

Case Report

Not peer-reviewed version

Combined Bentall, Coronary Artery Bypass Grafting and Implantation of Ascyrus Medical Dissection Stent Landed Inside a Thoracic Endovascular Aortic Repair Stent

Robert Grant , [Pouya Nezafati](#) ^{*} , Bruce French

Posted Date: 18 March 2026

doi: 10.20944/preprints202603.1327.v1

Keywords: acute type A aortic dissection; AMDS; aortic root surgery; dissection stent



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a [Creative Commons CC BY 4.0 license](#), which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Case Report

Combined Bentall, Coronary Artery Bypass Grafting and Implantation of Ascyrus Medical Dissection Stent Landed Inside a Thoracic Endovascular Aortic Repair Stent

Robert Grant ^{1,2}, Pouya Nezafati ^{1,2,*} and Bruce French ¹

¹ Department of Cardiothoracic Surgery, Liverpool Hospital, Newcastle, NSW, Australia

² Department of Cardiothoracic Surgery, John Hunter Hospital, Newcastle, NSW, Australia

* Correspondence: pouya.nezafati@health.nsw.gov.au; Tel: +61287383000

Abstract

A 58-year-old male presented with Acute Type A Aortic Dissection (ATAAD) and left lower limb paralysis with a history of previously implanted Thoracic Endovascular Aortic Repair (TEVAR). Entry tear of the ATAAD was evident within the ascending aorta with extension to distal left main and supra-aortic branches creating a dissection flap over the proximal end of the TEVAR stent causing a stent lumen blockage. Patient underwent emergency surgical repair with Bentall procedure and deployment of small Ascyrus Medical Dissection Stent (AMDS) landed distally inside the TEVAR stent and coronary artery bypass grafting (CABG), all with good effect. The patient did not have any clinical or biochemical organ malperfusion at 30-day follow-up. AMDS placement inside a TEVAR stent can clinically be an effective strategy for management of post ATAAD malperfusion with complex extensive disease requiring concurrent surgical fixations.

Keywords: acute type A aortic dissection; AMDS; aortic root surgery; dissection stent

1. Learning Objectives

- Highlight a novel use of the Ascyrus Medical Dissection Stent in the setting of prior TEVAR.
- Demonstrate a surgical strategy for managing complex malperfusion in acute type A aortic dissection.
- Emphasize the role of hybrid techniques in restoring true lumen flow and end-organ perfusion.

2. Introduction

Acute Type A Aortic Dissection (ATAAD) is known to be a high risk disease requiring emergency surgery [1]. Often, the intimal entry tear is within the ascending aorta which extends into the aortic arch and to descending aorta. In such cases, the dissection has most likely affected the supra-aortic branches for which total/hemi arch replacement has been known to be the surgical strategy. Conventional repair of the intimal flap has been reported to be associated with creation of new re-entries from false lumen which can further extend the dissection distally and collapse of the true lumen. The uncovered self-expanding endovascular stent, Ascyrus Medical Dissection Stent (AMDS), is introduced to prevent distal anastomotic new entry (DANE) by sealing the distal anastomosis and eliminating perfusion into the false lumen [2]. The stent is implanted into zone 0 of aortic arch true lumen.

Short-term follow-up for the use of AMDS is reassuring [3] however outcome of complex concomitant surgeries and AMDS landed inside a previously implanted TEVAR valve are still scarce and need to be evaluated. Herein, we report a case of ATAAD with root involvement which underwent a concomitant Bentall and AMDS implantation into a TEVAR stent, to good effect.

3. Case Description

A 58-year-old male presented following a collapse and paralysis of left lower limb with signs of acute ischemic lower limb. He had a history of a TEVAR for a motor car accident traumatic aortic rupture 15 years previously. On admission he was also noted to have changes of acute left coronary artery related ischaemia. ATAAD was confirmed with a complete circumferential sinotubular junction (STJ) tear in a 63mm diameter ascending aorta involving both coronary arteries. The Transesophageal Echocardiogram (TOE) revealed a severe aortic regurgitation.

The redundant intimal flap had completely obstructed the TEVAR (Figure 1). The false lumen propagated across the aortic wall supported by the TEVAR and ended distally in the left common iliac artery. As a consequence of the obstructed TEVAR and very little flow within the false lumen beyond it, there was virtually no blood flow distal to the aortic arch. As noted, the lower limbs were severely acutely ischaemic.

A decision was made to perfuse the patient via the right femoral artery. This appeared to unblock the TEVAR and was associated with satisfactory radial artery pressures and cerebral oximetry.

The patient underwent surgical repair with Bentall procedure, and the arch was stabilized with small (40mm-40mm straight) AMDS stent deployed distally into the lumen of the TEVAR and proximally anastomosed to a 26mm straight Dacron graft. The right and left main coronary arteries were treated with BioGlue and re-attached to the root of a 25mm Konect Aortic valve conduit graft with small external Teflon cuffs to support the anastomosis. On withdrawing Cardiopulmonary Bypass (CPB) severe hypokinesia of the Left Anterior Descending (LAD) and Left Circumflex (LCx) territories was noted, the decision therefore made to graft the LAD and LCx using saphenous veins. The patient was successfully weaned from bypass and transferred to the intensive care unit. He was extubated on day 4 postoperatively with stable hemodynamics and without end organ damage including intact bilateral lower limb perfusion. Post-operative CT Aortogram (Figure 2) revealed a well-seated AMDS.

The patient was ready for discharge on day 7 post-operatively to a rehabilitation center with no complications at 30-day follow-up post operation.

4. Discussion

Despite the advancement of pre-operative management and surgical technologies, morbidity and mortality of ATAAD are still considered to be high. For complex cases special attention is required in decision making and in this case also for the management of lower limb malperfusion due to a blocked TEVAR, the management of coronary artery dissection, aortic root dissection with severe aortic regurgitation and the management of aortic arch dissection where a TEVAR has been previously implanted.

This case describes a novel off-label use of an AMDS deployed in a TEVAR stent concomitant with modified Bentall's procedure and CABG surgery after ATAAD.

Covered stent graft landing into TEVAR has previously been reported, but uncovered AMDS stent into a TEVAR stent has never been described. This use of the AMDS stent successfully restored good end-organ perfusion. At the 30 day-review, no signs of false lumen flow were evident on the post-operative CT Chest at the aortic arch which reflects obliteration or thrombosis of the false lumen, radiologically. This describes the sealing promotion phenomena of the true lumen [4]. Moreover, there were no clinical neurovascular signs or symptoms of malperfusion.

Concomitant treatment of ATAAD with total arch replacement and aortic root or CABG surgery increases the early post-operative mortality. However, Immohr et al., [5], revealed that combining root surgery and AMDS implantation is safe and does not impair the early postoperative outcome. Moreover, the cardiopulmonary bypass time and circulatory arrest time with AMDS is known to be shorter than the use of Thoraflex for arch replacement. This is an advantage in cases of complex concomitant surgeries such as this.

5. Conclusions

Attention to decision making in complex ATAAD is of great importance. The clinical signs of re-perfusion from AMDS placement into a previously implanted TEVAR concurrent with Bentall and CABG for Debaky I aortic dissection, highlights another utility of AMDS which can further advance the standard of care for aortic dissections.

Informed Consent Statement: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Vilacosta I, San Román JA, di Bartolomeo R, Eagle K, Estrera AL, et al. Acute aortic syndrome revisited: JACC state-of-the-art review. *J Am Coll Cardiol*. 2021;78(21):2106–25.
2. Bozso SJ, Nagendran J, Chu MWA, Kiaii B, El-Hamamsy I, Ouzounian M et al. Single-stage management of dynamic malperfusion using a novel arch remodeling hybrid graft. *Ann Thorac Surg* 2019;108:1768–75.
3. Luehr M, Gaisendrees C, Yilmaz AK, Winderl L, Schlachtenberger G, et al. Treatment of acute type A aortic dissection with the Ascyrus Medical Dissection Stent in a consecutive series of 57 cases. *Eur J Cardiothorac Surg*. 2023 Mar 1;63(3):ezac581.
4. Bozso SJ, Nagendran J, Chu MWA, Kiaii B, El-Hamamsy I, et al. Midterm Outcomes of the Dissected Aorta Repair Through Stent Implantation Trial. *Ann Thorac Surg*. 2021 Feb;111(2):463–470.
5. Immohr MB, Mehdiani A, Bauer SJ, Ise H, Sugimura Y, et al. Combining aortic arch dissection stent implantation and root surgery for aortic dissection type A. *J Cardiothorac Surg*. 2023 Feb 10;18(1):72.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.