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Cardiopulmonary Exercise Test Responses in Children with Obstructive Sleep Apnea Syndrome

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Introduction: There is growing evidence linking obstructive sleep apnea syndrome (OSAS) with multiple cardiovascular and metabolic diseases. Studies in adults found that OSAS patients have also reduced exercise capacity, but there are limited data about cardiopulmonary exercise test (CET) responses in children with OSAS. The aim of this study is to evaluate cardiopulmonary responses to exercise in children with OSAS.

Methods: Twenty seven subjects, without any systematic disease, aged 7 to 14 years (mean age $10,5 \pm 1,8$ years), referring for evaluation of systematic snoring (≥ 4 nights/week), underwent overnight polysomnography and CET on a cycle ergometer (Protocol: maximal incremental 10 Watt/min). According to the Apnea Hypopnea Index (AHI) subjects were divided into two groups: A. mild OSAS (AHI= 1-5, n=15), B. moderate-severe OSAS (AHI >5, n=12). The results were compared to those of 13 healthy control subjects matched for age, sex, and body size.

Results: There were no differences in age, sex, BMI, systolic blood pressure (SBP) at rest, SBP and diastolic blood pressure (DBP) at exercise among the groups. Diastolic BP at rest was significantly higher in children with OSAS ($63,7 \pm 7,5$ mmHg vs $56,9 \pm 2,9$ mmHg, $p=0,02$), as well as work rate on CET (101 ± 30 Watt vs 79 ± 19 Watt, $p=0,15$). Significantly lower were VO_{2max} ($40,3 \pm 8,4$ vs $47,55 \pm 7,9$ ml/kg/min, $p=0,13$) and VO_{2max} (%) ($77,7 \pm 15$ vs $93 \pm 10,5$, $p=0,02$).

Conclusion: The present study demonstrates that young patients with OSAS have early in life a distinctive response to graded exercise, characterized by higher work rate, and lower VO_{2max} . Early identification of OSAS using CET shows promise for selecting patients at risk for this disorder in the clinical setting.