

Abstract

Introduction

Obstructive sleep apnea (OSA) is a disease with serious clinical consequences. It is accompanied by cardiovascular diseases, metabolic and neurocognitive disorders, and increased mortality. The relationship between OSA and systemic inflammation or cardiovascular disease is not fully understood. The Apnea Hypopnea Index (AHI) is used in the diagnosis and staging of OSA. This is the number of apnea and hypopnea episodes per hour of sleep. Correctly, the AHI value should be lower than 5.

The aim of the study

The aim of the study was to assess the relationship between the AHI value and the clinical phenotype of participants, biomarkers of inflammation, metabolism disorders and cardiovascular diseases in the general population.

Methods

The study group came from the Białystok PLUS population study that aimed at a comprehensive assessment of the health condition of the city's inhabitants (detailed medical interview, routine blood tests, anthropometric measurements, echocardiogram, densitometry, spirometry, ultrasound of the carotid arteries). AHI was measured using the Infoscan MED-Recorder. It is a device type III (polygraphy) for the outpatient diagnosis of sleep-related breathing disorders. In high-multiplex immunoassays, the level of biomarkers of inflammation (Inflammation panel), cardiovascular diseases (Cardiovascular III panel) and biomarkers of metabolic disorders or cellular adhesion (Cardiometabolic panel) were measured. The measurements were performed by the Olink laboratory (Uppsala, Sweden) using the proximity extension assay (PEA) technique. In the statistical analysis, I assessed clinical parameters and markers depending on the AHI value.

Results

The study group comprised 189 patients (mean age 47.27 ± 14.13 years, 56.08% women, N = 106). AHI ≥ 5 was found in 71 participants (37.5%). Probands with AHI ≥ 5 were significantly older, had higher BMI, neck circumference, blood pressure, larger left atrium, increased fasting glucose, and lower platelet count. They had more frequent hypertension, atrial fibrillation, carotid atherosclerosis or type 2 diabetes. Numerous biomarkers correlated with the AHI value. In most cases, this was due to the influence of BMI and age, which were higher in patients with AHI ≥ 5 . Only in the case of 2 biomarkers of cardiovascular diseases was the association with AHI independent. These were the tyrosine-protein kinase receptor UFO (AXL) and chitinase-3-like protein 1 (CHI3L1).

Conclusions

Increased AHI value is common in the general population. It is associated with a higher incidence of chronic diseases and an unfavorable clinical phenotype of participants. The AHI value correlates with the severity of systemic inflammation and metabolic disorders as well as with the level of cardiovascular disease biomarkers, but in most cases it is due to the influence of BMI and age of the participants. Obesity and adipose tissue are potential factors linking OSA with inflammation, cardiovascular disease and metabolic disorders.