Service Priorities and Programmes

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Effect of supplemental oxygen in exercise training in Pulmonary Rehabilitation Program (PRP) for non-hypoxemic COPD patients

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Introduction

Oxygen supplementation can enhance immediate exercise performance in non-hypoxemic COPD patients. However, its' effect on exercise training during PRP is unclear.

Objectives

To investigate the effect of supplemental oxygen on exercise training for non-hypoxemic COPD patients

Methodology

Moderate to severe COPD patients enrolled in PRP in Haven of Hope Hospital who were not qualified for long-term oxygen therapy were randomized to either O2-training-group (OG) or compressed air-training-group (CAG, as controlled). They would receive 6-week PRP exercise training while breathing O2 or compressed air at 3L/min during training. Outcomes including Stress Test (maximum workrate), endurance time in Constant-Workrate-Test (CWT), 6-Minute-Walk-Test (6MWT) while breathing room air; and quality of life by Chronic Respiratory Disease Questionnaire (CRDQ) were measured pre- and post-PRP. Between and within groups difference would be compared. Subgroup analysis of O2 responder (who showed > 10% improvement in walking distance with O2 comparing with room air in baseline 6MWT before PRP) vs non-responder and desaturator (patients with SaO2 drops below 90% in baseline 6MWT) vs non-desaturator were conducted. P-value < 0.05 was considered significant.

Result

65 subjects recruited and 53 completed PRP (OG:29, CA:24). There were no significant differences in patients' characteristics (age, FEV1, pO2) and baseline outcomes between groups. After PRP, there were significant improvements in both groups in maximum workrate (OG: +6.4W, 95% CI 3.8 to 9.0W, p<0.001; CAG: +6.1W, 95% CI 3.2 to 8.9W, p<0.001); endurance time (OG: +19.1min, 95% CI 9.7 to 28.5min, p<0.001; CAG: +30.6min, 95%CI 20.2 to 40.9min, p<0.001) and 6MWT (OG: +57.5m,

95% CI 38.3 to 76.7m, p<0.001; CAG: +31.4m, 95% CI 10.3 to 52.5m, p=0.004) and quality of life. However, there were no significant group differences after PRP. In subgroup analysis, patients in OG were divided into O2-responders (OG-OR, N=15) and non-responders (OG-NOR, N=14). After PRP, there were significant greater improvement in 6MWT comparing OG-OR vs OG-NOR and CAG (OG-OR: ↑ 84.1 + 42.0m vs OG-NOR: ↑ 28.9 + 44.0, p=0.008; vs CAG: ↑ 31.4 + 52.6m, p=0.004). On further analysis, desaturators were found to have a significant stronger association with O2 responders (61.5%) than non-desaturators (33.3%), p=0.04. Conclusions: Supplemental oxygen could enhance exercise training for selected COPD who has desaturation in baseline 6MWT and shows immediate improvement of > 10% in walking distance with O2 supplement.