Redox state of human serum albumin predicts 1-year prognosis in patients with heart failure: a single center prospective cohort study


1Japan Red Cross Aichi Medical Center Nagoya Daiichi Hospital, Department of Rehabilitation, Nagoya, Japan
2Nagoya University Graduate School of Medicine, Department of Biomolecular Sciences, Nagoya, Japan
3Japan Red Cross Aichi Medical Center Nagoya Daiichi Hospital, Department of Cardiology, Nagoya, Japan
4Fujita Health University Bantane Hospital, Department of Cardiology, Nagoya, Japan
5Aichi Medical University, Department of Cardiology, Nagakute, Japan

Funding Acknowledgements: Type of funding sources: Public Institution(s). Main funding source(s): Japanese Society of Cardiac Rehabilitation

Background: As chronic inflammation would be a fundamental underlying mechanism in the pathogenesis in patients with heart failure (HF), oxidative stress has a possibility to closely associate with the prognosis. However, little is known about the association of oxidative stress with the prognosis in HF patients.

Purpose: In this study, we assessed the association of the fraction of human mercapto-albumin \( f(\text{HMA}) \), an index of the redox state of human serum albumin, with prognosis in patients hospitalized for HF with the aim to find the possible biomarker available on the prediction for adverse events in HF patients.

Methods: A single-center prospective cohort study was conducted. In the cohort, 290 ambulate patients admitted for acute HF or exacerbation of chronic HF were registered. Of these, 182 who were successfully followed-up patients were analyzed (median age: 79 years, men: 68.3%, median follow-up: 365 days). The primary outcome was a composite of HF rehospitalization and all-cause mortality. The high-performance liquid chromatography postcolumn bromocresol green method was used to part human serum albumin into human nonmercaptoalbumin (oxidized form) and human mercaptoalbumin (HMA, reduced form). We divided patients into two groups by median \( f(\text{HMA}) \) level. Kaplan-Meier Curve and the Cox proportional hazards model was used to examine the significance of \( f(\text{HMA}) \) as a prognostic indicator of HF patients, adjusting for potential confounding factors.

Results: Median level of \( f(\text{HMA}) \) was 57.2%. During 50,965 person-days of follow-up, 52 patients (28.6%) were re-hospitalized due to HF exacerbation, and 25 patients (13.7%) died due to cardiac or noncardiac reasons. Log-rank analysis showed that a high \( f(\text{HMA}) \) group reduced adverse events (Fig. 1). In the Cox proportional hazards model, a high level of \( f(\text{HMA}) \) was associated with a reduced risk of composite outcomes (hazard ratio [HR] 0.64; 95% confidence interval [CI] 0.39-1.07). In the subgroup analysis, high \( f(\text{HMA}) \) showed an event-reducing effect in HF rehospitalizations (HR 0.53; 95% CI 0.30-0.94), but not in all-cause mortality (HR 0.61; 95%CI 0.27-1.38).

Conclusion: The findings of this study support that \( f(\text{HMA}) \) could be a novel prognostic biomarker for HF patients.