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Effect of Leucine-enriched Amino Acid Supplementation and Exercise in Patients on Maintenance Hemodialysis

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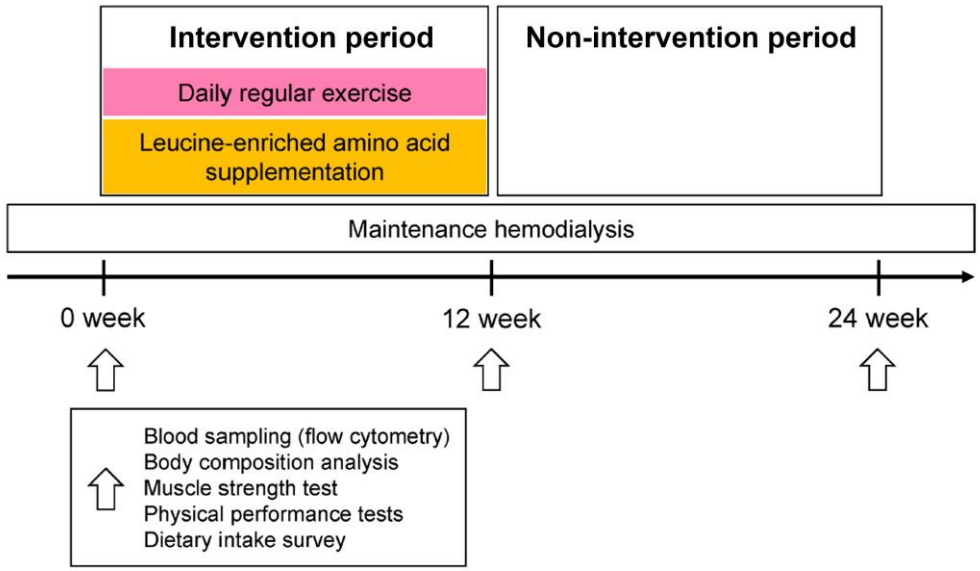
Objectives : Sarcopenia frequently occurs in hemodialysis patients up to 40%. We examined the effect of supplementation of leucine amino acid combined with resistance exercise on preventing sarcopenia in patients on maintenance hemodialysis (MHD).
Methods : This was a single center, prospective, single-arm pilot study in Chungnan National University Hospital. 22 non-sarcopenic patients on MHD at our hospital were enrolled. During the intervention period (first 12 weeks), participants were provided with daily 6g of leucine (3g in capsule and 3g via beverage) and a protocol for daily resistance exercise. Both interventions were stopped during following 12 weeks. Bioimpedance analysis (BIA), handgrip strength (HGS), short physical performance battery (SPPB), serum chemistry, immunophenotype of peripheral blood mononuclear cells were examined at baseline, 12 week and 24 week. Participants who expressed 5% or more improvement in each parameter were defined as responders.
Results : The study group's mean age and dialysis vintage was 55±11.8 years and 4.7±3.5 years, respectively. 7 patients (31.8%) were female. 21 patients (95.4%) showed improvement in at least one or more parameters. At 12 week, the number of responders were 14(63.5%) for skeletal muscle index and 7(31.8%) for grip strength. Baseline low grip strength (<35.0kg) was the strongest predictor of improvement in grip strength .Increase in grip strength was significant in females (7.6±8.2 vs -1.6±7.2%, p=0.03), in age over 60 (5.3±6.2 vs.-1.4±9.1%, p=0.04), and with higher exercise adherence (6.8±7.7 vs -3.2±6.4%, p=0.004). The number of responders were 13 patients (59.1%) for gait speed and 14(63.5%) for sit-to-stand time. Baseline low hemoglobin(<10.5 g/dL) and low hematocrit lower(<30.8%) were predictors of improvement in sit-to-stand time(AUC 0.862 and 0.848, respectively).
Conclusions : Supplementation of leucine amino acid combined with resistance exercise contributed to improvement of muscle mass, muscle strength, and physical performance in patients on MHD.

Study protocol.jpg



Study protocol.jpg