

Author's reply: A decline in activities of daily living due to acute heart failure is an independent risk factor of hospitalization for heart failure and mortality



Thank you for taking an interest in our study. We would like to thank Dr Li for raising some important points of discussion regarding our recent publication in the *Journal of Cardiology* [1].

Although activities of daily living (ADL) are recognized as being pertinent in averting relevant readmission for heart failure (HF) and mortality, little research has been conducted to assess a correlation between a decline in ADL and outcomes in HF patients. Using the Kitakawachi Clinical Background and Outcome of Heart Failure (KICKOFF) Registry, a community-based cohort study [2], we clearly described that a decline in ADL serves as a predictor of hospitalization of HF and all-cause death in patients with acute HF and a detailed social background in Japanese patients with a decline in ADL.

Dr Li suggested first that patients in the non-decline ADL group were younger than those in the decline ADL group. The older patients were complicated with other diseases, which may limit the patients' ADL. I agree with this point. Patients with HF were almost all suffering from other co-morbidities. Unfortunately, we do not have the data of orthopedic co-morbidities. However, our study showed that a decline in ADL caused the hospitalization for HF and is associated with hospitalization for HF and mortality. We compared the patients' ADL at the admission and before the discharge. In a sensitivity analysis, we added to compare the outcomes between the groups of patients with other factors including age (the groups for 75 years and over 75 years). In addition, we performed a multivariate analysis with the selected covariates including age (/year). Both analyses showed that a decline in ADL due to HF is an independent risk factor for hospitalization for HF and mortality.

Second, we should show the reason for a decline in ADL, but we checked only the patients' ADL at the admission and before the discharge. We did not collect the detailed data on what caused a decline in ADL. As Dr Li pointed out, the co-morbidities were the keys for a decline in ADL. This limitation would be intrinsic to multicenter registry studies. We would like to study this in future research.

Third, we can show the data of echocardiography and prescriptions at discharge. At the discharge, there were no significant differences in the left atrial (LA) diameter between the decline ADL group and non-decline ADL group (47.1 ± 8.2 mm vs. 41.2 ± 8.3 mm, $p = 0.29$). In the decline ADL group, the left ventricular (LV) diastolic and the LV systolic diameter were smaller than in the non-decline group (47.2 ± 9.2 mm vs. 49.4 ± 8.3 mm,

$p = 0.03$; 33.3 ± 10.1 mm vs. 36.6 ± 11.3 mm, $p = 0.04$, respectively). The SOLVD registry showed that the larger LV systolic diameter and the larger LA diameter were associated with increased mortality [3]. However, we had another result in our study because of the inclusion and exclusion criteria. In the SOLVD registry, the inclusion criteria were not only patients with HF but also patients with ejection fraction (EF) $\leq 45\%$. In our registry, we enrolled the patients of HF with preserved EF.

In regard to the prescriptions, there was no significant difference in the prescriptions of diuretic, angiotensin II receptor blocker, aldosterone receptor antagonist, beta-blocker and oral inotropic agents between the decline ADL group and non-decline ADL group (75.5% vs. 79.2%, $p = 0.41$; 43.9% vs. 49.3%, $p = 0.31$; 14.3% vs. 15.9%, $p = 0.68$; 61.2% vs. 68.4%, $p = 0.16$; 9.2% vs. 6.3%, $p = 0.30$; respectively). In 2017 in Japan, we could not use angiotensin receptor neprilysin inhibitor (ARNI) at general hospitals. We cannot predict the association with prescriptions and events.

I hope that my reply will address the problems that Dr Li pointed out. Once again, I would like to appreciate the intellectual suggestions and continued scientific discussions on the subject in the future.

References

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