Continued pursuit of evidence-based indications and the optimal operation for pediatric valve-sparing aortic root replacement

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Central Message

The largest experience with pediatric valve-sparing root replacement is reported, including guidelines for surgery. The reimplantation procedure using a graft with sinuses is advocated.

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With this sentinel contribution, the Johns Hopkins group has again updated the preeminent experience with valve-sparing aortic root replacement in children.¹ As acknowledged in the report, the establishment of data-driven, evidence-based surgical indications remains elusive. Because of their history of leadership in the field, many will look to these authors for guidance regarding the criteria for operative intervention. In this report, they have presented their thresholds for surgery according to size, growth rate, and disease type. Nevertheless, the hard evidence to support these recommendations is limited, and such data might be difficult to obtain. Aortic root aneurysms are rare in children, curbing sample size and statistical power, and hampering the ability to draw strong conclusions. Further, with the currently low anticipated risk of surgical mortality, the opportunity might have passed for prolonged nonoperative surveillance of these aneurysms, especially at potentially threatening dimensions. Moving forward, it might therefore be increasingly difficult to characterize the unrepaired natural history of this disease and calculate its relative attendant risks.

With accruing experience, the surgical technique at Johns Hopkins for valve-sparing root replacement has evolved.² Initially favored, the remodeling procedure has been abandoned because of a dissatisfying incidence of annular dilation, aortic insufficiency, and need for valve replacement. Consequently, the reimplantation procedure using a Dacron graft with prefashioned sinuses has been adopted. Because pseudoaneurysm development was observed in a subset of patients primarily with Loeys-Dietz syndrome, further specific technical modifications have been recommended for these cases such as the placement of additional subannular anchoring sutures.^{2,3}

The study has some limitations. Although this robust and lengthy series spans 2 decades, the median follow-up duration is <5 years. Because of the probable quaternary referral pattern of the series, an increased proportion of long-

distance patients might have helped contribute to the loss of approximately one-third of patients from follow-up by the first year after surgery. This early attrition arguably compromises the ability to achieve a full and accurate description of late outcomes. Although the report again reasserts the superiority of the reimplantation technique, this conclusion must be tempered by the noncontemporaneous nature of the cohorts and the small number of patients in the remodeling group. Nevertheless, the present results are consistent with most studies, which have shown improved durability of the reimplantation procedure.

Finally, the preferred graft design for valve-sparing root replacement remains controversial. Even as this study corroborates other reports showing good results using a graft with prefabricated sinuses,⁴ others have reported large series with similarly favorable outcomes using straight grafts without sinuses.^{5,6} Intuitively, the presence of sinuses would be expected to produce a more physiologic flow pattern with more natural movement of the aortic valve cusps. However, this theoretical advantage has not yet been conclusively shown to translate into improved valve longevity. Although advanced imaging studies do show improved flow characteristics when graft sinuses are present,^{7,8} further research and clinical data will be needed in the quest for the optimal graft and aortic valve-sparing operation.

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