Commentary: Ongoing challenges for optimal strategy of aortic arch surgery

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We congratulate Wang and colleagues¹ on their large cohort study in China of aortic arch surgery in the adult population with hypothermic circulatory arrest and unilateral antegrade cerebral perfusion. This article provides convincing findings because of not only the large number of the cohort but also minimizing possible confounding factors by using the standardized surgical technique.

Optimal surgical strategies of aortic arch surgery have been investigated by many investigators, but it still remains challenging. This study described detailed comprehensive data with excellent clinical outcomes. The study showed 30-day mortality was 6.1% and permanent neurologic dysfunction incidence was 4.8%. It is comparable with the outcomes of other high-volume centers, such as Okita and colleagues, who reported that the mortality of total arch replacement was 4.5% and permanent neurologic deficit was 3.3%.^{2,3}

It is important to mention that the incidence of paraplegia in this study is relatively low (2.0%) when they used the frozen elephant trunk technique in most of the cases. It has been reported that the use of frozen elephant trunk is associated with increased risk of postoperative paraplegia.⁴ It was identified in the study that age and DeBakey type I dissection were independent predictors of paraplegia, but not the use of the elephant trunk technique. The authors mentioned that this result might have been due to the shorter lower body circulatory arrest time compared with the other studies.^{5,6} Further investigations would be warranted in this matter.

There are several points to be addressed in understanding this article correctly. First, the mean patient age was 47 years old, which is relatively young compared with other reports,^{2,3} and might have been a contributor for clinical outcomes in this study. Second, this study includes nondissection patients (9.4%) undergoing aortic arch surgery, and more than 40% of dissection patients had subacute or chronic dissection. In general, the outcome of

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Central Message

Clinical outcomes of aortic arch surgery have been improved for the last 2 decades. However, there are still many opportunities and questions in the queue to be investigated.

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surgery for nonacute aortic dissection is better than acute aortic dissection.^{7,8} Third, they reported that the risk for permanent neurologic dysfunction and mortality increased when unilateral antegrade cerebral perfusion time was longer than 38 minutes and decreased when nasopharyngeal temperature at the time of circulatory arrest was lower than 24°C. It is generally difficult to assess an event with 2 variables that both are confounding factors for the event. Fourth, it is important to note that the definition of unilateral antegrade cerebral perfusion time in this study is the period from the initiation of unilateral antegrade cerebral perfusion to the reconstruction of left carotid artery (ie, duration of the distal aortic anastomosis and left carotid anastomosis). This definition appears to make their “circulatory arrest time” shorter than it really is as well as ones in the other studies.^{5,6}

Although aortic arch surgery has emerged as an important treatment strategy and its clinical outcomes have improved during the last 2 decades, there are still many opportunities and questions in the queue to be investigated.

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