Vascular Clinic ZNA

Covered Endovascular Reconstruction of Aortic Bifurcation or CERAB-technique with three covered stents
A benefit for treating extensive aortoiliac occlusive disease.

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PURPOSE
We developed a new Covered Endovascular Reconstruction of Aortic Bifurcation or CERAB-technique for extensive and/or recurrent aortoiliac occlusive disease using Atrium’s Advanta™V12 covered balloon expandable stents to rebuild the aortic bifurcation.

INTRODUCTION
The iliac region and later the aortic bifurcation were one of the first target zones of peripheral endovascular therapy. During the last decades iliac balloon angioplasty and stenting became a common treatment with fair results. Over the last few years, the endovascular approach to treat more extensive aortoiliac occlusive disease has been expanded, due to the introduction of new stent technologies, the development of dedicated devices and the increasing experience of the interventionalist.

A few reports about endovascular revascularisation, mainly by using bare stents, on TASC II (TransAtlantic Inter-Society Consensus) class C and D aortoiliac lesions were very promising regarding safety, mid-term durability, technical success and low morbidity compared with surgical intervention. According to J.E. Indes, endovascular treatment for aortoiliac occlusive disease (AIOD) appears to be more suitable than open repair for higher-risk patients who are older, with higher comorbidities, and who require urgent treatment for their AIOD in the inpatient setting. Furthermore it is associated with lower complication rates, shorter length of stay and lower inpatient costs.

METHODS/TECHNIQUE
Endovascular bifemoral recanalisation of the aortoiliac axes, (with or without brachial access); placement and expansion of a 12 mm Advanta V12 large diameter balloon expandable covered stent-graft (Atrium Europe BV) in the distal aorta (through a 9 Fr introducer) (Fig 1A). Post-dilation of the proximal 12 mm V12 stent to the diameter of the native aorta. The balloon is positioned so that the distal marker is about 15 mm proximal to the distal stent margin (Fig 1B). After optimal positioning (+/- 20 mm above the bifurcation) and complete expansion, the distal end of stent becomes funnel-shaped. Bi-lateral V12 covered stent-grafts are then placed in this conic segment, in a “kissing-stent” configuration (Fig 1C) and simultaneously inflated (Fig 1D). A tight seal is now formed between the bi-lateral iliac stents and the aortic stent, simulating a new bifurcation with the hemodynamic aspect of an aortobifemoral prosthesis or “flowsplitter” of an EVAR prosthesis (Fig 1E & F).

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PURPOSE
We wanted to see if those results could be improved. Why use ePTFE covered balloon expandable stents? The idea was threefold.

First, we have the very promising results from the COBEST (Covered versus Balloon Expandable Stent Trial) reported by Mwipatayi and additional clinical data that outlines the benefits of stent graft use in the iliac region.

For example, the distal stent margin is optimally placed. The balloon is positioned so that the distal marker is about 15 mm proximal to the distal stent margin (Fig 1B). After optimal positioning (+/- 20 mm above the bifurcation) and complete expansion, the distal end of stent becomes funnel-shaped. Bi-lateral V12 covered stent-grafts are then placed in this conic segment, in a “kissing-stent” configuration (Fig 1C) and simultaneously inflated (Fig 1D). A tight seal is now formed between the bi-lateral iliac stents and the aortic stent, simulating a new bifurcation with the hemodynamic aspect of an aortobifemoral prosthesis or “flowsplitter” of an EVAR prosthesis (Fig 1E & F).
RESULTS

2 Centre experience
We treated 44 patients with acute, chronic or recurrent aortoiliac occlusive disease with TASC II C & D lesions (patients characteristics: figures 2, 3). A subset of patients received endarterectomy of the femoral bifurcation to improve distal outflow.

Technical success rate was ~96%
We now have follow-up data from 3 months to 38 months. Four patients died of non-interventional causes. Follow-up was done by ultrasound and CT-angiography. Four patients re-occluded (1 completely) due to progressive distal peripheral disease or haematological disorders. They successfully received thrombolysis or mechanical thrombectomy and treatment of the outflow problems. A classic thrombectomy is feasible without damaging the reconstruction. The other patients experienced no complications (see figures 4, 5), however, they received subsequent endovascular treatment for progressive distal disease, when indicated by the follow-up investigations.

CONCLUSION

• The technique is safe and feasible and can be performed completely percutaneously, because of the access sheath diameter of 9 Fr.
• A larger population and longer follow-up is needed to compare to bare stents, but the mid-term and the few long term results are very encouraging.

• Distal peripheral outflow needs to be sufficient enough to maintain the arterial flow in the aortoiliac reconstruction. An intervention may be needed to improve flow.
• It can be combined with other revascularisation techniques as a “hybrid” procedure.
• CERAB can be used for the treatment of recurrent or in-stent disease at the level of the aortic bifurcation.
• Critical issues include cost effectiveness, patient selection, fine-tuning of the technique and defining the optimal medical support.

References