

The Impact of Intradialytic Pedaling Exercise on Arterial Stiffness in a Hemodialysis Population

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Objectives: Hemodialysis patients are at greater risk of increased arterial stiffness. Regular aerobic exercise has been shown to reduce arterial stiffness in hemodialysis patients. However, the impact of a more realistic intradialytic form of exercise, such as pedaling, is unclear. Therefore, we aimed to examine 1) the effect of intradialytic pedaling exercise on arterial stiffness over 4 months, and 2) the durability of the pedaling effect 4 months after finishing the exercise intervention.

Methods: We performed a 4-month randomized control trial in patients on a stable in-center hemodialysis regimen (3 days/week). Subjects were block randomized to either pedaling exercise (EX) or to a control group receiving usual dialysis (nonEX) for 4 months. At baseline and 4 months, augmentation index heart rate corrected (Alx75), and carotid-femoral pulse wave velocity (cfPWV) were assessed (applanation tonometry; SphygmoCor XCEL). Measurements were repeated in the EX group 4 months after the exercise intervention.

Results: 11 exercisers (58±16 years, BMI 26±5kg/m², 3 female) and 10 controls (53±15 years, BMI 27±6kg/m², 3 female) were included. Overall exercise compliance was 60±25%, and subjects exercised on average 47±25 mins per session. Alx75 was unchanged in the EX group, however an increase of 4.4±4.5% was noted in the nonEX group (*P*=0.020). We observed a greater absolute decrease in cfPWV in the EX group compared to the nonEX group: -1.44±2.06 vs. 0.27±0.55 m/s (*P*=0.037) (Figure 1). This difference in cfPWV was maintained after adjustments for age, Charlson comorbidity score, and the baseline cfPWV value (*P*=0.041). Interestingly, the decrease in cfPWV observed in the EX group was partially preserved 4 months after exercise cessation (Figure 2).

Conclusions: The relationship between intradialytic pedaling exercise and improved arterial stiffness is promising, and warrants further investigation. Moreover, we have demonstrated that pedaling exercise is a realistic form of aerobic training in hemodialysis patients.

Figure 1. Post-Exercise Absolute Change in cfPWV

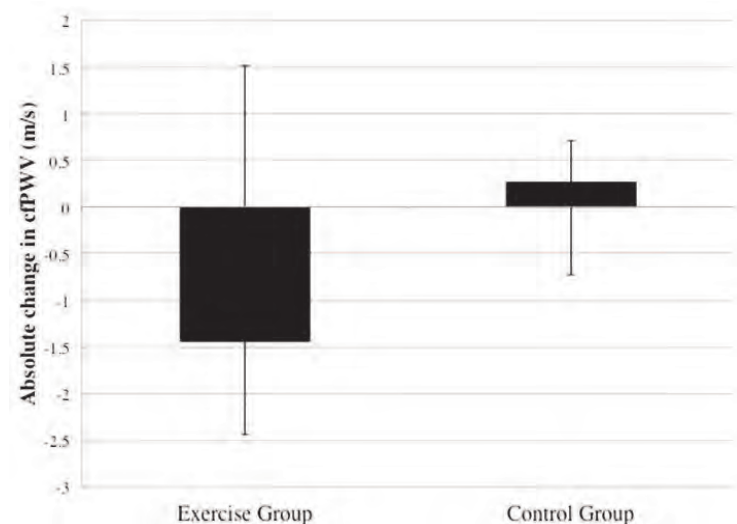


Figure 2. cfPWV at baseline, post-exercise and 4 months after exercise cessation

