Letter by Romeo et al Regarding Article, “Immediate and Midterm Cardiac Remodeling After Surgical Pulmonary Valve Replacement in Adults With Repaired Tetralogy of Fallot: A Prospective Cardiovascular Magnetic Resonance and Clinical Study”

To the Editor:
We read with great interest the recent article by Heng and colleagues describing the follow-up of 57 patients with repaired tetralogy of Fallot who underwent pulmonary valve replacement (PVR) with cardiac magnetic resonance imaging. They conclude that significant right heart structural reverse remodeling takes place immediately after PVR, followed by gradual further biological remodeling during follow-up.

The analysis concerned 57 relatively healthy individuals, given their absence of contraindications to cardiac magnetic resonance, good kidney function, and the elective setting. The authors, however, did not disclose the selection criteria that left them with only 57 of a potentially larger cohort (PVR and redo sternotomy; n=257) suggested by a recent overview of consecutive patients undergoing surgery in their center. We are eager to learn about the distribution of clinically relevant covariates of these 57 in comparison with the entire cohort. In addition, during the same time period, specific volumetric thresholds such as intervention criteria were adopted. It can be assumed that patients at the far ends of the volumetric spectrum will thus be less prevalent, and the subsequent extreme hazards they may endure during follow-up, as well. What is the authors’ opinion on how this influences the strength of the inferred causality?

Furthermore, prediction of right ventricle (RV) volume normalization was optimal with a preoperative RV end-diastolic indexed volume of 158 mL/m² and a preoperative RV end-systolic indexed volume of 82 mL/m². Although the discriminative qualities were demonstrated by an area under the curve of 0.88 and 0.90, respectively, model calibration was not mentioned at all. A model intended for prognostic capabilities demands good calibration to be clinically useful. Nonetheless, the relationship between reverse RV remodeling and adverse clinical outcome remains elusive. Applying this knowledge to individualized timing of PVR is even harder. Ideally, the current and future risk of adverse outcome should be continuously available given patient-specific characteristics—for example, sex, age, etiology of the disease, and type of graft used. Mixed and joint modeling, an area of biostatistics that has received a lot of attention lately, carries these capabilities. By using these methods, the temporal pattern of repeatedly gathered biomarkers like echocardiographic measurements can be analyzed and used to predict mortality and reintervention. Volumetric measurements can be associated with the risk of heart failure, reoperation, and mortality in a statistically robust manner. These dynamic prediction models are patient-specific and enable the visualization of current and future risks. Moreover, these risk estimates are updated instantaneously with new measurements and can thus be of direct value in clinical decision making.

This study represents an important contribution to our understanding of RV reverse remodeling after PVR. However, we still question its predictive value for adverse clinical outcomes, which leaves us unsure of how to use this information in optimizing the timing of PVR. The application of joint models is advised, because...
they are an excellent method for subject-specific prediction and individualized timing of PVR using repeatedly measured biomarkers.

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Affiliation
Department of Cardiothoracic Surgery, Erasmus University Medical Center, Rotterdam, The Netherlands.

Disclosures
None.

REFERENCES