Ascending beyond the root of the problem: Aortic root replacement with and without hemiarch repair

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Aortic root replacement has been shown to provide very good clinical outcomes in large-scale¹ and single-center² studies. In this issue of the *Journal*, Preventza and colleagues³ from Baylor up the ante by presenting an impressive series of 140 patients who underwent primary elective aortic root replacement, 119 of whom underwent concurrent hemiarch repair. The study reports no mortality, strokes, or renal failure requiring dialysis in the hemiarch group, nor any difference in composite adverse events between the patients with and without hemiarch repair. On the basis of these results, Preventza and colleagues³ conclude that the addition of hemiarch repair to aortic root surgery does not adversely impact perioperative mortality and morbidity. These investigators deserve praise for these exemplary outcomes, which may be related to a detailed and standardized cerebral protection regimen during hemiarch repair. All patients received antegrade cerebral perfusion during hemiarch repair, predominantly through the innominate artery. Moderate systemic hypothermia (23.7°C) was used, with near-infrared spectroscopy-driven flow rate adjustments. The distal anastomosis was performed in expedited fashion, with a mean antegrade cerebral perfusion time of only 18 minutes, which possibly was facilitated by relatively normal distal aortic size as evidenced by the median graft size of 24 mm. Because cerebrovascular events are a major driver of mortality in aortic surgery,⁴ avoidance of neurologic complications, no small feat in this sizable series, is paramount. This does not discount but only reflects the extensive experience with aortic surgery and operative acumen of these investigators.

The outcomes presented, however, must be viewed in the appropriate context. The patients in the study of Preventza and colleagues³ were young and underwent elective primary aortic root operations with essentially a “prophylactic” hemiarch replacement and thus represent an optimal clinical cohort. In a series of 142 such patients undergoing aortic root replacement with concurrent distal aortic

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Central Message

In patients without previous cardiac surgery undergoing primary aortic root replacement, concurrent hemiarch repair can be performed without additional risk.

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replacement under hypothermic circulatory arrest, Hagl and associates² reported similar results, with 0.7% mortality and 1.4% stroke rate. The pacemaker rate in that series was only 1.4%, whereas it was substantially higher in the study of Preventza and colleagues³ at 9.2%. Addition of hemiarch repair in patients at higher risk undergoing aortic root replacement⁵ or those undergoing isolated aortic valve replacement⁶ has also been shown not to influence perioperative mortality or morbidity. The comparison group in the study of Preventza and colleagues³ of those who underwent isolated aortic root replacement was quite small, with only 21 patients, and therefore the rates of tracheostomy, pacemaker implantation, and stroke were exacerbated by a small denominator. This really brings into question the need to include the “control” group, which was small and fraught with higher complication rates than would be expected. The excellent outcome data of 119 patients with aortic root replacement and hemiarch repair, although not novel, stand on their own.

With this report, Preventza and colleagues³ have raised the bar of surgical expectations, but caution should be exercised in generalizing these results to other clinical populations or operative strategies. In the presented clinical context, Preventza and colleagues³ have demonstrated that hemiarch repair at the time of aortic root replacement is very safe and when indicated can be pursued without

additional risk. These data provide a foothold to ascend beyond the problem at the root.

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