palliation. This option was not available during the study, but it may have an advantage relative to a surgical shunt.^{5,6}

Although this is certainly not the final word, Jeon and colleagues² have offered an approach that matches treatment to anatomy and results in a high likelihood of annulus preservation in even the youngest patients with tetralogy of Fallot.

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Commentary: Tetralogy of Fallot: Will time tell?

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The treatment of tetralogy of Fallot (TOF) is one of the great success stories of congenital cardiology and cardiac surgery. The accompanying crippling cyanosis was the impetus for the development of aortopulmonary shunts¹ and one of the driving forces behind early intracardiac repairs.^{2,3} The major tenets of the procedure were defined nearly 40 years ago,^{4,5} yet despite all the accrued knowledge and experience, today the optimal timing and strategy of repair remain controversial. Opinions are particularly divergent when discussing the roles of primary repair versus palliation in the symptomatic neonate.⁶⁻⁸

As the negative effects of long-standing pulmonary valve insufficiency became clear, focus has been shifted toward preserving pulmonary valve function. How best to accomplish this goal remains controversial. The current manuscript by Jeon and colleagues⁹ aims to answer these

CENTRAL MESSAGE

After nearly 75 years, we lack consensus on the care of symptomatic neonates with tetralogy of Fallot. Treatment strategies yield similar early results. Long-term, well-designed studies are needed.

questions. The study goal was to identify the optimal surgical strategy for individual patients to achieve preservation of the pulmonary valve annulus (PVA). The authors' retrospective, observational analysis suffers from the familiar shortcomings: selection bias, lack of a control group, etc. However, it does represent a well-matched group from the standpoint of patient characteristics cared for at a single center providing similar perioperative care. Given the small numbers of patients involved, patients with major associated abnormalities and palliative strategies other than Blalock-Taussig shunts should likely have been excluded from the analysis. The composite metric, "optimal early outcome," encompasses what most would agree are the accepted goals following treatment.

Many of the findings in the current study are familiar. Despite longer mechanical ventilator times, intensive care

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unit, and hospital stays whose lengths rival the combination of data from the 2 stages of the palliative approach, patients undergoing primary repair in the neonatal period had similar overall outcomes. Approximately 30% of patients in both groups required sacrificing pulmonary valve integrity at the time of repair. The thrust of the current study was the finding that initial PVA was the only variable that correlated with time to reach the outcomes of pulmonary stenosis or insufficiency. The finding that the probability of achieving optimal early outcome was greater with a primary repair strategy in younger and smaller patients with larger PVA whereas the staged repair more often benefited older and larger patients with small initial PVA is both logical and intuitive. Their conclusion that “the surgical strategy for symptomatic TOF should be individualized according to the initial size of the PVA” is a rational piece of the puzzle.

Other equally important items remain unanswered. Is the phenotype of TOF in a symptomatic neonate different from those presenting later? Does an aortopulmonary shunt reliably lead to growth of the pulmonary valve annulus? How small a pulmonary valve can be preserved? Is preservation of pulmonary valve annular function worth the risks of multiple successive cardiopulmonary bypass runs? Are the negative effects of an infundibular patch similar to total annulus division? How many of these patients undergoing complex interventions on the

pulmonary valve as neonates truly have a competent pulmonary valve and preserved right ventricle size and function at intermediate follow-up? The answers to these and other pertinent questions await a larger multicenter randomized trial. Given the clinical equipoise after nearly 75 years, it is time.

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