Impact of Rhythm Control by Catheter Ablation on Exercise Capacity in Asymptomatic Long-standing Persistent Atrial Fibrillation: Implication of Chronotropic Incompetence

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Introduction: A decision to perform AF ablation in long-standing persistent atrial fibrillation (L-PeAF) is challenging, moreover if patients are asymptomatic, because a mortality or stroke reduction benefit of rhythm control with catheter ablation over a rate control strategy has not been demonstrated. This study evaluated the impact of rhythm control by catheter ablation on exercise performance in asymptomatic (mEHRA score=0) L-PeAF patients.

Methods: A decision to perform AF ablation in long-standing persistent atrial fibrillation (L-PeAF) is challenging, moreover if patients are asymptomatic, because a mortality or stroke reduction benefit of rhythm control with catheter ablation over a rate control strategy has not been demonstrated. This study evaluated the impact of rhythm control by catheter ablation on exercise performance in asymptomatic (mEHRA score=0) L-PeAF patients.

Result: Compared to baseline, no improvement in all 4 exercise parameters was observed in rate control group (Group 1, n=39). Postablation exercise study in recurrence-free patients (Group 2, n=48) showed significant increase in O2-pulse(10.32±3.10 vs. 14.04±3.99 mL/beat, \( \Delta \delta = 3.72±3.36, P<0.0001 \)), and small increase in Peak VO2(25.24±5.04 vs. 26.45±5.33 mL/min/kg, \( \delta = 1.22±4.36, P=0.059 \)). However, a significant increase of peak VO2 was observed in patients without chronotropic incompetence (CI) among group 2 patients (n=24, 26.22±4.99 vs. 28.52±5.28 mL/min/kg, \( \delta = 2.30±4.72, P=0.026 \)), whereas not in patients with CI(24.26±4.99 vs. 24.39±4.60 mL/min/kg, \( \delta = 0.13±3.74, P=0.868 \)). Postablation exercise study in symptomatic L-PeAF(group 3, n=20) showed significant increase in Peak VO2 (24.41±6.49 vs. 29.41±6.42 mL/min/kg, \( \delta = 4.99±5.94, P=0.001 \)), in O2-pulse (8.86±3.22 vs.13.85±2.64 mL/beat, \( \delta = 4.99±2.85, P<0.0001 \)), corresponding METs (6.52±2.09 vs. 8.21±1.97, \( \delta = 1.70±1.83, P=0.001 \)), and decrease in VE/VCO2 slope( 34.91±19.81 vs. 24.14±5.93, \( P=0.054 \)).

Conclusion: Successful ablation improves exercise capacity in selected asymptomatic L-PeAF without postablation CI. Improvement of exercise capacity after catheter ablation is more prominent in symptomatic L-PeAF.