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Commentary: Ventricular function improvement after the cone for Ebstein anomaly: It is time to incorporate magnetic resonance studies into every long-term postoperative protocol

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The cone procedure was developed and popularized in the mid-2000s. About 15 to 20 years later, the dominance of this operation over other repairs (eg, Carpentier or Danielson) is firmly established. The operation works and the reconstructed tricuspid valve maintains good function over long periods of time. Ebstein anomaly is a disease of the right ventricular (RV) myocardium, and therefore, the logical question to ask is whether the cone repair affects late biventricular function and ventricular remodeling. Neijenhuis and colleagues¹ present a single surgeon experience and retrospective analysis of 58 patients who underwent the cone procedure focusing on cardiac magnetic resonance (CMR) outcomes. There was modest improvement in RV function as determined by pulmonary blood flow but, a more dramatic improvement in left ventricular (LV) function. As such, this report is important and supports use of the cone procedure to treat this heterogeneous group of patients.

Patients with Ebstein anomaly have ventricular septal distortion from RV atrialization, dilatation, and dysfunction. In addition, patients can have LV cardiomyopathy, often associated with LV noncompaction. The improvement in

Drs Vanderlaan and Bacha performing a cone procedure.

CENTRAL MESSAGE

Stable tricuspid valve function and improved RV and LV function at midterm after the cone procedure is documented. It will be important to validate these results in centers with extensive experience.

LV function after cone reconstruction could be related to 2 main phenomena: a ventricular–ventricular interaction-type phenomenon related to RV geometrics and improved synchrony, or it could be related to improvement in LV filling (ie, preload) from improved overall RV functional efficiency. The present CMR analysis did not specifically assess septal motion. Therefore, as with many good and worthwhile studies, this report reveals more questions than it answers. The reason for the recovery of LV function (which other authors have noted^{2,3}), if true, is unknown as of yet.

It is also important to note that these results are based on a small number of patients ($n = 12$) who actually had CMR examinations before and after. Therefore, the next order of business for the congenital heart surgery community is to validate these results. Every patient who has had a cone reconstruction should have a scheduled CMR at mid- to long-term postoperative follow-up. Only then, with a larger number of patients studied, will we know whether the cone operation, beyond providing a durable repair at the valve level, also results in improvement in RV and LV function and why.

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