Rehabilitation

Associations of severity of liver damages with physical function and prognosis in patients with heart failure

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Introduction: Heart failure (HF) and liver dysfunction often coexist because of complex cardiohepatic interactions, which adversely affects prognosis. However, the association between liver dysfunction and physical dysfunction, and between coexistence of both and prognosis in HF patients remains unclear.

Purpose: We evaluated the associations of severity of liver damage and physical function and prognosis in patients with HF.

Methods: The study population consisted of 895 patients with HF (mean age, 69.4 ± 14.2 years) who underwent liver function test using model for end-stage liver disease excluding international normalized ratio (MELD-XI) score and physical function test (grip strength, leg strength, gait speed, and 6-minute walking distance [6MWD]). The associations between MELD-XI score and physical function were assessed by multivariate linear regression model analysis. Moreover, we investigated the prognostic value of coexistence of liver dysfunction and physical dysfunction. The endpoint was all-cause mortality.

Results: After adjusting for covariates, MELD-XI score was independently associated with lower grip strength, leg strength, gait speed, and 6MWD (P < 0.001). In addition, hierarchical multivariate linear regression analysis revealed that adding MELD-XI scores or BNP explained additional variance in the physical function measures. The MELD-XI score added to the clinical model was significantly more predictive of physical function (grip strength, change in F: 27.105, P < 0.001; leg strength, change in F: 33.980, P < 0.001; gait speed, change in F: 22.826, P < 0.001; 6MWD, change in F: 59.193, P < 0.001) than BNP added to the clinical model. Eighty-six deaths occurred over a median follow-up period of 1.67 years (interquartile range: 0.62 – 3.04). Patients with high MELD-XI score and reduced physical function were found to have significantly higher mortality risk even after adjusting for several covariates (grip strength, hazard ratio [HR] = 3.80 [95% confidence interval (CI) = 2.04 – 7.08], P < 0.001; leg strength, HR = 4.65 [95% CI = 2.47 - 8.75], P < 0.001 and gait speed, HR = 2.49 [95% CI = 1.43 - 4.33], P = 0.001; 6MWD, HR = 5.48 [95% CI = 2.88 - 10.41], P < 0.001).

Conclusions: Liver dysfunction was correlated with reduced physical function. Moreover, the coexistence of lower physical function and liver dysfunction considerably affected prognosis in patients with HF.

Abstract Figure. Kaplan–Meier survival curves