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Relationship between skin autofluorescence levels and clinical outcomes in heart failure patients undergoing cardiac rehabilitation

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Background: Advanced glycation end-products, indicated by skin autofluorescence (SAF) levels, could be prognostic predictors of all-cause and cardiovascular mortality in patients with diabetes mellitus (DM) and renal disease. However, the clinical usefulness of SAF levels in patients with heart failure (HF) who underwent cardiac rehabilitation (CR) remains unclear.

Purpose: The purpose of this study was to investigate the prognostic value of SAF levels in patients with HF who underwent CR.

Methods: This study enrolled 204 consecutive patients with HF who had undergone CR at our university hospital between November 2015 and October 2017. Clinical characteristics and anthropometric data were collected at the beginning of CR. SAF levels were noninvasively measured with an autofluorescence reader. The major adverse cardiovascular event (MACE) was a composite of all-cause mortality and unplanned hospitalization for HF. Follow-up data concerning primary endpoints were collected until November 2018.

Results: Patients' mean age was 68.1 years, and 61% were males. Patients were divided into two groups according to the median SAF levels (high and low SAF groups). Patients in the high SAF group were significantly older, had a higher prevalence of chronic kidney disease, and histories of coronary artery bypass surgery; however, there were no significant between-group differences in sex, prevalence of DM, left ventricular ejection fraction, and physical function. During a median follow-up period of 623 days, 25 patients experienced all-cause mortality and 34 were hospitalized for HF. Kaplan–Meier analysis showed that patients in the high SAF group had a higher incidence of MACE (log-rank $P<0.05$), whereas when patients were divided into two groups according to the median hemoglobin A1c level, no significant between-group difference was observed for the incidence of MACE (Figure). After adjusting for confounding factors, Cox regression multivariate analysis revealed that SAF levels were independently associated with the incidence of MACE (hazard ratio: 1.74, 95% confidence interval: 1.12–2.65, $P<0.05$).

Conclusion: SAF levels were significantly associated with the incidence of MACE in patients with HF and may be useful for risk stratification in patients with HF who undergo CR.

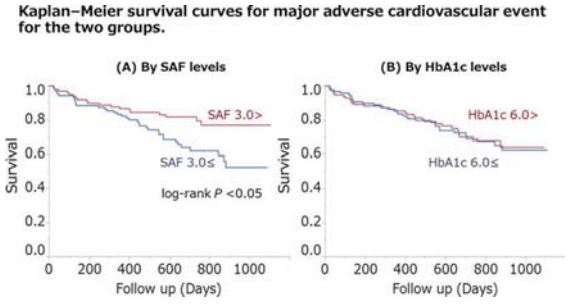

Figure 1