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Commentary: Combine the right size with the right shape

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CENTRAL MESSAGE

The shape of the right ventricular outflow tract in repaired tetralogy of Fallot may be an important factor to influencing the outcome.

Early outcomes of tetralogy of Fallot repair are excellent. Long-term survival after repair reaches 95% after 25 years.¹ However, many patients continue to have long-term sequelae in the form of pulmonary regurgitation or, to a lesser extent, residual right ventricular outflow tract (RVOT) obstruction. Depending on clinical and hemodynamic implications, these residual lesions might require intervention using pulmonary valve implantation and/or relief of a residual obstruction. As the cohort of patients with repaired tetralogy of Fallot (rTOF) grows, more data will be available to reflect on factors that can indicate how we may minimize late complications and reinterventions.

Cardiac magnetic resonance (CMR) imaging is an important tool in monitoring of patients with tetralogy of Fallot following surgical repair.² It has the advantage of being a noninvasive, radiation-free modality largely unaffected by postoperative limited windows. CMR provides an accurate assessment of cardiac volumes, function, and anatomy. Several studies using CMR in the past decade have helped us define variables like right ventricular (RV) end-diastolic and end-systolic volumes and function that indicate the need for intervention while reverse remodeling is still possible.^{3,4} Recently, we have been able to guide, based on CMR volumes and flow measurements, which patients are likely to benefit from a pulmonary valve replacement while asymptomatic.⁵

In this issue of the *Journal*, Shen and colleagues⁶ have added to existing data that enable us to better interpret

CMR of rTOF. They have shifted the focus from solely cardiac volumes, which heretofore have been studied extensively, onto shapes of the RVOT. They divide the RVOT shapes into 2 broad categories: tubular and nontubular. They further classify the nontubular shapes into (1) pyramid with the narrow end toward bifurcation, (2) hourglass, and (3) reverse-trapezoid with the narrow end toward the infundibulum. The pyramid shape (which would be expected with a wide transannular patch) had the greatest RV volume and longest QRS duration, whereas the inverse-trapezoid shape (as would be expected with a valve-sparing repair) had the smallest RV volume and shortest QRS duration. Although the shape did not affect exercise tolerance, branch pulmonary artery stenosis was an important predictor of diminished exercise capacity. It would have been worthwhile to explore an association between various surgical strategies (eg, transannular or transinfundibular valve-sparing) and the various shapes defined in their analyses. This information could potentially influence and/or justify choice of a particular surgical approach.

Finding an evidence-based answer continues to be a challenge in the field of medicine.⁷ Recently, a propensity score-adjusted study of large registry of rTOF (INDICATOR) by Bokma and colleagues has called into question the dogma that pulmonary valve replacement alters the unnatural history of rTOF patients and has shown that proactive early intervention might even be detrimental.⁸ The small number of adverse events, even in large cohorts, and a shorter duration of follow-up contribute to the conflicting results of different studies. Thus, in the field of

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CMR, newer imaging adjuncts, such as feature-tracking to measure ventricular strain, have been added to the armamentarium for predicting optimal timing of pulmonary valve replacement.⁹ We congratulate the authors for their contribution to this expanding field of imaging in patients of rTOF.

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Commentary: “If it ain’t pretty, it ain’t going to work pretty”

Tain-Yen Hsia, MD

“If it ain’t pretty, it ain’t going to work pretty”

—Levi Watkins, Jr, MD
(June 13, 1944-April 11, 2015)

Levi Watkins, Jr was a trailblazer. Born in Kansas but raised in Alabama during the birth of the civil rights movement, Watkins was 11 years old when he joined his family pastor, Reverend Dr Martin Luther King, Jr, in the Montgomery bus boycott that followed Rosa Parks’ arrest for refusing to give up her seat to a white passenger. Later, Watkins was the first African American to study

Levi Watkins, Jr reminding the author, “if it ain’t pretty, it ain’t going to work pretty.”

CENTRAL MESSAGE

Unique shapes of the reconstructed right ventricular outflow tract following tetralogy of Fallot repair are associated with worse late outcomes.

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medicine at Vanderbilt University and was the sole African American by the time he graduated. He entered surgical training as an intern at Johns Hopkins Hospital in 1971 and survived its notoriously difficult pyramidal scheme to become its first African American Chief Resident in Cardiac Surgery. Just 7 months after completing training, as a