control for all confounding differences between study cohorts, their findings suggest that AAW may be an ideal choice for the elderly patient population or those with a reduced life expectancy, especially those in whom prolonged cardiopulmonary bypass times and/or hypothermic arrest might not be tolerated. Because proximal arch redilation may occur, yearly rates appear to be insidious, and periodic postoperative surveillance may be warranted.

See Article page 463.

Commentary: Wrap one's aorta around

Vicente Orozco-Sevilla, MD,^{a,b,c} and
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Wrapping techniques, with or without aortoplasty,¹⁻³ have been used as a less-invasive surgical alternative for the treatment of moderately dilated aortas during other cardiac surgery procedures (ie, those that are not primarily focused on aortic repair). Additionally, there are subsets of patients with aortic disease, such as those with advanced age or those with multiple comorbidities, that face a greatly enhanced risk of operative death during proximal aortic repairs (eg, of the ascending aorta and transverse arch) that center on aortic replacement.⁴ Aside from the aortic wrapping technique's technical simplicity, enthusiasm for its use is low due to the lack of long-term results, especially in comparison to alternate approaches

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CENTRAL MESSAGE

Aortic wrapping should be in the armamentarium of every surgeon to selectively reinforce the aorta.

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such as aorta replacement. Presumed complications of aortic wrapping include migration, erosion, ulceration, and atrophy of the aortic wall caused by possible biomechanical, structural, and histologic changes associated with the wrapping.⁵

Kim and colleagues⁶ provide us with an update of their experience with the management and long-term prognosis of 4 other aortic regions (ie, annulus, sinus, ascending aorta, and proximal arch) when a moderately dilated ascending aorta during aortic valve surgery was wrapped or replaced. The authors reviewed 964 patients undergoing aortic valve surgery between 1995 and 2018; they excluded patients with congenital anomalies or aortic dissections and patients who had concomitant aortic root or aortic arch surgery or concomitant mitral valve or

tricuspid valve surgery. From 204 remaining patients, a propensity score matching study was performed comparing a total of 140 patients who were split into 2 groups: those who received aortic wrapping (n = 70) and those who received aortic replacement (n = 70). Although there was no in-hospital death, the replacement group's intensive care unit stay was longer. The diameter of the tubular ascending aorta or root components did not vary between the groups in terms of stability. During the excellent long-term follow-up (3.9-11.2 years), the authors reported that men with a preoperative ascending diameter >47 mm and hypertension had significantly higher adverse aortic events, such as dilation of the proximal aortic arch and late reoperations for dissection or rupture, indicating that close postoperative surveillance monitoring is needed. In 2013, these same authors suggested a more conservative approach, in which aortic valve replacement alone (in patients with moderately dilated ascending aortas) achieved similar clinical outcomes to either aortic wrapping or aortic replacement.⁷ In the 2013 study, despite a shorter follow-up period (24.5-68 months), the authors concluded that in patients with moderately dilated aortas there were liberal management choices that could be tailored to individual patient conditions. For example, in regard to patient-specific surgical risk and life expectancy, wrapping of the aorta was helpful in stabilization of the aorta.

Regarding the present study,⁶ the authors should be commended for their considerable efforts to provide us with data that will allow us to understand this controversial topic. External wrapping is a basic technique that, when performed correctly, stabilizes the ascending aorta, the sinuses of the aortic root, and the annulus of the aortic valve. So, what causes the proximal arch to dilate? The distribution of wall stress at the junction of the ascending aorta and proximal arch is among the arguments used in an aortic wrapping model.⁸ In our own clinical practice, we selectively reinforce the distal anastomosis by wrapping it with a strip of polyethylene terephthalate. Additionally, in patients with "thin" nondilated aortas or in patients with bicuspid valve aortopathy, we occasionally reinforce the native aortic tissue between the innominate and left

common carotid arteries in this fashion. It is unclear whether the type of arch, whether it be Gothic or Romanesque,⁹ or if the length of the aorta¹⁰ will play a role in wrapping failure. We believe this entire field is evolving. Improved technology, such as personalized external aortic root support,¹¹ has already set the tone for future advancements in this field. With an eye to the future, it will not be long before endovascular technology will be used for internal wrapping rather than external wrapping of the aorta. We hope that surgeons will keep an open mind and get involved when these advancements occur, and in the meantime, aortic wrapping should be in the armamentarium of every surgeon.

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