See Article page 212.

Commentary: Late outcomes for survivors of the arterial switch operation: The glass is at least half-full

Joseph B. Clark, MD

Following decades of accruing experience with the arterial switch operation, early and intermediate outcomes have become exceedingly well described. Further characterization of late patient outcomes remains an ongoing pursuit. Fricke and colleagues¹ advance that understanding with their latest contribution on long-term outcomes. Although many findings are consistent with prior reports, the study shines a light on the potential challenges facing adult survivors.

In this large series spanning more than 30 years, early mortality was 3.3% and was remarkably stable across operative eras. The increased risk associated with the presence of a ventricular septal defect was again demonstrated, with these patients experiencing twice as much early mortality, late reintervention, and late reoperation. Although early survival may have been primarily driven by coronary artery status (most early deaths were due to myocardial ischemia), late outcomes did not appear to be influenced by coronary troubles. Coronary reoperations were rare and were typically confined to the early postoperative period; overall freedom from coronary reoperation was 99% at 25 years. With no patient deaths beyond 14 months, late survival was superb at 95% at 25 years. Good myocardial health was also the rule, as 98% of patients with available data showed normal ventricular function and Class I functional status.

Although late coronary pathology was not appreciated, such was not the case for the outflow tracts. Not

Joseph B. Clark, MD

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Although overall outcomes remain encouraging, late survivors of the arterial switch operation are at risk for progressive neo-aortic root dilation and valve regurgitation.

surprisingly, reintervention and reoperation were most commonly required for the neopulmonary root and pulmonary arteries. Notably, the authors identified burgeoning left-sided disease in the neo-aortic root and valve as a principal finding. Although the overall cohort showed a 3.1% rate of at least moderate neo-aortic regurgitation (AR) at a median of 15 years, the rate increased to 6.3% in those with 25-year follow-up. Hampered by the lack of serial imaging data, the temporal progression of AR could not be further elucidated. Nonetheless, the surgical results offer some longitudinal insight as freedom from neo-aortic root or valve reoperation decreased from 96% at 10 years to 92% at 25 years. In patients with 25-year follow-up, the incidence of moderate or greater AR and neo-aortic valve replacement combined to reach 15%.

These findings corroborate prior studies showing late progression of neo-aortic valve disease. van der Palen and colleagues² observed neo-aortic root dilatation without stabilization during early adulthood, leading to moderate or greater AR in 31% by 25 years. Nakayama and colleagues³ also documented progressive AR in adulthood, with more than moderate AR worsening from 9% at 20 years to 18% at 30 years, eventually yielding a freedom from neo-aortic valve reoperation of 91% at 30 years.

Accordingly, for long-term survivors of the arterial switch operation, the neo-aortic root and valve will require

From the Division of Pediatric Cardiac Surgery, Department of Pediatrics, Penn State Children's Hospital, Hershey, Pa.

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Address for reprints: Joseph B. Clark, MD, Division of Pediatric Cardiac Surgery, Department of Pediatrics, Penn State Children's Hospital, 500 University Dr, H085, Hershey, PA 17033 (E-mail: jclark7@pennstatehealth.psu.edu).

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lifetime surveillance and may necessitate reoperation in a fraction of patients. Despite this potential disease burden, the vast majority of patients in this series appear to have realized excellent long-term outcomes. Depending on one's perspective, this ever-evolving story may be likened to the glass that is seen as either half-empty or half-full. Overall, these results seem to argue in favor of the latter.

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