血液透析濾過（Hemodiafiltration）および透析の透析膜（ダイアライザー）の違いが透析中に実施する運動療法の効果に与える影響：過去基点多施設コホート研究

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【Background and aims:】Diminished physical function in hemodialysis patients is a critical issue, necessitating strategic approaches to enhance the efficacy of exercise therapy. The differential impacts of HD and HDF on solute clearance, albumin loss, uremic conditions, and malnutrition could influence the success of exercise interventions. Presently, empirical evidence for this is lacking. This investigation explores how HD and HDF modalities influence the efficacy of exercise therapy administered during dialysis sessions.

【Methods】 This study encompassed intradialytic resistance exercises, involving 414 hemodialysis patients across 10 centers over six months. The intradialytic regimen comprised stretching and four types of resistance exercises utilizing elastic tubes, conducted thrice weekly. Parameters such as 10-meter walking speed, knee extensor muscle strength, serum albumin levels, normalized protein catabolic rate (nPCR), and Creatinine Generation Rate (%CGR) were assessed pre-and post-intervention. Statistical analysis included propensity score matching to adjust for baseline characteristics, segregating patients into HD and HDF cohorts. Changes in the aforementioned indicators before and after intervention (Δ) were calculated. Analytical methods included paired t-tests for within-group comparisons and independent t-tests for between-group comparisons of Δ values. A 5% risk threshold was established for statistical significance. Ethical clearance was obtained from the Seirei Christopher University Ethics Committee.

【Results】A propensity score matching yielded 70 matched pairs. Within-group analyses in the HD group revealed significant improvements in 10-meter walking speed (1.42±0.41→1.60±0.46 m/s, p=0.000), knee extensor strength (44.3±14.7→49.6±13.8%, p=0.000), and a reduction in Kt/V (1.69±0.32→1.64±0.32, p=0.006) after six months. The HDF group significantly enhanced 10-meter walking speed (1.54±0.40→1.72±0.40, p=0.000), knee extensor strength (51.7±17.1→57.4±17.7%, p=0.000), nPCR (0.88±0.15→0.94±0.18, p=0.009), and %CGR (106.3±23.2→112.9±25.2, p=0.002). Comparative analysis between groups demonstrated a significantly lower ΔAlb （HD 0.04±0.24 HDF -0.05±0.27, p=0.045）and a higher Δ%CGR （HD 1.47±18.2 HDF 6.65±17.2, p=0.004）in the HDF group compared to the HD group.

【Conclusion】The study demonstrated a notable HDF group improvement in %CGR, an indicator of muscle mass, despite a decrease in albumin levels. This suggests that albumin loss due to HDF minimally affects the augmentation of physical function. The findings suggest integrating exercise therapy with HDF may positively influence protein consumption and muscle mass enhancement.

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