

Extent of self-adjustment to AF in exercise capacity evaluates significance of sinus maintenance and determines suitability of sinus maintenance therapy in patients with persistent AF

T. Haruna, T. Kuriyama, T. Hamaguchi, Y. Yamaji, E. Nakane, M. Inoko

Kitano Hospital, Heart Center, Osaka, Japan

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Atrial fibrillation (AF) causes hemodynamic inefficiency and possibly deteriorates to heart failure (HF). However, we have experienced drastic variations in the extent of HF deterioration in persistent AF (PeAF) patients. Some studies showed that newly developed PeAF (New AF), not pre-existing PeAF adversely impacted HF patients in two years. These issues suggest that most PeAF patients gradually adjust to AF-induced hemodynamic inefficiency, however the extent of self-adjustment to PeAF differs among patients. We hypothesized that the extent of the self-adjustment might determine the adverse impact of New AF on patients. We proposed that especially New AF patients with poor adjustment to PeAF should be targeted for aggressive sinus rhythm (SR) maintenance through catheter ablation (RFCA). We considered exercise capacity (EC) of PeAF patients as the extent of the self-adjustment to PeAF. Consequently, we sought to investigate whether EC testing (CPX) in PeAF patients could be used as a determinant for suitability of aggressive SR maintenance therapy in PeAF patients.

Subjects & Method: We performed CPX to evaluate Peak VO₂ intake (PVO₂) at baseline for 196 consecutive PeAF patients undergoing RFCA (male: 151, female: 45). After >6 months SR-maintenance, CPX was repeated. %PVO was calculated by standardizing PVO to age and gender. During RFCA, Swan-Ganz catheter study was done to monitor changes in hemodynamics before and after RFCA. Echocardiography was done at baseline, 6 months after SR maintenance.

Results: %PVO varied from 38 to 175% before RFCA. %PVO₂ of NYHA 3 class patients was 76.8±17.7%. PeAF patients with 80% and more of %PVO₂ seemed adjusted to AF in terms of exercise capacity. In this study we defined PeAF patients below 80% PVO₂ as Non-adjusted. Out of 196 patients, 149 undertook CPX again. Changes in %PVO₂ ranged from -38% to 48% (median: 7.0%). According to multi-regression analysis of changes in %PVO, PeAF patients with Non-adjustment ($\beta=0.31$), greater increase in HR during repeated CPX ($\beta=0.40$), larger reduction in E/e ($\beta=-0.21$) after SR maintenance, obtained larger improvement in EC. Particularly, Non-AF adjustment in PeAF patients was the sole predictor of improvement in EC after RFCA.

Furthermore, we sought to identify the determinants of Non-AF adjustment in PeAF patients. Multivariate logistic analysis demonstrated that female patients became Non-adjusted significantly more easily than male ($p<0.001$). Increase in HR during CPX was the most important factor for adjustment to PeAF. In males, poor LV diastolic function, higher Pulmonary vascular resistance were also negative predictors for adjustment to PeAF. However, there is concern about deterioration in EC for patients with chronotropic incompetence revealed after RFCA.

Conclusion: The extent to which PeAF patients could adjust to AF helps in evaluating the significance of SR-maintenance and determining the suitability of aggressive SR-maintenance therapy.