

EVALUATION OF RIGHT VENTRICULAR PERFORMANCE IN PATIENTS WITH POSTOPERATIVE CONGENITAL HEART DISEASES USING DOPPLER TISSUE IMAGING AND CARDIOPULMONARY BYPASS INDICES

Vishal Bhende¹, DR.TANISHQ S. SHARMA¹, Badra Trivedi¹, DR. AMIT KUMAR¹, Dushyant Parmar¹, Paresh Nerurkar¹, Prachi M. Shah¹, Naresh Jayantibhai Fumakiya¹, R.PATHAN SOHILKHAN¹, and DR.HARDIL P. MAJMUDAR¹

¹Pramukhswami Medical College

January 24, 2022

Abstract

The RV is considered “the forgotten side of the heart”; however, limited studies have focused on its evaluation . The RV helps manage various cardiovascular diseases. Its function is a strong determinant of the prognosis for patients with congenital heart defects, ischemic heart disease, pulmonary arterial hypertension, congestive heart failure, and cardiomyopathy. Therefore, its function should be assessed accurately. Although cardiac magnetic resonance imaging remains the gold standard for the noninvasive measurements of RV size and function, it is time-consuming, expensive, and sometimes not feasible in everyday clinical practice. Echocardiography is the first and the only method used frequently for RV evaluation because of its availability and cost-effectiveness. The complex anatomy of the RV and its trabeculated myocardium that impedes clear endocardial border tracing, unfavorable position within the thoracic cavity, and high dependence on the loading conditions of traditional RV systolic function indices make the echocardiographic analysis of the RV somewhat challenging. The RV primarily helps pump blood coming from the systemic venous system to the pulmonary trunk. The first parts to contract are the inlet and trabeculated myocardium, and, after 25–50 ms, the conus contracts. The RV functions as a high-volume, low-pressure pump; the contraction of predominantly longitudinal fibers as well as afterload and preload influence the RV’s performance. In addition, RV systolic synchrony, atrioventricular synchrony, and ventricular interdependence. A previous study has reported that 20%–40% of the RV volume outflow and systolic pressure is caused by the contraction of the left ventricle (LV). RV dyssynchrony potentially reduces the cardiac output or increases the filling pressure. Thus, maintaining the sinus rhythm and atrioventricular synchrony is crucial for the performance of the RV, particularly in the case of chronic RV failure and acute RV infarction. The current guidelines for cardiac chamber quantification suggest sonographers to use multiple acoustic windows to precisely observe the right heart from various perspectives. Because no single index of contractility that perfectly describes RV performance exists, various parameters need to be measured. In the clinical practice, the most common and feasible indices that can be used to evaluate the RV systolic function are Doppler tissue imaging, tricuspid annular plane systolic excursion (TAPSE), derived tricuspid lateral annular systolic velocity (S’ wave), and fractional area change (FAC).

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