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Commentary: Protect the brain: An armamentarium of cerebral-protection strategies should be in the aortic surgeon's toolbox

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Aortic arch reconstructions and the use of cerebral perfusion adjuncts are increasingly performed in aneurysm and dissection repairs.¹ The need for cerebral protection during this period of circulatory arrest was recognized early in the evolution of the field, and techniques for cerebral perfusion were identified as early as 1952 by Drs Cooley and DeBakey.² Antegrade and retrograde cerebral-perfusion strategies allow for longer periods of hypothermic arrest with less hypothermia.³ Various strategies have been developed for antegrade cerebral perfusion (ACP), including the use of side-arm grafts or direct cannulation of the axillary artery, innominate artery, or carotid artery.

In this issue of the *Journal*, Sang and colleagues⁴ present a technique of directly cannulating the innominate artery using a Seldinger technique and pediatric arterial cannula. They use 12- and 14-French pediatric cannulas, which, according to the manufacturer, allow for 1.5-2 L/min of flow with acceptable pressures.⁵ The authors present good operative outcomes in 42 patients with 2% mortality (n = 1 patient) and, importantly, no clinical strokes. We too preferentially cannulate the innominate artery when the vessel is not dissected or planned to be resected to perform the reconstruction. Preventza and colleagues⁶ examined cannulation of the innominate versus axillary artery and found no

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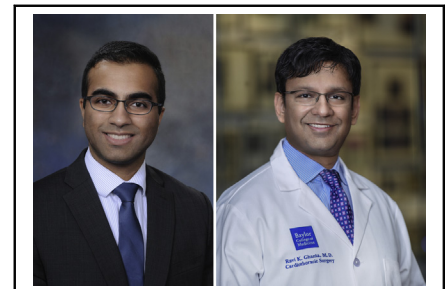
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CENTRAL MESSAGE

Direct cannulation of the innominate artery with a pediatric arterial cannula provides another tool in the armamentarium of the aortic surgeon when considering options for antegrade cerebral protection. It can be performed with good operative outcomes.

difference in mortality or neurologic outcomes. As some morbidity and brachial plexus nerve injury is possible with axillary approaches, the innominate artery appears to be the optimal choice for ACP based on current clinical data.⁷ Interestingly, a randomized control trial is currently underway to examine this question, and this question may be conclusively answered.⁸ Another important consideration for all arch reconstructions is the use of unilateral ACP versus bilateral ACP cerebral perfusion, which may be useful for longer circulatory arrest times.⁹

Advantages of the technique described by Sang and colleagues include relative speed and simplicity. During Seldinger cannulation, one must be cognizant of the wire direction and presence of atherosclerosis. One might achieve a similar result with a pediatric angled metal tip cannula; however, this has not been systematically studied as Sang and colleagues have done. Their strategy, however, requires cannulation of the aorta for establishment of cardiopulmonary bypass. Axillary or innominate artery side-arm graft cannulation enables a “one-stop shop” for both cardiopulmonary bypass and ACP.

The authors demonstrate a method that is straightforward and reproducible, and this may help surgeons who are devising cerebral-protection strategies. Complex aortic

reconstructions require a toolbox of strategies in the surgeon's armamentarium.

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