

**LEFT VENTRICULAR EJECTION FRACTION IS SENSITIVE TO CYCLE-LENGTH IRREGULARITY IN PATIENTS WITH ATRIAL FIBRILLATION AND SYSTOLIC DYSFUNCTION**

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**BACKGROUND:** Atrial fibrillation (AF) is characterized by randomly irregular cycle lengths, resulting in considerable beat-to-beat variability of left ventricular (LV) performance. This study aimed to evaluate the impact of cycle-length irregularity during AF on the variability of ejection fraction (EF) in patients with normal and abnormal LV systolic function.

**METHODS:** In 110 patients with AF, LV EF was determined from simultaneous biplanar views of the LV over 20 cardiac cycles using a matrix-array transducer and a Simpson's biplane method. We used the ratio of the preceding R-R interval ( $RR_1$ ) to the pre-preceding R-R interval ( $RR_2$ ) as an index of cycle length irregularity and assessed its effect on the beat-to-beat changes of normalized EF (EF/average EF over 20 cardiac cycles) in patients with normal and abnormal LV systolic function (EF  $\geq$  55% vs. <55%). The relationship of normalized EF (y) with  $RR_1/RR_2$  (x) over 20 beats was fitted to the regression equation  $y=a+bx$ .

**RESULTS:** The index of cycle-length irregularity is a strong predictor of LV EF during AF in patients with normal and abnormal LV function ( $r^2$ :  $0.76\pm 0.09$ ,  $0.78\pm 0.11$ ,  $p=0.217$ ). There was a significant difference in the impact of cycle-length irregularity on the beat-to-beat changes of LV EF between patients with normal and abnormal LV function. The LV EF was more dependent on the  $RR_1/RR_2$  ratio in patients with abnormal LV function than in patients with normal LV function (b:  $0.57\pm 0.21$  vs.  $0.28\pm 0.06$ ,  $p<0.001$ ).

**CONCLUSION:** The beat-to-beat variability of LV systolic function is more sensitive to the cycle length irregularity during AF in patients with systolic dysfunction.

**Keyword:** Atrial Fibrillation, Ventricular function, systole