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Muscle strength, muscle mass and arterial stiffness in peritoneal dialysis patients

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OBJECTIVES

Muscle tissue is a principal component of the heart and, in the form of vascular smooth muscle, also of the vasculature; muscle wasting in chronic kidney disease could therefore potentially affect cardiac and vascular contractility. We here investigated possible associations between muscle strength, muscle mass and arterial stiffness measurements in a cohort of prevalent peritoneal dialysis (PD)

METHODS

In a cross-sectional analysis 76 prevalent PD patients underwent assessments of muscle strength - by handgrip dynamometry yielding handgrip strength (HGS) - and muscle mass – by dual-energy X-ray absorptiometry (DXA) yielding lean body mass (LBM). Arterial stiffness was measured by pulse waveform analysis (PWA) using SphygmoCor device; two PWA parameters were used in this study as surrogate markers of arterial stiffness: central pulse pressure (CPP) and augmentation index (AIx).

RESULTS

In univariate analysis, HGS and LBM were significantly and negatively correlated with CPP and AIx. In multivariate analysis, and independently of age, sex, diabetes mellitus status, serum albumin levels, and BMI or waist circumference, HGS was negatively associated with CPP (standard beta=-0.36; p=0.01). Similar results were observed for AIx (standard beta=-0.27; p=0.05). In contrast to HGS, LBM was not associated with CPP or AIX in multiple adjusted models.

CONCLUSIONS

Reduced muscle strength, but not reduced muscle mass, was independently associated with indices of higher arterial stiffness in patients undergoing PD therapy. This is consistent with the hypothesis that uremia-induced muscle alterations may impact on arterial contractility.

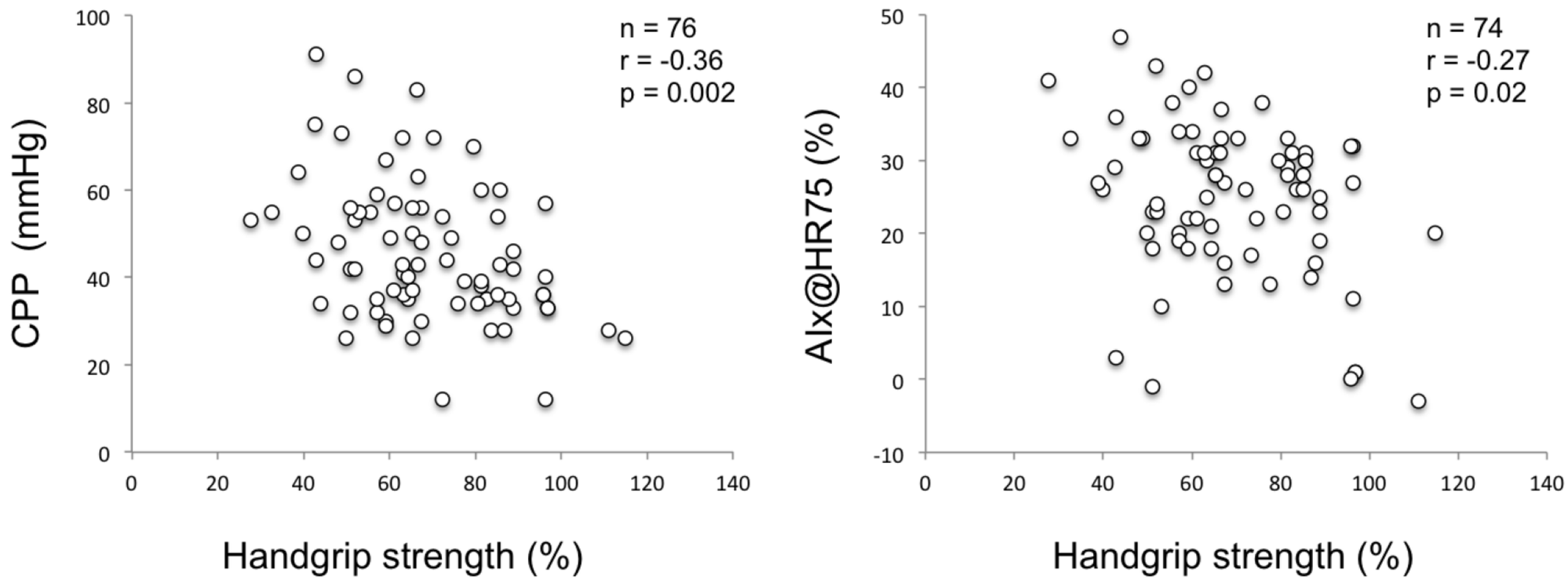

Figure 1. Univariate correlations between handgrip strength and CPP (central pulse pressure) and AIx@HR75 (augmentation index corrected by a 75 bpm heart rate)

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