

## Safety of Cardiopulmonary Exercise Testing in Children with Pulmonary Hypertension

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**Background:** Cardiopulmonary exercise testing (CPET) is a valuable tool to objectively measure exercise capacity. Recent evidence supports its role as a prognostic tool and to guide treatment in several conditions including pulmonary hypertension (PH). Evidence for its use in children with PH is extremely limited, partly because of concerns regarding its safety in this setting. The purpose of this study was to assess the safety profile of CPET in a large cohort of paediatric PH patients.

**Methods:** Retrospective data was obtained from all consecutive patients undergoing CPET at a single centre between March 2004 and November 2013. Exclusion criteria for CPET were: height <120cm, WHO class IV, history of syncope or significant ischemia/arrhythmias during exercise. Significant events recorded were: symptoms reported by patients, arrhythmias, abnormalities detected on ECG and abnormal responses of arterial O<sub>2</sub> saturation (SaO<sub>2</sub>).

**Results:** 113 patients (53 with PH associated with congenital heart disease and 36 with idiopathic PH) had 185 CPETs in the study period. The median patient age was 14 years (25th and 75th percentiles, 10.5 and 15 years). Peak oxygen uptake (VO<sub>2</sub>) ( $\pm$ SD) for all patients was 21.4 $\pm$ 8.0 mL/kg/min, which corresponded to 54.4 $\pm$ 20.0% of the predicted values. Peak respiratory quotient was 1.08 $\pm$ 0.16. All tests were maximal, except 2, requiring premature termination for clinical reasons. Baseline SaO<sub>2</sub> was 93.8 $\pm$ 8.5% and 19% of children had a baseline SaO<sub>2</sub> <90%. The average SaO<sub>2</sub> during peak exercise was 82.7 $\pm$ 19.1%. A drop of SaO<sub>2</sub> <5% was observed in 44.6% of patients, whereas 20.1% of patients had a decrease >20%. Seven patients (3.8%) experienced dizziness, associated with significant desaturation in 2, and requiring termination of CPET in 1. Five (2.7 %) children experienced chest pain, which was associated with significant desaturation in 3 and early CPET termination in 1. No significant arrhythmias or ECG changes were observed.

**Conclusion:** Exercise testing in mild to moderately symptomatic children with PH in a controlled environment and with an experienced team is safe. Arterial O<sub>2</sub> desaturation is common but asymptomatic in the majority of patients. No side effects of the test were serious and all resolved promptly when the test was terminated.