type 1 endoleak is a significant but uncommon complication of EVAR and is associated with a high risk of aneurysm growth and potential rupture.<sup>2</sup> Treatment for type 1 endoleak commonly includes the use of proximal extension cuff and/or the use of a Palmaz® (Johnson & Johnson Interventional Systems Co., Warren, NJ) stent to maximize infra-renal aortic sealing and graft wall apposition. In cases where endovascular techniques are either unsuccessful or unfeasible, open revision techniques have been recommended and usually necessitate either graft explantation or open sac revision. We describe a successful case of surgical treatment for a proximal type

1 endoleak following EVAR, performed without the use of aortic clamping.

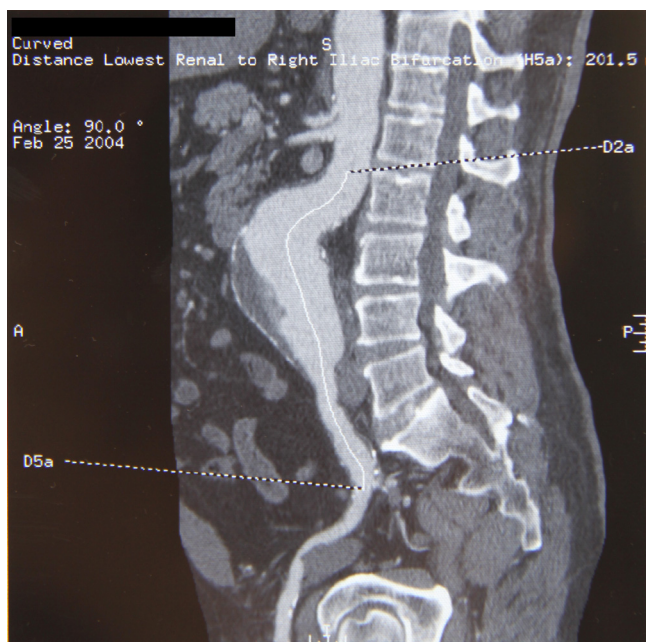
## 2. Presentation of case

A 68 year old gentleman underwent endovascular repair of a 6 cm diameter fusiform infra-renal aortic aneurysm using a Zenith® (Cook Medical, Bloomington, IN) bifurcated device in 2004. He presented to our clinic for review of routine surveillance computed tomography (CT) imaging. The CT angiogram demonstrated caudal graft migration, a proximal type 1 endoleak and loss of graft wall apposition due to ongoing posterior infra-renal neck dilatation, measuring approximately 10 mm. The aneurismal sac size had increased to 7.0 × 5.5 cm from 6.5 × 5.3 cm in 2009; the aneurismal neck was 28 mm in diameter. He had significant co-morbidities including cerebrovascular disease, severe obstructive sleep apnoea (OSA), ischaemic heart disease, type 2 diabetes mellitus, hypertension, hypercholesterolaemia, morbid obesity and a significant smoking history.

Review of his serial imaging confirmed 6 mm of infra-renal aortic neck in which a seal could potentially be achieved using endovascular techniques. As such, the patient was consented for an endovascular repair, being counselled that the risk of an

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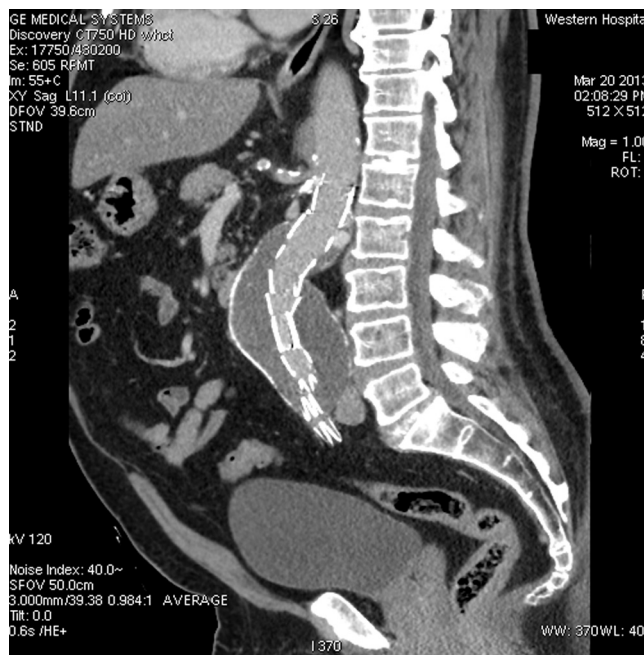
**Fig. 1.** CT scan sagittal slice, showing the infra-renal AAA prior to initial endovascular repair.

unsuccessful procedure and need for conversion to an open repair was high (Figs. 1–5).

He proceeded to undergo an attempt at endovascular salvage of the endoleak. Under general anaesthetic, he underwent a catheter angiogram which confirmed the CT findings of a posterior endoleak. An Endurant® (Medtronic, Inc., Minneapolis, MN) 28 mm × 49 mm cuff was deployed in the immediate infra-renal aortic neck with the graft material slightly protruding across the inferior aspect of both renal arteries to maximize seal. Despite aggressive balloon moulding, the type 1 endoleak persisted. Subsequently, an attempt was made to place a Palmaz® stent. During the deployment process, however, the Palmaz® stent inadvertently migrated off the balloon



**Fig. 2.** CT scan coronal slice, showing the infra-renal AAA prior to initial endovascular repair.



**Fig. 3.** CT scan sagittal slice, showing a type 1 endoleak post-endovascular repair of AAA with a Zenith® bifurcated device. Note the contrast blush posteriorly into the aneurysmal sac and loss of graft-wall apposition.

and as a salvage manoeuvre the stent was deployed in the visceral aorta extending into the supra-coeliac aortic clamp zone. At this point, the endovascular procedure was aborted.

Despite being advised of the extremely high peri-operative morbidity and mortality risk, the patient was adamant on pursuing further surgical options. Given his poor physiological reserve, comorbid state, and that the Palmaz® stent was seated across the supra-coeliac clamping zone, the vascular team offered to repair the endoleak using a peri-aortic Dacron graft, thus avoiding the need for aortic cross-clamping.



**Fig. 4.** CT scan coronal slice, after the initial endovascular attempt to repair type 1 endoleak with an Endurant® cuff and the Palmaz® stent. Note the position of the Palmaz® stent across the supra-coeliac aortic clamp zone.

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