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Commentary: (Preoperative) size matters: Pulmonary artery reinterventions after arterial switch operation

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The arterial switch operation (ASO) remains the gold standard therapy for patients with dextro-transposition of the great arteries (d-TGA), with low early mortality rates of 1% to 3% and long-term survival rates >90% at 15, 20, and 25 years.¹⁻⁴ Now that ASO patients are expected to survive the operation, attention has been shifted to short- and long-term morbidity.²⁻⁵ Branch pulmonary artery stenosis (BPAS) has been identified as the most common indication for reintervention in d-TGA patients following ASO.^{2,5} Luo and colleagues⁶ analyzed the relationship of preoperative features to postoperative reintervention for BPAS. In their large, single-center cohort of 262 patients, the authors report early PA reintervention rate of 10.7%, an unusually high number attributed to early detection of BPAS by utilizing intraoperative epicardial echocardiography. Patients undergoing early PA intervention also had a late reintervention rate of 24%, whereas only 9.4% of those without early reintervention required late reintervention, at a median follow-up of 20.8 months. Although no predictive factors were identified for early branch PA reintervention, smaller preoperative left PA (LPA) and right PA (RPA) dimensions were independently associated with late branch PA reintervention on multivariable analysis. Additionally, the authors found that LPA and RPA dimensions were significantly

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CENTRAL MESSAGE

Branch pulmonary artery stenosis is not uncommon after the arterial switch operation, and its late occurrence is associated with smaller preoperative branch pulmonary artery size.

smaller on postoperative discharge echocardiograph compared with preoperative baseline. A notable finding was the relative futility of catheter-based intervention for early BPAS.

Multiple mechanisms for BPAS following ASO have been proposed,⁷ and multiple surgical techniques have been employed with hopes of improving outcomes.^{8,9} Although this study does not address technical considerations of the ASO, it does point out a need for possible modification to standard ASO in those patients with smaller branch PAs on preoperative assessment. Furthermore, this study is the first to show smaller preoperative LPA and RPA size to be predictive of late PA reintervention. Given this study's single-institution design with consistent surgical technique, it is unclear whether or not these findings would hold true for ASO performed in other centers.

With improved survival in patients following neonatal ASO for d-TGA, focus has turned to reducing long-term morbidity in this population, including BPAS, its most common complication. The authors should be congratulated for identifying preoperative risk factors that may alert surgeons and cardiologist to those at particular risk for this condition. Although the present study is another step toward understanding postoperative BPAS, additional research is needed to determine whether or not modified surgical techniques may reduce the need for postoperative PA reintervention. In the meantime, it would be understandable

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if surgeons planning an ASO were to give serious consideration to preemptive augmentation of smaller-than-usual branch pulmonary arteries. Given the high rates of multiple PA reinterventions in this study, it is also clear that there continues to be room for improvement in managing these complications by both surgical and transcatheter approaches.

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Commentary: Branch pulmonary artery stenosis after the arterial switch operation: Is prevention better than cure?

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Pulmonary arteries after the Lecompte maneuver.

CENTRAL MESSAGE

The Lecompte maneuver has proved to be an essential part of the arterial switch operation. However, the stretch imparted might exacerbate the stenosis in small-branch pulmonary arteries.

The arterial switch operation (ASO) has revolutionized the surgical management of children with transposition of the great arteries with neonatal repairs being performed at many centers with good results.¹ Despite distinct advantages over the earlier and almost obsolete atrial switch repair,² postoperative branch pulmonary artery (PA) stenosis remains the Achilles's heel of a successful ASO.³

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The Toronto group analyzed 262 consecutive children with dextro-transposition of the great arteries who underwent the ASO to evaluate the effect of preoperative anatomic factors on postoperative branch PA stenosis.⁴ There were 28 early branch PA interventions (10.6%) concomitant (n = 20) or during the intensive care unit stay (n = 10). Seven percent were secondary to complex coronary artery anatomy. Patients who had branch PA reintervention had more right ventricular (RV) dysfunction,