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Pulmonary right ventricular resynchronization in congenital heart disease

Jan Janoušek

Children's Heart Centre, University Hospital Motol, Prague, Czech Republic

Abstract:

Pulmonary right ventricular resynchronization (RV-CRT) is a novel option to treat heart failure in patients with coingenital heart disease. Pulmonary right ventricular (RV) dysfunction and failure are associated with several congenital heart lesions, typically postoperative tetralogy of Fallot. They are attributed to several factors, including myocardial fibrosis, surgical scar, and long-term post-repair volume overload caused by pulmonary regurgitation. Pulmonary re-valvulation is thought to reverse pathological RV remodeling. However, a decreased probability of reverse remodeling has been reported in patients with high RV volumes, low ejection fraction, and those with wide QRS complex (≥160 ms) caused by right bundle branch block. Right bundle branch block is the most frequent cause of electromechanical discoordination in congenital heart disease. In post-repair tetralogy of Fallot, RV dyssynchrony has been associated with decreased RV ejection fraction and pathological RV remodeling and is hypothesized to play a role in the progression of RV dysfunction. A recently published report showed a positive effect of temporary pulmonary RV cardiac resynchronization therapy (RV-CRT) on acute hemodynamics, RV mechanics, and contraction efficiency. Dubin et al was first to report permanent RV-CRT in a small series of patients using a previously implanted implantable cardioverter-defibrillator. Subsequently, RV-CRT has been shown to improve both right ventricular mechanics and contraction efficiency and to effectively treat chronic pulmonary right ventricular dysfunction. RV-CRT effects can be further elucidated by computer modelling.

References

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