

## **The longitudinal effect of dysglycaemia on the ventilatory and aerobic function in children and adults with cystic fibrosis**

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### **Introduction:**

Previous cross-sectional studies have reported lower ventilatory and aerobic function (peak oxygen uptake,  $VO_{2peak}$ ) during exercise in people with cystic fibrosis related diabetes (CFRD), compared to non-CFRD counterparts. Given that  $VO_{2peak}$  is highly predictive of mortality, and the pancreas is one of the earliest affected organs in CF, there is a necessity to identify the interaction between exercise parameters and glycaemic status - particularly over time, which has implications for disease management in CFRD.

### **Objectives:**

To examine differences in ventilatory and exercise-based changes (including  $VO_{2peak}$ ) in people with CF, of differing glycaemic status.

### **Methods:**

Annual review data, including cardiopulmonary exercise testing and pulmonary function tests, were retrospectively analysed in  $n = 82$  people with CF. Data was analysed in two ways: 1) three groups; normal glucose tolerance (NGT), impaired glucose tolerance (IGT) and CFRD, and 2) a dichotomous division of NGT versus a combined IGT + CFRD group. Data was analysed at baseline (T0) and one-year follow up (T1). Analysis of variance, with Bonferroni-corrected post-hoc tests determined significant differences between variables at different time points.

### **Results:**

At baseline, absolute forced expiratory volume in one second ( $FEV_1$ ) and  $VO_{2peak}$  were significantly reduced ( $p = 0.01$ ) in the CFRD ( $n = 19$ ) group compared to NGT ( $n = 58$ ). At T1, a reduced relative peak power ( $W \cdot kg^{-1}$ ,  $p = 0.05$ ),  $VO_{2peak}$  ( $p = 0.03$ ) and gas exchange threshold ( $p = 0.02$ ) were observed from T0 in the combined group ( $n = 24$ ) compared to the NGT group

( $n = 58$ ). No change in  $VO_{2\text{peak}}$  was identified over time, however, a significant decrease was discovered for  $FEV_1$  ( $\%_{\text{pred}}$ ) in the NGT group between T0 and T1 ( $p = 0.02$ ).

**Conclusions:**

Patients with CFRD have a reduced aerobic and ventilatory function compared to non-CFRD counterparts. Whilst a decrease in lung function was observed longitudinally, no change in  $VO_{2\text{peak}}$  was found, thus alluding to how aerobic and ventilatory functions provide different clinical organ and systemic outcomes in CF. Future research building upon these findings should assist with future management strategies to increase the longevity and quality of life of those with CFRD.