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Hyperlipidemia Prevalence and Cholesterol Control in Obstructive Sleep Apnea: Data from the European Sleep Apnea Database (ESADA)

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Objectives: Obstructive sleep apnea (OSA) and hyperlipidemia are independent risk factors for cardiovascular disease. However, there is no definite information regarding the association between OSA and hyperlipidemia. In the previous study of the European Sleep Apnea Database (ESADA) cohort, an independent association between OSA and lipid concentrations was demonstrated in population without reported diagnosis of hyperlipidemia or having lipid lowering medication (Gunduz et al 2018, *Respirology*). The aim of the present study was to investigate the association between OSA severity and prevalence of reported hyperlipidemia in patients of the ESADA cohort.

Methods: The cross-sectional analysis included 11,892 patients (age 51.9±12.5 years, 70% male, body mass index (BMI) 31.3±6.6 kg/m², mean Oxygen Desaturation Index (ODI) 23.7±25.5 events/h) investigated for OSA. The independent odds ratio (OR) for hyperlipidemia in relation to measures of OSA (ODI, Apnea Hypopnea Index, mean and lowest oxygen saturation) was determined by means of General Linear Model analysis with adjustment for important confounders like age, BMI, comorbidities, and study site.

Results: Hyperlipidemia prevalence increased from 15.1% in subjects without OSA to 26.1% in those with severe OSA, p<0.001. Corresponding numbers in diabetic patients were 8.5% and 41.5%, p<0.001. Compared with ODI quartile I, patients in ODI quartiles II-IV had an adjusted OR (95% CI) of 1.33 (1.15-1.55), 1.37 (1.17-1.61), and 1.33 (1.12-1.58) (p<0.001), respectively, for hyperlipidemia. Overweight and obese subjects demonstrated an increased OR for hyperlipidemia, whereas subjects with morbid obesity did not. Hyperlipidemia prevalence was influenced by cardio-metabolic comorbidities and geographical regions with the highest prevalence in central Europe. OSA severity did not worsen cholesterol control in patients diagnosed with hyperlipidemia.

Conclusion: The present study, including the largest patient sample on this topic to date demonstrated that OSA was independently associated with the diagnosis of hyperlipidemia and had a negative influence on cholesterol levels in severe OSA subjects. Intermittent hypoxia had a strong influence on hyperlipidemia diagnosis. Meanwhile, hyperlipidemia was notably underrecognized in OSA subjects. The geographical impact of different European sites was identified and defined as a new confounder. Further studies elucidating the effect of CPAP therapy on lipid status in the ESADA cohort are of importance.

Keywords: Cholesterol, hyperlipidemia, hypoxia, obesity, sleep apnea