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The effect of high altitude (2500 m) on incremental cycling exercise in patients with pulmonary arterial hypertension and chronic thromboembolic pulmonary hypertension: a randomised controlled crossover trial

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Shareable abstract (@ERSpublications)
In 27 patients with stable PVD, cycling exercise at 2500 m was well tolerated, but exercise capacity was lower compared with 470 m, associated with lower blood oxygenation and increased ventilatory inefficiency https://bit.ly/47ryXTT

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Abstract

Background Our objective was to investigate the effect of a day-long exposure to high altitude on peak exercise capacity and safety in stable patients with pulmonary arterial hypertension (PAH) and chronic thromboembolic pulmonary hypertension (CTEPH).

Methods In a randomised controlled crossover trial, stable patients with PAH or distal CTEPH without resting hypoxaemia at low altitude performed two incremental exercise tests to exhaustion: one after 3–5 h at high altitude (2500 m) and one at low altitude (470 m).

Results In 27 patients with PAH/CTEPH (44% females, mean±SD age 62±14 years), maximal work rate was 110±64 W at 2500 m and 123±64 W at 470 m (−11%, 95% CI −16– −11%; p<0.001). Oxygen saturation measured by pulse oximetry and arterial oxygen tension at end-exercise were 83±6% *versus* 91±6% and 6.1±1.9 *versus* 8.6±1.9 kPa (−8% and −29%; both p<0.001) at 2500 *versus* 470 m, respectively. Maximal oxygen uptake was 17.8±7.5 $L \cdot min^{-1} \cdot kg^{-1}$ at high altitude *versus* 20±7.4 $L \cdot min^{-1} \cdot kg^{-1}$ at low altitude (−11%; p<0.001). At end-exercise, the ventilatory equivalent for carbon dioxide was 43±9 at 2500 m *versus* 39±9 at 470 m (9%, 95% CI 2–6%; p=0.002). No adverse events occurred during or after exercise.

Conclusions Among predominantly low-risk patients with stable PAH/CTEPH, cycling exercise during the first day at 2500 m was well tolerated, but peak exercise capacity, blood oxygenation and ventilatory efficiency were lower compared with 470 m.

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