Pulmonary Hypertension and Exercise Training: Evidence Based Studies

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Introduction

Pulmonary Hypertension (PH) is regarded as a mean pulmonary artery pressure greater than 25 mm Hg in the setting of normal or reduced cardiac output and a normal pulmonary capillary wedge pressure. A constellation of permissive and provocative factors exists, various mechanisms are activated that lead to vascular constriction, cellular proliferation, and a prothrombotic state in varying degrees, which results in PH and its clinical sequelae [1-6].

Three mechanistic pathways are known in patients with PH. (A) The endothelin (ETs): Big-ETn is converted in endothelial cells to ETn-1 by endothelin-converting enzyme (ECE). ET-1 binds to PASMC ETnA and ETnB receptors, which ultimately leads to PASMC contraction, proliferation, and hypertrophy. ETn-1 binds to endothelial cell Also ETB receptors. (B) The prostacyclin (PGII2): The production of PGII2 is catalyzed by prostacyclin synthase in endothelial cells. In PBMCs, PGII2 stimulates adenylate cyclase, thus increasing production of cAMP from catalyzed by prostacyclin synthase in endothelial cells. In PBMCs, PGII2 stimulates adenylate cyclase, thus increasing production of cAMP from

Pandey and colleagues reported a prospective intervention studies that evaluated the efficacy and safety of exercise training (ET) in patients with PH. Primary outcome of this meta-analysis was a change in six-minute walk distance (6MWD). The authors also assessed the effect of exercise on peak oxygen uptake (VO2 peak), resting pulmonary arterial systolic pressure (PASP), peak exercise heart rate (HR peak), and quality of life. A total of 16 studies with 434 exercise-training participants were included. ET was associated with significant improvement in 6MWD [Weighted mean difference (WMD): 5.77 meters (95% CI: 4.25 to 7.28)], VO2 peak [WMD = 1.7 ml/kg/min (95% CI: 1.3 to 2.0)], PASP [WMD = -3.6 mmHg (95% CI = -5.8 to -1.4)], HR peak [WMD = 10.4 beats per min (95% CI: 5.5 to 15.3)], and quality of life as measured on SF-36 questionnaire subscale scores. ET was well tolerated with a low dropout rate and no major adverse events [8].

ET in patients with PH is associated with a significant improvement in exercise capacity, pulmonary arterial pressure and quality of life.

References


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