

There Is More Than Just Longitudinal Strain: Prognostic Significance of Biventricular Circumferential Mechanics

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Global longitudinal strain is a well-established predictive parameter of adverse outcomes in several cardiac diseases. Despite the significant contribution of circumferential shortening to the global ventricular function, data are scarce concerning the biventricular circumferential strain phenotypes and their prognostic value on long-term mortality.

Our aim was to assess both left (LV) and right ventricular (RV) global circumferential strain (GCS) using 3D echocardiography (3DE) to determine the prognostic importance of the deterioration of biventricular circumferential mechanics.

Patients with various established left-sided heart diseases (n=364) were retrospectively identified with a median follow-up of 41 months. All patients underwent clinically indicated 3DE and LV and RV ejection fractions (EF), and GCS were quantified. To determine the prognostic power of the different patterns of biventricular circumferential mechanics, patients were divided into 4 groups using the median values of LV and RV GCS (absolute values of 27.1 and 17.9%, respectively). Group 1 had patients with both LV and RV GCS above median; Group 2 had patients with LV GCS above the median, while RV GCS below the median. In Group 3 patients had LV GCS values below the median, while RV GCS was above median. Group 4 had patients with both LV and RV GCS below the median. The primary endpoint was all-cause mortality.

55 patients (15%) met the primary endpoint. Comparing the 4 groups based on LV and RV GCS values enabled a detailed risk stratification. In Group 1 vs. Group 4, patients who had lower LV and RV GCS values the risk of all-cause mortality was more than 5 times higher than in patients with both LV and RV GCS above the median. By comparing Group 2 with Group 3, the associated risks for all-cause mortality did not differ.

Based on the different patterns of LV and RV GCS, decreased GCS was associated with an increased risk of long-term all-cause mortality. Interestingly, decreased RV GCS with maintained LV GCS showed a similar risk of adverse outcomes than decreased LV GCS with maintained RV GCS, thus emphasizing the importance of the assessment of biventricular GCS.