Relationship between Heart Rate Variability (HRV) Parameters and Obstructive Sleep Apnea (OSA) in Children

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Purpose
Study the relationship between HRV parameters and AHI from polysomnography which is the current gold standard for OSA diagnosis. The study measured the cardiovascular consequences in pediatric OSA patients suffering from intermittent hypoxia which can cause Cor pulmonale or death. The study also sought to determine if there were any early warning signs that could improve patient treatment or reduce mortality.

Materials and Methods
A 24-hour ambulatory Holter monitor to record electrocardiograph activity in suspected OSA children who have been previously diagnosed with adenotonsillar hypertrophy. A sleep study in parallel with the electrocardiography monitoring. Software to digitize the electrocardiograph data into time and frequency domain parameters of HRV data.

Results
Polysomnography and HRV recordings were obtained from eighty-three children divided into four groups: primary snoring, mild OSA, moderate OSA and severe OSA. Tachycardia and reduced HRV were observed during apnea subsequent to bradycardia. Reduced HRV correlated with the severity of OSA. In severe OSA cases, the standard deviation of heart rate interval was significantly reduced. In addition, power spectral density analysis indicated a significant increase in the low frequency/high frequency ratio and a decrease in high frequency in severe OSA children, especially in patients with pulmonary hypertension.

Conclusion
HRV measurements may be used as a screening tool to diagnose severe OSA. Alterations in HRV may be used as a predictor or early warning sign of cardiovascular morbidity associated with severe OSA.