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# P105 -The effects of high intensity interval training on cardiovascular structure and function in renal transplant patients. The C-PACE-KD study

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Introduction

Cardiovascular disease (CVD) remains a major cause of morbidity and mortality in renal transplant recipients (RTRs). Several exercise programs have been shown to impact positively on cardiovascular health in patients with chronic kidney disease (CKD). There are fewer data about the effects of exercise in RTRs, including the feasibility and acceptability of high-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) in this population. This cardiac MRI (CMR) sub-study is part of a larger feasibility trial of HIIT in RTRs. This abstract reports the effects of HIIT and MICT on cardiovascular structure and function assessed with cardiac MRI (CMR), particularly looking for signs of deleterious changes in cardiovascular structure or function. Details of feasibility will be reported on completion of the full PACE-KD study.

Method

10 RTRs were randomised to one of three exercise programs: HIIT A (16 min interval training with 4, 2 and 1 min intervals at 80%-90% of peak oxygen uptake (VO2 peak)), HIIT B (4×4 min interval training at 80%-90% VO2peak) or MICT (~40 min cycling at 50%-60% VO2peak). Participants undertook 24 supervised training sessions over an 8 week period, with VO2 peak testing on a cycle ergometer using a standard stepped protocol at baseline and 8 weeks. Multiparametric CMR scans were performed before and after the study intervention, including myocardial tissue characterization with native T1 mapping.

Results

7 of the 10 patients completed the 8 week exercise protocols. Mean age was 46.2 years (±9.4) with 7 males and three females. Mean eGFR was 45mL/min/1.73m2 (±16.5) and mean time post-transplant was 48 months (±32.1). VO2 peak and maximum power output increased for all patients between baseline and final assessments (25.4±7ml/kg/min vs 28.7±7.6ml/kg/min, $p<0.01$ and 167.5±55.6 Watts vs 196.6±61.3 Watts, $p<0.01$). There were no significant changes in left ventricular (LV) ejection fraction (63.8±7.9% vs 64.7±7.2, $p=0.6$), LV mass (135±31.8% vs 137.3±25.5%, $p=0.4$) or LV mass / LV end-diastolic volume (0.85±0.13g/ml vs 0.85±0.12g/ml, $p=0.9$). There were no significant changes in global longitudinal systolic strain (-16.2±1.9 vs -15.9±2.7, $p=0.6$), global circumferential systolic strain (-18.7±1.9 vs -18.6±3.1, $p=0.8$), circumferential peak early diastolic strain rate (0.98±0.18 vs 0.83±0.26, $p=0.4$), or longitudinal peak early diastolic strain rate (0.79±0.2 vs 0.82±0.27, $p=0.7$). There was a significant reduction in global native T1 time between the baseline and follow-up scan (1256.1±53.6ms vs 1216.9±31.7ms, $p=0.01$).

Conclusions

RTRs who completed the 8-week training programme significantly improved their aerobic capacity. This exploratory study did not raise any safety issues and there were no signals for adverse effects on traditional measures of cardiovascular structure and function assessed with CMR. There was a suggestion that the training programmes led to an improvement in myocardial tissue characterization assessed by native T1 mapping. This may represent a reduction in myocardial inflammation or interstitial fibrosis, although these results must be seen as hypothesis-generating only.