Obstructive Sleep Apnea, Obesity and Cellular Adhesion Molecules: Impact of 2 Years of CPAP Treatment

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Introduction: Elevated levels of intercellular cell adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1) may contribute to cardiovascular disease and are associated with Obstructive Sleep Apnea (OSA) and obesity. The interaction between CPAP and obesity in determining levels of these molecules is unknown.

Objectives: We investigated associations between adhesion molecule changes and CPAP usage after 2 years of treatment, and examined whether these associations differed based on obesity.

Methods: 309 OSA patients referred for CPAP from the Icelandic Sleep Apnea Cohort were studied. The mean (SD) BMI was 32.4(5.1), they had severe OSA [AHI=45.0(20.2)] and 79% were male. Subjects were stratified by BMI at baseline (<30, 30-35, ≥35). Fasting blood was drawn to assess adhesion molecules (measured via ELISA) in untreated subjects and again 2 years after CPAP initiation.

Measurements and Main Results: There were 177 full (≥4 hours/night), 44 partial (<4 hours/night), and 88 non CPAP users. We observed significant change in ICAM-1 ($p<0.001$) and VCAM-1 ($p=0.012$) change between the 3 CPAP usage groups. For ICAM-1, the strongest association was among the most obese subjects ($p<0.001$). In each case, we observed significant differences between full and non-users; non-users had significant increases in ICAM-1 and VCAM-1 levels compared to no change in full users.

Conclusion: In a moderate to severe OSA population, adequate CPAP usage protects against increases in cellular adhesion molecules observed in non-users over a two year period. For ICAM-1, this association is dependent on obesity, with a strong association in subjects with a BMI≥35.

Trainee Award Eligible