thus limiting the time of “true” uni-ACP. Although such a technique ensures rapid antegrade perfusion of both brain hemispheres, in situ revascularization of the left subclavian artery may be challenging to perform routinely in all cases of type A dissection.

Although the data of the study of Norton and colleagues¹ support the use of uni-ACP in hemiarch and proximal arch (zone 1 and 2) procedures in type A aortic dissection, the safety of uni-ACP during full arch procedures is inconclusive. Further studies assessing the efficacy and safety of

uni-ACP during total (zone 3) arch replacement procedures, especially during prolonged periods of circulatory arrest, are required before its use can be generalized.

References

1. Norton EL, Wu X, Kim KM, Patel HJ, Deeb GM, Yang B. Unilateral is comparable to bilateral antegrade cerebral perfusion in acute type A aortic dissection repair. *J Thorac Cardiovasc Surg.* 2020;160:617-25.e5.
2. Bischoff MS, Brenner RM, Scheumann J, Bodian CA, Griep RB, Lansman SL, et al. Long-term outcome after arch replacement with a trifurcated graft. *J Thorac Cardiovasc Surg.* 2010;140(6 Suppl):S71-6; discussion S86-91.

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Commentary: Can unilateral antegrade cerebral perfusion constitute a unified method for acute type A aortic dissection repair?

Hitoshi Matsuda, MD, PhD,^a and
Soichiro Kitamura, MD, PhD^b

Accumulated surgical experience and resultant improvements in surgical skills, extracorporeal circulation, organ protection, and devices have led to the establishment of an integrated surgical approach for acute type A aortic dissection.^{1,2} Technical upgrading is continually pursued, mostly toward less invasiveness with improved endovascular techniques and more simplicity of complicated procedures for secure organ protection.

Cerebral protection is the key for successful acute type A aortic dissection treatment and is therefore essential for the postoperative prognosis. In this issue of the *Journal*, Norton and colleagues³ report that cerebral perfusion with

Hitoshi Matsuda, MD, PhD (left), and Soichiro Kitamura, MD, PhD (right)

CENTRAL MESSAGE

Conversion of uni-ACP to bi-ACP was encountered in 2%. It is wise to know the utility of both uni-ACP and bi-ACP and to then use the more effective ACP type for each patient rather than unified ACP.

antegrade cerebral perfusion (ACP) unilaterally (unilateral ACP [uni-ACP]) is comparable to bilateral ACP (bi-ACP), which has been a routine procedure.

Their comparison of medium-size cohorts reveals that 30-day mortality and postoperative stroke rate were not different and that postoperative bleeding was less and midterm survival was better for the uni-ACP group. They obtained the data from patients who were cooled to 18°C in the early stage and to 24°C-28°C in the late stage, with hypothermic circulatory arrest lasting 29 minutes for uni-ACP and 45 minutes for bi-ACP. As simple

From the ^aDepartment of Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Suita, Japan; and ^bJapan Cardiovascular Research Foundation, Suita, Japan.

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Address for reprints: Hitoshi Matsuda, MD, PhD, National Cerebral and Cardiovascular Center, 6-1 Kishibeshinmachi, Suita, Osaka, 564-8565, Japan (E-mail: hitmat_0706@ncvc.go.jp).

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circulatory arrest at 18°C for 29 minutes would be the alternative for cerebral protection, their comparison might compare the 2 methods both with enough hypothermia with short duration.

The recent trend is for temperature during circulatory arrest to be higher. We have reported newly developed postoperative permanent neurologic dysfunction in 6.9% of patients, a ratio that is between that for uni-ACP and bi-ACP reported by Norton and colleagues.³ We initiated ACP by cannulating all 3 supra-aortic vessels with the lowest nasopharyngeal temperature at 23°C ± 2.8°C. Duration of ACP was 58 ± 4 minutes for hemiarch replacement and 177 ± 64 minutes for total arch replacement.⁴

Moreover, in patients with a complete circle of Willis, back flow inside the left carotid and vertebral arteries perfused from the right side arteries prevents the entrapment of air or small debris. When a surgeon encounters difficulties with cannulation of the left carotid or subclavian artery as a result of stenosis or severe calcification, the findings presented in this issue should prove helpful for deciding whether to use uni-ACP with clamping of the left carotid artery.

Norton and colleagues³ describe several limitations of the study and document the results of propensity score match analysis and subcohort analysis showing that more patients in the bi-ACP group needed to be treated with extensive (zones 2 and 3) arch replacement. The longer

duration of hypothermic cardiac arrest and crossclamping and the lower minimum temperature required for bi-ACP are apparently related to the need for more extensive replacement. Moreover, they note that, concerning the collaterals between the right and left carotid arteries and the circle of Willis, the criteria for left common carotid perfusion determined with left near-infrared spectroscopy were reduced by more than 30%, and conversion of uni-ACP to bi-ACP was encountered in 2%. It is therefore necessary to pay more attention to left-sided cerebral protection when uni-ACP is used.

In conclusion, it is advisable to understand fully the utility of both uni-ACP and bi-ACP and to then use the more effective ACP for each patient, rather than using the unified ACP method.

References

1. Sasaki H, Ogino H, Matsuda H, Minatoya K, Ando M, Kitamura S. Integrated total arch replacement using selective cerebral perfusion: a 6-year experience. *Ann Thorac Surg.* 2007;82:S805-10; discussion S824-31.
2. Minatoya K, Inoue Y, Sasaki H, Tanaka H, Seike Y, Oda T, et al. Total arch replacement using a 4-branched graft with antegrade cerebral perfusion. *J Thorac Cardiovasc Surg.* 2019;157:1370-8.
3. Norton EL, Wu X, Kim KM, Patel HJ, Deeb GM, Yang B. Unilateral is comparable to bilateral antegrade cerebral perfusion in acute type A aortic dissection repair. *J Thorac Cardiovasc Surg.* 2020;160:617-25.e5.
4. Inoue Y, Minatoya K, Oda T, Itonaga T, Seike Y, Tanaka H, et al. Surgical outcomes for acute type A aortic dissection with aggressive primary entry resection. *Eur J Cardiothorac Surg.* 2016;50:567-73.