

Frailty, Hand Grip Strength, and Predictive Laboratory Parameters in Patients on Long-Term Hemodialysis

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Objectives: To determine the association of frailty with hand grip strength and to identify predictive laboratory parameters in patients with end stage renal disease on maintenance hemodialysis.

Methods: This observational study was carried out during December 2024 and January 2025 on patients with end stage renal disease on maintenance hemodialysis. Key exclusion criteria included physical disabilities, poor functional status, acute kidney injury and unwillingness. Before the start of the mid-week hemodialysis session, hand grip strength was tested on both sides thrice using a handheld digital dynamometer and the best value recorded. Short Physical Performance Battery was also administered to all patients by trained house officers. Blood samples were also collected before starting the hemodialysis sessions to check blood hemoglobin, serum calcium, phosphate, albumin, creatinine, potassium, C-reactive protein and bicarbonate levels. Scores of 10-12 on SPPB were classified as normal. Lower scores indicated frailty.

Results: There were 105 patients, aged 55.00 ± 14.96 years. Hand grip strength was 15.11 ± 6.95 and 13.52 ± 6.96 on the right and left sides, with a mean HGS of 14.32 ± 6.80 kg. There was a significant correlation between HGS and SPPB score ($r^2=0.287$; $p<0.001$). Handgrip strength ≥ 16.95 kg had a sensitivity of 65.71% and a specificity of 81.43% in predicting a score of ≥ 10 on SPPB (area under ROC curve=0.781; $p<0.001$). None of the laboratory parameters could predict frailty in this cohort ($p>0.05$ for all parameters on logistic regression).

Conclusions: Though the presence of frailty correlates with the hand grip strength, it cannot be predicted by any of the laboratory parameters evaluated in this study.

Keywords: Hemodialysis; End-stage renal disease; Hand grip strength; Physical performance; Frailness

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