

혈액투석환자에서 신체수행 능력에 영향을 미치는 인자

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Factors Affecting Physical Performance in Maintenance Hemodialysis Patients

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Background: Poorer physical performance (PP) is observed even in relatively healthy maintenance hemodialysis (MHD) patients than in general population, which is associated with lower quality of life, higher rate of hospitalization and mortality. We therefore assessed PP in MHD patients and age- and gender-matched normal controls and evaluated factors related with PP in MHD population.

Methods: PP was evaluated in 81 patients on MHD 3x/week for ≥ 6 months and 34 controls using measures such as 6-minute walk (6MW, m), sit-to-stand (STS, cycles), gait speed (m/s) and timed up and go (TUG, s) test. Body composition was measured with bioelectrical impedance analysis (BIA), dual energy X-ray absorptiometry (DEXA) and computed tomography (CT). Muscle strength was assessed with hand grip dynamometer. Data on demographic, nutritional status and blood chemistry were obtained.

Results: Patients were 56.1 ± 11.9 (SD) years (y), 46.9% female, 54.3% diabetes and dialysis vintage was 4.7 ± 5.2 y. Normals were 54.5 ± 13.7 y and 50% female. All PP were greatly reduced in MHD vs. normal (all $p < 0.001$): 6MW (458.9 ± 112.7 vs. 570.4 ± 75.0), STS (17.9 ± 5.6 vs. 24.3 ± 7.2), gait speed (0.91 ± 0.19 vs. 1.10 ± 0.18) and TUG (7.3 ± 2.0 vs. 5.7 ± 1.1). In univariate analysis, PP (in order as follows: 6MW, STS, gait speed and TUG) correlated with age ($r = -0.477$, $p < 0.001$; $r = -0.358$, $p = 0.001$; $r = 0.383$, $p < 0.001$; $r = 0.468$, $p < 0.001$), phase angle (PA) measured by BIA ($r = 0.322$, $p = 0.004$; $r = 0.450$, $p < 0.001$; $r = -0.436$, $p < 0.001$; $r = -0.331$, $p = 0.003$), weight-adjusted appendicular skeletal muscle mass (ASM/wt, %) measured by DEXA ($r = 0.347$, $p = 0.002$; $r = 0.148$, $p = 0.189$; $r = -0.262$, $p = 0.018$; $r = -0.231$, $p = 0.038$), weight-adjusted thigh muscle area (TMA/wt, cm^2/kg) measured by CT ($r = 0.527$, $p < 0.001$; $r = 0.490$, $p = 0.004$; $r = -0.523$, $p < 0.001$; $r = -0.466$, $p < 0.001$). These PP are also significantly associated with grip strength (kg, $r = 0.472$, $p < 0.001$; $r = -0.235$, $p = 0.035$; $r = -0.444$, $p < 0.001$; $r = -0.474$, $p < 0.001$). Even after adjustment for age, gender, serum creatinine, hemoglobin, 25(OH) vitamin D, PA and ASM/wt, TMA/wt. shows significant correlation with 6MW ($r = 0.32$, $p < 0.001$), STS ($r = 0.51$, $p < 0.001$) and gait speed ($r = -0.37$, $p < 0.001$) and grip strength is related to STS ($r = 0.25$, $p = 0.017$) and TUG ($r = -0.27$, $p = 0.004$).

Conclusions: MHD patients show decreased PP compared to normals, which are significantly related to loss of muscle mass and strength (i.e. sarcopenia). Intervention to overcome sarcopenia must be important in order to improve PP in this population.

Key Words: 혈액투석, 신체수행능력, 근육량, 근력

Maintenance hemodialysis, Physical performance, Sarcopenia