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EDITORIAL COMMENT

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A new tool in the surgeon's hand—initial experience with a new stent for type A dissection involving the aortic arch

Thorsten Wahlers * and Maximilian Luehr

Department of Cardiothoracic Surgery, Heart Center, University of Cologne, Cologne, Germany

* Corresponding author. Department of Cardiothoracic Surgery, Heart Center, University of Cologne, Kerpener Str. 62, 50937 Cologne, Germany. Tel: +49-(0)221-478-32508; fax: +49-(0)221-478-32509; e-mail: thorsten.wahlers@uk-koeln.de (T.C.W. Wahlers).

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Montagner *et al.* [1] are presenting their initial experience using a new and innovative aortic stent prosthesis: the non-covered Ascyrus Medical Dissection Stent (AMDS). The authors' aim was to analyse the potential changes in true lumen area—as indexed to whole vessel area preoperatively—in a consecutive series of 16 patients with acute type A aortic dissection (ATAAD).

The authors found a significant improvement in true lumen perfusion after AMDS implantation. Indexed true lumen area was increased postoperatively by 72%, 112% and 30% in the innominate, right and left common carotid artery, respectively. Preoperative total occlusions of both common carotid arteries recovered completely after surgical treatment. Moreover, the segments of the proximal and mid descending aorta showed an increase of indexed true lumen area of 78% and 48%, respectively.

They concluded that AMDS is a promising hybrid device to treat ATAAD even if cerebral malperfusion is present.

Acute aortic dissection type A with malperfusion of the supra-aortic vessels is a disastrous disease associated with high mortality and morbidity rates, even if the diagnosis is made early and aortic surgery is performed immediately [2, 3].

Postoperative outcomes are mainly influenced by the perioperative duration of impaired cerebral blood flow, the time interval between the diagnosis and the operation and adverse risk factors like advanced age and additional comorbidities, as previously shown. However, emergent open surgery is the only effective tool to counterbalance this problem.

There are various surgical strategies that have undergone a lot of modifications throughout the last 2 decades; however, axillary cannulation, moderate hypothermia and antegrade selective cerebral perfusion are today well accepted methodologies routinely applied worldwide [4–6]. Thus, postoperative results have improved significantly by the routine application of selective cerebral perfusion and treatment of residual vessel dissection of the supra-aortic branches by using multiple-branched prostheses for extra-anatomic reconstruction.

Based on our experience both reconstruction techniques, by means of aortic hemiarch or total arch replacement, either as a classic or frozen elephant trunk, can be performed successfully with the use of the above-mentioned strategies. Nevertheless, more complex surgery for total arch repair clearly demands surgical expertise of many years.

The authors demonstrated that, in between February 2018 and March 2020, a total of 233 patients underwent surgery for ATAAD in their institution. Forty-eight patients (21%) were treated with AMDS implantation for De Bakey Type I acute dissection, representing the primary study cohort. Patients with involvement of at least 1 supra-aortic vessel ($n = 16$) based on preoperative CT scan were included in the final study population.

The non-covered AMDS is a new tool in the armentarium of the cardiothoracic surgeon based on a hybrid graft, which consists of a 10-mm proximal polytetrafluoroethylene cuff, for the sealing of the distal anastomosis and a super helical non-covered nitinol stent, for the remodelling of the arch and descending aorta. The application as compared to other conventional techniques is simple, potentially restores supra-aortic perfusion and usually does not prolong the antegrade selective cerebral perfusion or distal circulatory arrest times. This was also found in the present study with a mean distal circulatory arrest time of 45 min.

In the presented study, postoperative results were also good regarding the impact of AMDS on true lumen perfusion. The comparison between dissection morphology in the supra-aortic vessels prior and after surgery showed complete regression of total occlusions in both carotid arteries and an increase in dissection-free vessels: 0–25% for innominate artery, 18.75–62.5% for right common carotid and 56.25–75% for left common carotid artery. In all patients, full AMDS expansion could be visualized without any device complications.

Neurological outcome in the study group was not as good; however, this might probably be related to the severity of ATAAD cases already assessed preoperatively.

The authors are to be congratulated to demonstrate their early and excellent results with the new AMDS prosthesis. The device is obviously well designed and allows for re-approximation of the inner wall of the dissected aorta. Application is simple, as outlined before, and no technical limitations have been observed so far.

Currently, the postoperative follow-up period is too short to make any final conclusions regarding the long-term outcome after ADMS treatment. Therefore, regular clinical supervision of these patients and future reevaluations including diagnostic imaging are strongly recommended.

Moreover, the current number of patients treated with this device is still very limited and it is difficult to determine in which settings the best results will be achieved with the use of this promising technology.

We believe the most suitable patient remains the classic ATAAD patient with an entry tear in the ascending aorta and extension of the dissection downstream the descending aorta. In the study group presented, it could be shown that the successful application of the device had a positive impact on the remodelling process of the supra-aortic branches and the remaining aorta. By replacing the ascending aorta with a vascular prosthesis and facilitating aortic remodelling by the AMDS at the same time, healing of the disease in these cases seems achievable. This approach also may reduce the risk of distal aortic new entry (DANE), which is frequently seen after hemiarch repair [7].

In conclusion, this new prosthesis is a promising tool for the treatment of ATAAD in selected patients. Further experience is necessary to determine the applicability in various aortic morphologies as well as the influence on the long-term outcome of these patients.

REFERENCES

[1] Montagner M, Kofler M, Heck R, Buz S, Starck C, Kurz S *et al.* Initial experience with the new type A arch dissection stent: restoration of supra-aortic vessel perfusion. Eur J Cardiothorac Surg.

[2] Luehr M, Etz CD, Nozdrzykowski M, Lehmkuhl L, Misfeld M, Bakhtiary F *et al.* Extra-anatomic revascularization for preoperative cerebral malperfusion due to distal carotid artery occlusion in acute type A aortic dissection. Eur J Cardiothorac Surg 2016;49:652–8, discussion 658–659.

[3] Czerny M, Schmidli J, Adler S, van den Berg JC, Bertoglio L, Carrel T *et al.* Current options and recommendations for the treatment of thoracic aortic pathologies involving the aortic arch: an expert consensus document of the European Association for Cardio-Thoracic surgery (EACTS) and the European Society for Vascular Surgery (ESVS). Eur J Cardiothorac Surg 2019;55:133–62.

[4] Sabashnikov A, Heinen S, Deppe A-C, Zeriouh M, Weymann A, Slottosch I *et al.* Axillar or aortic cannulation for aortic repair in patients with stanford A dissection? Ann Thorac Surg 2016;102:787–94.

[5] Urbanski PP, Luehr M, Di Bartolomeo R, Diegeler A, De Paulis R, Esposito G *et al.* Multicentre analysis of current strategies and outcomes in open aortic arch surgery: heterogeneity is still an issue. Eur J Cardiothorac Surg 2016;50:249–55.

[6] Keeling WB, Tian DH, Leshnower BG, Numata S, Hughes GC, Matalanis G *et al.* Safety of moderate hypothermia with antegrade cerebral perfusion in total aortic arch replacement. Ann Thorac Surg 2018;105:54–61.

[7] Lansman SL, Goldberg JB, Kai M, Malekan R, Spielvogel D. Extended arch procedures for acute type A aortic dissection: a downstream problem? Semin Thorac Cardiovasc Surg 2019;31:17–20.