The Effects of Intradialytic Exercise on Daily Physical Activity and Clinical Parameters in Hemodialysis (HD) Patients

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**Background:** The mortality of HD patients treated with the novel online hemodiafiltration (HDF) is better than conventional HD, but is still higher than non-HD population. Sedentary or low daily physical activity caused by sarcopenia, inactive life style, and uremic toxins, are correlated with increased cardiovascular mortality. Interestingly, the potential of adding intradialytic exercise program to improvement daily physical activity and overall health status of dialysis patients has never been explored.

**Objective:** Our intradialytic exercise training protocol was initiated by multidisciplinary team to assess the effects on daily physical activity and other clinical parameters in HD patients.

**Methods:** This was an open-labelled randomized controlled trial in 12 HD patients treated with the online HDF. All participants were randomized into control or adding intradialytic exercise (IDX) groups. The subjects in the IDX group were trained to exercise on a cycle ergometer (Figure 1) within the first hour of online HDF. Physical activity was measured in term of daily step counted by a wrist-worn wearable triaxial accelerometer (Fitbit flex2®). The muscle mass and biochemical values were measured and compared at baseline and 3 months. (ClinicalTrials.gov Registration: NCT03353844)

**Result:** Of 12 HD patients, their ages were 53.1±14.5 years and BMI were 23.23±5.5 kg/m2. The baseline physical activities measured by daily step count were 5,948±3715 and 6525±5389 steps (NS) in the IDX and the control groups, respectively. At 3 months, the physical activities were improved in the IDX group compared with the control group (+1449.66 ± 1405.02 vs -766.68 ± 819.31 steps, P = 0.034). The muscle mass changes were slightly higher in the IDX group. Hemoglobin and albumin changes were increased in the IDX group compared with the control group < +1.0 (0.2, 2.7) vs -1.4 (-3.4, 0.1) g/dL, P= 0.016 and +0.30(0.0, 0.63) vs -0.15(-0.28, -0.03) g/dL, P=0.010>. The phosphate reductions were more favourable in the IDX group <-2.05 (-2.80, -0.73) vs -0.10 (-0.88, 0.75), P=0.016).

**Conclusion:** Intradialytic exercise training could improve physical activity as well as muscle mass and other metabolic controls in HD patients. These may contribute to further improvement in quality of life and cardiovascular mortality.
Keywords: Intradialytic exercise, Physical activity, Hemodialysis patient