Abstract 14

Association Between Excessive Daytime Sleepiness and Oxygen Desaturation in Obstructive Sleep Apnea Syndrome: Nadir Oxygen Saturation vs Mean Oxygen Saturation vs Time Spent Below 90% Oxygen Saturation—Which Is Important?

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Introduction: Excessive daytime sleepiness (EDS), one of the most common symptoms associated with obstructive sleep apnea syndrome (OSAS), is thought to result from sleep fragmentation and/or hypoxemia during sleep. Multiple oxygen saturation values have been used to indicate the severity of hypoxemia secondary to respiratory events. Previous studies have shown some evidence linking either nadir or mean oxygen saturation with EDS. To date, none of the studies has systematically investigated the importance of time spent below 90% oxygen saturation nor compared the relative value of each of these three measures.

Methods: 300 polysomnograms of OSA patients (apnea-hypopnea index [AHI] > 5) were reviewed (150 cases with > 5% of total sleep time spent below 90% oxygen saturation; 150 cases with nadir oxygen saturation of 90%) over the period from 2003 to present. Daytime sleepiness was defined using the Epworth sleepiness scale (ESS).

Results: ESS score was significantly correlated with neck circumference ($r = 0.343$, $P < .01$), BMI ($r = 0.350$, $P < .01$), AHI ($r = 0.301$, $P < .01$), arousal index ($r = 0.178$, $P < .05$), mean oxygen saturation ($r = -0.293$, $P < .01$), nadir oxygen saturation ($r = -0.491$, $P < .01$), and spending > 5% of total sleep time below 90% oxygen saturation ($r = -0.615$, $P < .01$). Logistic regression modeling and multivariate analysis were used to determine the role of these variables and significant sleepiness (ESS > 10). After adjustment for covariables, only spending > 5% of total sleep time below 90% oxygen saturation was statistically significant for the high ESS in the multivariate analysis, with an odds ratio of 20.176 ($P < .001$; 95% CI, 10.758 to 37.745).

Conclusion: The results of this study show that the severity of oxygen desaturation, defined as spending > 5% of total sleep time below 90% oxygen saturation, may be the most important factor in EDS in patients with OSAS.