Introduction

Obstructive Sleep Apnea Syndrome (OSAS) is the most common sleep disordered. In Spain, 3-6% of the population have symptoms of snore with 24-26% of them were diagnosed with OSAS [1]. OSAS is characterized by recurrent partial or complete upper airway obstruction resulting in a hypoxia-reoxygenation cycle and arousals during sleep.

Hypoxia, the main factor in the pathogenesis, leads to increased hypercapnia and intrathoracic pressure, activation of the sympathetic nervous system, deterioration of cerebral blood flow, elevation of blood pressure and disturbance of sleep. This results inadequate sleep, abnormal motor activity, headache and fatigue [2]. Because of all these metabolic changes, endothelial dysfunction occurs and there is an increased risk of cardiovascular and cerebrovascular events. Tachycardia or rhythm disturbances may occur during sleep [3]. PSG is the gold standard test in OSAS diagnosis. The disease grade is classified according to the AHI values in the polysomnography report. Those with AHI ≤ 5 are considered as simple snoring. AHI: 5-14.9 are mild OSAS, those with AHI: 15-29.9 are moderate OSAS, and those with AHI ≥30 are severe OSAS [4].

RDW shows irregularities between the shapes of erythrocytes. Oxidative stress caused by hypoxia causes irregularity in erythrocyte morphology. In systemic diseases such as iron deficiency anemia, folic acid deficiency, vitamin B12 deficiency and chronic liver disease, RDW levels increase because of oxidative stress [5]. High RDW values are an important biomarker of cardiovascular mortality and morbidity risk, before myocardial infarction [6,7]. Given the inflammatory nature of OSAS, it is thought to be associated with RDW.

The aim of this study was to evaluate the association between RDW and AHI in patients with OSAS and to determine whether RDW could be a predictor of disease severity before PSG.
Materials and Methods

The study included 109 patients admitted to Adana City Training and Research Hospital otolarhinolaryngology clinic between January 2018 and March 2018, with a complaint of snoring and symptoms of sleep apnea. All patients underwent PSG in the sleep laboratory of otolarhinolaryngology clinic.

Those with any systemic disease that would affect the RDW were excluded from the study. Patient demographics and laboratory data were recorded. Sleep and physiological variables were monitored with Comet-PLUS Grass® (Astro-MedIndustrial Park, West Warwick, USA) PSG. Electroencephalography can be performed with 10 channels (C3, C4, O1, O2, Fp1, Fp2, F3, F4, P3, P4), submental Electromyography (EMG), right and left eye electrooculography, electrocardiography, oronasal airflow (thermal sensor and nasal transducer), body position, thoracic and abdominal motion meter (inductance plethysmograph), arterial blood oxygen saturation with finger pulse oximetry, left and right leg motion sensors (EMG), and tracheal microphone were used.

Apnea was defined as reduction of air flow signal, more than 90% for at least 10 seconds, measured by the thermal sensor. Hypopnea was defined as a reduction in the nasal pressure signal, more than 30% over baseline and resulted in more than 3% desaturation or arousal compared to baseline, for at least 10 seconds. The study population was divided according to the AHI values; (i) mild OSAS; AHI: 5-14.9 (ii) moderate OSAS; AHI: 15-29.9, (iii) severe OSAS; AHI:> 30. Those with AHI between 0-4.9 were the control group. Statistical analysis was performed with IBM SPSS Statisticsfor Windows, version 22.0 (SPSS Inc., Chicago, IL, USA). AHI and RDW correlations were assessed by Pearson correlation test, RDW value between groups was assessed by Independent Samples test, p <0.05 was considered statistically significant. For the study, permission was obtained from the ethics committee of our hospital.

Results

Of the patients included in the study, 83 (76%) were male and 26 (24%) were female. The mean age was 45.3 (43.7 for males and 50.8 for females), the mean Body Mass Index (BMI) was 30.3 (min: 19 - max: 51), the mean AHI was 22.6 (min: 0, max: 103) and the mean RDW was 13.5 (min: 12, max: 15.9). Patient characteristics, BMI, AHI and RDW values of the subgroups are given in table 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>Age (average)</th>
<th>BMI (average)</th>
<th>AHI (average)</th>
<th>RDW (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46.5</td>
<td>30.8</td>
<td>10.5</td>
<td>13.5</td>
</tr>
<tr>
<td>2</td>
<td>48.7</td>
<td>29.8</td>
<td>22.3</td>
<td>13.2</td>
</tr>
<tr>
<td>3</td>
<td>48.9</td>
<td>34.4</td>
<td>66.5</td>
<td>13.9</td>
</tr>
<tr>
<td>Control</td>
<td>40.6</td>
<td>27.7</td>
<td>2.1</td>
<td>13.3</td>
</tr>
</tbody>
</table>

Discussion

OSAS is a syndrome characterized by recurrent partial or complete upper respiratory tract obstruction resulting in a hypoxia-reoxygenation cycle and arousals during sleep. Some studies have shown that platelet activation due to the hypoxia-reoxygenation cycle is associated with increased RDW and inflammation.

Citation: Karaoğullarindan A and Yalım SD. Relationship between APOE- Hypopnea Index and Red Cell Distribution Width in Patients with Obstructive Sleep Apnea Syndrome. SM Otolaryngol. 2018, 2(1): 1015.

RDW increases are seen in patients with OSAS. Further comprehensive studies involving a large number of patients are needed to determine its association with AHI and its usefulness as a biomarker.

References


