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Title: Bronchoscopic lung volume reduction with endobronchial valves improves exercise capacity but not oxygen uptake kinetics in a group of patients with severe emphysema

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Body: Background: Bronchoscopic lung volume reduction with endobronchial valves (BLVR) in emphysema improves ventilatory mechanics and in exercise capacity. We aimed to examine the effect of BLVR on oxygen uptake (VO₂) kinetics in emphysema patients. We hypothesise that reduction of gas trapping would accelerate VO₂ kinetics. Methods: 5 male emphysema patients (age: 63.8±8.1 y; FEV1 %predicted: 29.2±7.6) who showed a reduction in residual volume (RV) >350ml post BLVR and were able to exercise on cycle ergometer at 75% peak work load for >4 min pre and post BLVR were selected for VO₂ kinetics analysis. VO₂ dynamics were quantified from the rise time (Tau). Results: Post BLVR treatment, there was a 19% reduction in the RV (1.2±0.8 L), 29% increase in FEV1 (0.24±0.19 L) and 11% increase in TLCO (0.5±0.8). Exercise time increased by 45% (88 ±236 s) however there was no significant change in tau (41.7±13.3 vs. 39.5±7.8 s; p=0.78). 1 subject with 2.3L reduction in RV, 0.46L increase in FEV1 and an increase in exercise time of 329s showed faster VO₂ kinetics post BLVR (tau: 40.8 vs 59.4 s).

Conclusions: BLVR improved lung function and presumably V/Q mismatch and O₂ delivery without acceleration in VO₂ kinetics in the group as a whole. This could be a result of poor muscle oxidative capacity and compromised ability to extract O₂ despite improved delivery.