

DOI: 10.5152/TurkThoracJ.2019.57

[Abstract:0303] MS-081 [Accepted: Oral Presentation] [Clinical Problems - Pulmonary Vascular Diseases Occupational Lung Diseases]

Prevalence of Sleep Related Breathing Disorders in CTEPH patients

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Objectives: In the natural course of acute pulmonary embolism, near total resolution or minimal residual healing is seen. However, chronic thromboembolic pulmonary hypertension (CTEPH) develops in 2-5% of cases. Sleep related breathing disorders suggested to develop as a result of hypoxemia and right ventricle dysfunction in CTEPH patients; but there are not enough studies on this subject. The aim of the study was to evaluate the prevalence and types of sleep related breathing disorders in CTEPH patients.

Methods: The study involved 52 patients (mean age: 55.6 ± 15.7 , 69.2% men, mean body mass index [BMI] 28.2 ± 4.7 kg/m²) with the diagnosis of CTEPH who were admitted to outpatient clinic and/or hospitalized in Marmara University Hospital. Patients' medical histories, physical examination findings were recorded; detailed spirometry, carbonmonoxide diffusion capacity measurement (DLCO) tests, right heart catheterization, echocardiography and 6 minute walking test were performed. Epworth Sleepiness Scale (ESS) Hospital anxiety depression scale (HAD) and short form-36 (SF-36) forms were filled; sleep test was performed with single night polysomnography (PSG). Patients with apnea hypopnea index(AHI) ≥ 15 /hour in PSG were accepted as OSA.

Results: Polysomnographic analysis of the patients revealed that all apneas were obstructive type; patients were divided into two groups with a cut-off point $AHI \geq 15$. The number of patients with $AHI \geq 15$ in 52 patients was 26 (50%). There were no significant differences between the two groups in terms of demographic data, comorbidities, respiratory function test, DLCO, proBNP, 6MWT, echocardiographic and hemodynamic measurements performed with right heart catheterization; as expected, there was a significant difference between the two groups in terms of ODI, mean saturation and minimum saturation ($p < 0.001$). There was a significant ($p = 0.019$) positive correlation between age, BMI and ESS and AHI in the whole patient population. As the PVR value measured by right heart catheterization increased in patients; the time spent under $< 90\%$ saturation also increased during sleep. ($r = 0.28$; $p = 0.045$). Positive correlation was found between sPAB measured by echocardiography, and mPAB measured during the operation; with time spent under $< 90\%$ saturation ($p < 0.001$).

Conclusion: This is the first CTEPH and SRBD done with polysomnography in the literature. The frequency of moderate-severe obstructive sleep apnea in this group of patients was 50%. The time spent hypoxemic on polysomnography and PVR, mPAB measured with right heart catheterisation and echocardiographic sPAB values were found positively correlated. The development of sleep disorders in CTEPH patients requires a greater number of studies to clarify pathogenesis, to identify risk factors, and to assess the effect of the pulmonary endarterectomy operation on sleep related breathing disorders.

Keywords: Chronic thromboembolic pulmonary hypertension, CTEPH, obstructive sleep apnea, sleep related breathing disorders