Effects of cardiac rehabilitation on the two-year prognosis of patients with heart failure: a multicentre prospective cohort study

T. Adachi[1], N. Iritani[2], K. Kamiya[3], K. Iwatsu[4], K. Kamisaka[5], Y. Iida[6], S. Yamada[1]

[1]Nagoya University Graduate School of Medicine, Department of Integrated Health Sciences, Nagoya, Japan; [2]Toyohashi Heart Center, Department of Cardiac Rehabilitation, Toyohashi, Japan; [3]Osaka Medical College, Department of Hygiene & Public Health, Takatsuki, Japan; [4]Hirakata Kohsai Hospital, Department of Rehabilitation, Hirakata, Japan; [5]Kitano Hospital, Rehabilitation Center, Osaka, Japan; [6]Toyohashi Sozo University, Department of Physical Therapy, Toyohashi, Japan

On behalf of FLAGSHIP collaborators

Background: Cardiac rehabilitation (CR) is a comprehensive disease management program highly recommended by heart failure (HF) guidelines. However, the prognostic effects of outpatient CR are inconsistent among recent meta-analyses which enrolled mainly younger HF with reduced ejection fraction (HFrEF). With an aging population, an increased importance of CR has been put on patients with HF with preserved ejection fraction (HFpEF).

Purpose: This study aimed to examine the prognostic effects of regularly undergoing CR for 6 months after discharge analysing nationwide cohort data including older population with HFrEF and HFpEF.

Methods: We analysed 2876 patients who hospitalised for acute HF or worsening chronic HF and capable of walking at discharge in the multicentre prospective cohort study. Frequency of outpatient CR participation of each patient was collected using medical records. We assessed CR frequency within 6 months of discharge since most collaborating hospitals conducted final follow-up examinations at 6 months. The CR group was defined as patients who underwent outpatient CR once or more per week for 6 months after discharge. The main study endpoint was a composite of all-cause mortality and HF rehospitalisation during a 2-year follow-up. We performed a propensity score-matched analysis to compare survival rates between the CR and non-CR groups. Propensity scores for each patient were produced by a logistic regression analysis with the CR group as the dependent variable and 33 potential confounders as independent variables. To evaluate events beyond 6 months, we also conducted landmark analyses at 6 months.

Results: Of the 2876 enrolled patients, 313 underwent CR for 6 months. After propensity score matching using confounding factors, 626 patients (313 pairs) were included in the survival analysis (median age: 74 years, men: 59.6%, median left ventricular ejection fraction [LVEF]: 42%). During 1006.1 person-years of follow-up, 137 patients were rehospitalised due to HF exacerbation, and 50 patients died in the matched cohort. In Cox proportional hazards model (Figure 1), CR was associated with a reduced risk of composite outcomes (hazard ratio [HR] 0.66; 95% confidence interval [CI] 0.48–0.91), all-cause mortality (HR 0.53; 95% CI 0.30–0.95), and HF rehospitalisation (HR 0.66; 95% CI 0.47–0.92). A subgroup analysis showed similar CR effects in patients with HFpEF (LVEF ≥50%) and HFrEF (LVEF <40%). However, in a landmark analysis, CR did not reduce the adverse outcomes beyond 6 months after discharge (Figure 2).

Conclusions: The findings of this study demonstrate the needs that CR should become a standard treatment for HF regardless of HF type and the necessity of periodical follow-up after completing CR program to maintain its prognostic effects.
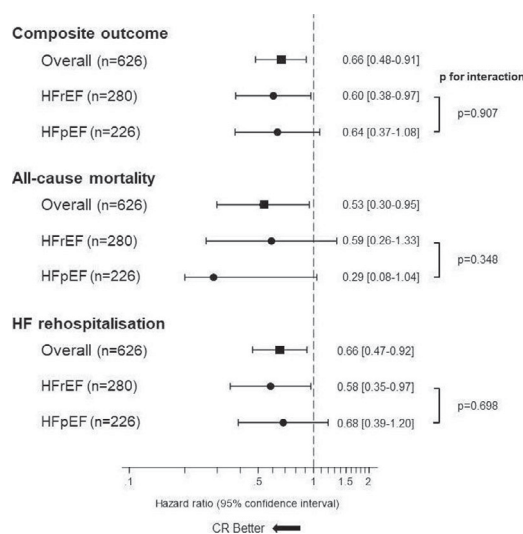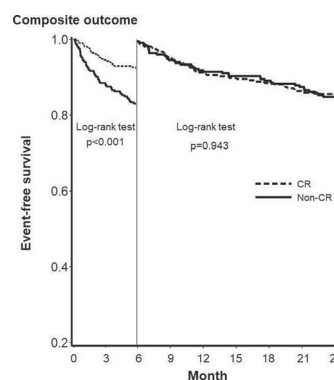
Figure 1. Prognostic effects of CR

Figure 2. Landmark analysis