Commentary: Optimal perfusion strategy for stroke risk reduction in type A aortic dissection repair—Still unresolved?

Konstantin von Aspern, MD, Christian D. Etz, MD, PhD, and Michael A. Borger, MD, PhD

From the University Department for Cardiac Surgery, Leipzig Heart Center, Leipzig, Germany.

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Address for reprints: Michael A. Borger, MD, PhD, University Department for Cardiac Surgery, Leipzig Heart Center, Struempellstrasse 39 04289, Leipzig, Germany (E-mail: michael.borger@helios-kliniken.de).

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Acute aortic dissection type A is one of the most devastating acute pathologies in cardiac surgery, being associated with a significant risk of major morbidity and mortality. The primary treatment goal of surgery is to ensure the patient's survival and terminate acute end-organ ischemia, with prevention of future adverse events from the structurally injured downstream aortic wall as an important secondary goal. Even in experienced aortic centers, morbidity and mortality remain significant for this challenging pathology.¹⁻⁵ One of the most disastrous complications remains permanent neurologic impairment as a result of cerebral stroke.^{1,4}

Since the early days of successful type A dissection repair by De Bakey and associates in the 1950s,^{6,7} technical adjustments have led to significant improvements in postoperative morbidity and mortality. With the advent of cerebral perfusion and the implementation of novel neuromonitoring methods, many surgeons have also opted for higher intraoperative core temperatures without seeing a significant increase in postoperative neurologic complications.^{5,8}

In this issue of the *Journal*, Ghoreishi and colleagues⁹ shed light on the association of different operative strategies in type A repair with regard to stroke risk. In their study—representing the largest registry-based cohort analysis on this topic to date—Ghoreishi and colleagues⁹ provide valuable benchmark data on operative management of this pathology, add more insight into the long-contested issue of optimal cannulation technique, and describe potential advantages of a controversial cerebral protection strategy: retrograde cerebral perfusion (RCP).

Most of the findings of Ghoreishi and colleagues⁹ are consistent with previous studies on this topic. With a mortality of 17% and a new-onset postoperative stroke rate of 13%, the results are in line with comparable large registry analyses, such as the German Registry for Acute Aortic

Dissected aortic aneurysm (arrow) with graft to carotid artery (asterisk).

Central Message

Modern TAAD repair during mild to moderate hypothermia with cerebral perfusion appears safe. Retrograde cerebral perfusion is promising, but the strategy of no cerebral perfusion should be abandoned.

See Article page 2143.

Dissection Type A² and the International Registry of Acute Aortic Dissection.¹⁰ An interesting observation in the study of Ghoreishi and colleagues⁹ is that the degree of hypothermia did not seem to significantly affect neurologic outcome, a reassuring finding given the previously mentioned general trend toward higher core temperatures during arch surgery. Interpretation of this finding, however, also requires consideration of the implemented cerebral perfusion strategy, the extent of aortic wall destruction, and the preoperative clinical status of the patient. Generally speaking, procedures performed during moderate or mild hypothermia used some sort of cerebral perfusion strategy, whereas surgery without cerebral perfusion necessitates deep or profound hypothermia. Direct comparison of these strategies would therefore require thorough analyses of the previously mentioned variables and selection criteria as possible confounders.

The most interesting finding of the study of Ghoreishi and colleagues⁹ is the protective influence of RCP on postoperative stroke. Efficacy of RCP has been a controversial topic in aortic arch surgery for many years, with some investigators finding inferior results for RCP relative to antegrade cerebral perfusion (ACP).¹¹ In their risk regression model, Ghoreishi and colleagues⁹ compared the effects of different cerebral protection strategies (ACP, RCP, and none) on

stroke. The reference (comparison) value for this variable was no cerebral perfusion. Given the fact that no cerebral perfusion was associated with the highest incidence of stroke, the advantageous effect of RCP could be shown only in comparison to no cerebral perfusion, a strategy that is being used with decreasing frequency in current clinical practice.^{3,12} A direct comparison between RCP and ACP revealed no significant difference in stroke rate (11.4% vs 12.8%; $P = .155$). Contemporary data on large patient cohorts reveal postoperative stroke rates between 6% and 10% when using unilateral or bilateral ACP.^{1,5,12} Even for prolonged cerebral perfusion times (ie, longer than 60 minutes), stroke rates of only 8% have been demonstrated with ACP.¹³

Ghoreishi and colleagues⁹ were able to confirm that no cerebral perfusion yields worse results than any other cerebral perfusion strategy in terms of postoperative stroke, a finding that has been demonstrated many times before. Potential superiority of RCP during type A aortic dissection repair, however, requires further investigation. What we can conclude with a high degree of certainty is that no cerebral perfusion during type A dissection surgery—and indeed, during any aortic arch surgery—is an inferior technique that should be abandoned without further delay.

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