Prevalence of Metabolic Syndrome in Patients with Obstructive Sleep Apnea Syndrome: A Single Center Experience

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Abstract
Obstructive sleep apnea syndrome (OSAS) is a syndrome characterized by attacks of recurrent complete (apnea) or partial (hypopnea) upper airway obstruction and often a reduction in blood oxygen saturation during sleep. Metabolic syndrome, is a systemic endocrine disease with high mortality, begins with insulin resistance, abdominal obesity, glucose intolerance or diabetes mellitus, dyslipidemia, hypertension and coronary artery disease. In the literature, the prevalence of metabolic syndrome in OSAS patients are expressed in percentage of 30-77%. In our study we investigated the presence of metabolic syndrome among the obstructive sleep apnea syndrome patients. In our study, prevalence of metabolic syndrome in patients with moderate to severe OSAS was found to be 16%.

ABBREVIATIONS
OSAS: Obstructive Sleep Apnea; AHI: Apnea Hypopnea Index; Cad: Coronary Artery Disease; Tnf-A: Tumor Necrosis Factor Alpha; Il-6: Interleukin-6

INTRODUCTION
Regular sleep, duration and quality of sleep is very important for the proper functioning of body systems. Sleep disordered breathing covers; simple snoring, upper airway resistance syndrome, obstructive sleep apnea syndrome (OSAS), central sleep apnea syndrome, Cheyne-Stokes respiration and obesity hypoventilation syndrome. Obstructive sleep apnea syndrome (OSAS) is a syndrome characterized by attacks of recurrent complete (apnea) or partial (hypopnea) upper airway obstruction and often a reduction in blood oxygen saturation during sleep [1]. OSAS is the most common sleep disorder seen in both sexes, all races, age and all the socio-economic status and ethnic groups. In the general population a frequency of 4-5% is reported [2].

Apnea, which means inability to breathe; is the absence of the oral and nasal airflow for 10 seconds or more. Hypopnea; is the at least 50% decrease of air stream for 10 seconds or more with the falling of 3% oxygen saturation or arousal development. The arousal; also known as the micro waking, allowing termination of abnormal breathing pattern, is the sudden transition to the lighter sleep stage or being awake. Apnea-hypopnea index (AHI) is obtained by dividing number of apnea and hypopnea numbers to the total sleep time in hours. The index value greater than 5 suggests OSAS but the clinical importance is greater than 15.

Pathophysiology of the disease is not fully understood. Pathologies narrowing of the upper airway can cause OSAS development. Obesity, male gender, anatomical features, such as short neck, cigarettes, alcohol and sedative drug use leads to the development of OSAS [3].

The metabolic syndrome is a cluster of the most dangerous heart attack risk factors: diabetes and raised fasting plasma glucose, abdominal obesity, high cholesterol and high blood pressure. It is reported that 22% of the average prevalence of metabolic syndrome in adults. The prevalence increases with age, the 20-29 age group 6.7% and 43.5% rate seen in the 60-69 age group [4].

According to TEKHARF study, across Turkey from the year 2000, 9.2 million people aged 30 and over has metabolic syndrome. Also, 53% of individuals who developed coronary artery disease are affected by the metabolic syndrome. In our country, the prevalence of metabolic syndrome is at very high rate; as 28% of men and 40% of women [5]. OSAS is associated with the criteria of metabolic syndrome such as obesity, male sex, hypertension and diabetes [6]. Recent studies showed OSAS is also an independent risk factor for the development of metabolic syndrome [7-9].

In our study we investigated the presence of metabolic syndrome among the patients attending to the Erzurum Regional Training and Research Hospital Sleep disorders department and diagnosed as OSAS with the night polysomnography records.

MATERIALS AND METHODS

910 patients with suspected OSAS with snoring, witnessed night apneas and excessive daytime sleepiness attending to our sleep disorders department within years 2013-2014 are included in this cross-sectional study. 601 (66,04%) were male and 309 (33,96%) were female. 80 (8,8%) patients were between 20-30 years, 112 (12,3%) patients between 30-40 years, 234 (25,7%) were between 40-50 years, 380 (41,8%) patients were between 50-60 years and 104 (11,4%) patients were more than 60 years.

Night polysomnographic recordings of patients were obtained by Twin Grass Technologies Recording and Analysis Software system in Erzurum Training and Research Hospital Sleep Laboratory.

Patients with apnea-hypopnea index (AHI) <5 were evaluated OSAS negative, from 5-15 mild OSAS, 16-30 medium OSAS and >30 were evaluated as severe OSAS (Table 1). Metabolic syndrome was diagnosed according to the NCEP-ATP (National Cholesterol Education Program- Adult Treatment Panel) III criteria (10). (Table 2). Data analysis was performed using IBM SPSS 23.0 statistical software package. Data were analyzed using descriptive statistical methods (frequency, percentage, mean, standard deviation, median, min-max).

RESULTS

According to apnea-hypopnea index (AHI) 336 (36,9%) patients diagnosed with OSAS, medium (30 ≥ AHI> 15) and severe (AHI> 30). 71% of the medium and severe OSAS patients were male and 29% were female.

336 patients who were diagnosed with medium and severe OSAS were evaluated for MS. 56 patients that provide NCEP ATP III Metabolic Syndrome Diagnostic Criteria were detected. 16% of patients with moderate and severe obstructive sleep apnea syndrome were diagnosed as Metabolic Syndrome. Age groups of patients are given in Table (3).

Patients who have received a diagnosis of MS were analyzed in terms of age and gender. Male patients with MS were 3,6 times more at risk of severe OSAS than female patients. The distribution by sex of the patients had been diagnosed with MS are shown in the Table (4).

CONCLUSION

OSAS is an independent risk factor for the development of metabolic syndrome. OSAS is associated with the criteria of metabolic syndrome such as obesity, male sex, hypertension and diabetes. In their study Wilcox et al identified a new combination of metabolic syndrome (syndrome X), and OSAS as syndrome (Syndrome Z) [11]. Metabolic syndrome is more common in OSAS 5-9 fold compared to patients in the control group [12,13].

In the literature, the prevalence of metabolic syndrome in OSAS patients are expressed in percentage of 30-77% and increases with increasing degree of OSAS [12,14,15]. Prevalence of metabolic syndrome is 33% in the adult age group in Turkey according to METSAR study results [16].

Visceral obesity and insulin resistance plays an important role in the pathogenesis of metabolic syndrome [17,18]. Visceral adipose tissue secretes cytokines and hormones such...
as tumor necrosis factor alpha (TNF-α), interleukin-6 (IL-6), leptin associated with atherosclerosis development. Visceral fat accumulation is associated with the degree of OSAS [19,20].

In OSAS, apnea, hypopnea episodes, activation of the sympathetic system, development of hypoxia and ischemia / reperfusion episodes generate free oxygen radicals. Free oxygen radicals lead to the development of the metabolic and cardiovascular events [21]. AHI is more correlated with visceral fat tissue than body mass index. According to the study, snoring and daytime sleepiness was associated with metabolic syndrome development in patients with OSAS [22].

In our study, prevalence of metabolic syndrome in patients with moderate to severe OSAS was found to be 16%. This value is lower than defined prevalence of metabolic syndrome for our country (33%). The number of patients with mild OSAS which has not been included in this study was quite high. Therefore, this may cause significantly lower prevalence. Also according to community-based studies, the prevalence of diabetes and impaired glucose tolerance in our region is lower than the overall rate of the country [23]. This difference may have affected the prevalence of metabolic syndrome in our region. Also because of the geographical location of our region, animal protein based diet is mainly forefront. Therefore, the metabolic syndrome prevalence can be reduced. We believe that more work needs to be done about the diabetes and MS prevalence in our region. The relationship between OSAS and metabolic syndrome has been known since the 1990's. The pathophysiology is largely explained by the recent studies. Therefore, the presence of metabolic syndrome in patients with obstructive sleep apnea syndrome should be investigated.

REFERENCES


Cite this article