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Effects of branched chain amino acid supplementation on exercise training during early recovery phase in elderly patients with heart failure and sarcopenia

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Background and Purpose: In patients with heart failure (HF), sarcopenia is recognized as a therapeutic target related to the patients' reduced exercise capacity and adverse clinical outcomes. Although exercise training is effective for HF patients with sarcopenia, the optimal nutritional intervention for these patients remains unclear. We examined the effect of branched chain amino acid (BCAA) supplementation on exercise training in HF patients.

Methods and Results: Twenty-six HF patients aged 65 years or older (73% female, age 81±7 yrs) were enrolled in this prospective study. In the early recovery phase during hospitalization, they were administered 2500 mg/day of BCAA (leucine 1400 mg/day) after combined aerobic and resistance exercise training. Body composition, anthropometric measurements, and biomarkers associated with sarcopenia were evaluated at the beginning of the study and discharge. Coronary artery disease, valvular heart disease, atrial fibrillation, non-ischemic cardiomyopathy and hypertension, were observed in 23%, 42%, 69%, 23%, and 58%, respectively. During the mean 11.9±9.2 days of BCAA supplementation, HF worsening was not observed. The patients' Short Physical Performance Battery (SPPB) scores improved significantly after intervention (from 7.8±3.3 to 8.5±2.8, p<0.05). Significant improvement was not observed in knee extension strength or the skeletal muscle mass index. Insulin-like growth factor 1 (IGF-1) increased significantly from 79.4±24.1 ng/ml to 104.6±29.6 ng/ml (p<0.01) whereas growth hormone, testosterone, tumour necrosis factor alpha, vitamin D, high-sensitivity C-reactive protein and interleukin-6 were unchanged. In the patients with sarcopenia (n=15), significant improvement was observed in the SPPB score (from 6.4±2.9 to 7.4±2.3, p<0.05) and IGF-1 (from 76.4±24.1 ng/ml to 108.7±34.8 ng/ml, p<0.01); these changes were not observed in the patients without sarcopenia (n=11).

Conclusions: BCAA supplementation on exercise training in elderly HF patients with sarcopenia was safe and can be effective in early recovery phase during hospitalization. Further comparative studies are needed.