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A comprehensive study of the literature on the prevalence of OSA in thyroid illness patients

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Background: Obstructive sleep apnea and hypothyroidism are associated due to the similarity of certain symptoms in both conditions. The objective of this study was to determine the attributes and indicators of thyroid disease associated with OSA, as well as the frequency of thyroid disease among persons diagnosed with OSA using laboratory testing.

Material and Methods: This study was a prospective descriptive study. A total of 100 individuals were referred for an overnight sleep study by the Department of General Medicine at D.D. Medical College and Hospital in Thiruvallur, Tamil Nadu, India. The study was conducted between April 2012 and March 2013.

Result: Patients with hypothyroidism not only have a higher body weight and are more prone to diabetes mellitus and hypertension, but they also have longer durations of time with arterial oxygen saturation levels below 90. Male patients diagnosed with hypothyroidism had a propensity for increased body weight, prolonged periods of arterial oxygen saturation exceeding 90%, and a higher desaturation index. There were no discernible differences observed between euthyroid and hypothyroid instances in female patients with obstructive sleep apnea. Among the 53 patients without OSA, seven were diagnosed with clinical hypothyroidism and were already undergoing thyroxine replacement therapy.

Conclusion: The study indicates that the prevalence of newly diagnosed clinical hypothyroidism in individuals with obstructive sleep apnea was relatively low. However, subclinical hypothyroidism was shown to be common among OSA patients.

Keyword: Thyroid, hypothyroidism, obstructive sleep apnea, TSH, and thyroxine

Introduction

Obstructive sleep apnea and hypothyroidism are associated due to the similarity of certain symptoms between the two conditions. The association between obstructive sleep apnea and hypothyroidism can be explained by several mechanisms, including the blockage of the upper airway due to the accumulation of mucoprotein, changes in the regulatory control of the pharyngeal dilator muscles caused by neuropathy, and the possibility of respiratory center depression [1-3]. Thyroxine replacement medication does not always completely alleviate sleep disordered breathing, and addressing sleep disturbed breathing does not cure hypothyroidism.Thus, it is imperative to accurately diagnose and effectively manage both diseases. OSA has been observed to have a correlation with thyroid problems, particularly hypothyroidism [2-4].

The incidence of obstructive sleep apnea was predicted to range from 25% to 50% in people diagnosed with hypothyroidism. The exact pathophysiologic mechanism is not fully

understood, but the higher occurrence of obstructive sleep apnea in patients with hypothyroidism may be linked to factors such as obesity, enlarged tongue, and enlarged thyroid gland, swelling of the upper airway due to myxedema, accumulation of mucopolysaccharides in upper airway tissues, and reduced control of ventilation [5-7]. Patients diagnosed with obstructive sleep apnea and individuals suffering from hypothyroidism frequently exhibit comparable symptoms, including apathy, lethargy, weariness, and excessive daytime somnolence. It is crucial to acknowledge the correlation between two ailments as the convergence of these conditions might lead to misdiagnosis or insufficient awareness of one of them. Additionally, treating one disease does not alleviate the other [8-10].

Although sleep medicine research has primarily concentrated on investigating the effects of obstructive sleep apnea on cardiovascular and neurologic health, there is less literature available regarding the relationship between OSA and hypothyroidism, and the existing perspectives on this matter are still subject to debate [9-11]. Thus, the objective of this cross-sectional study was to examine the frequency of hypothyroidism in individuals with OSA, as well as analyze the attributes and factors that contribute to hypothyroidism in relation to OSA. Consequently, there may be variations in the occurrence of hypothyroidism in individuals with obstructive sleep apnea based on race and geographic location [10-12]. This study was conducted to analyze the levels of TSH and thyroxine in order to determine the prevalence of thyroid illness among patients diagnosed with OSA and to identify the characteristics and predictors of thyroid disease in these patients.

Materials and Methods

The study in question was a descriptive prospective one. All one hundred patients were sent to the D.D. Medical College and Hospital's Department of General Medicine in Thiruvallur, Tamil Nadu, India, for an overnight sleep study. The research spans the months of April 2012 and March 2013. Sleep medicine specialists at the SDC gathered demographic and clinical information from patients during the first assessment by having them fill out the Wisconsin Sleep Cohort Study questionnaire. This questionnaire covers topics such as medical diagnoses, sleep complaints, and presenting symptoms, sleep symptoms, and medical symptoms.

Results

This decrease is accompanied by continuous oxygen desaturation, and it is not related to obstructive apneas, hypopneas, or periodic breathing. During the trial, all the patients being monitored were not under the effect of any hypnotics or narcotics.

Table 1: OSA patients with and without clinical hypothyroidism: demographics and PSG

Characteristics	Clinical Hypothyroidism		p-value
	Yes	No	
Sleep Efficiency	10	93	0.00
AHI	72.7	75.8	0.647
Desaturation Index	62.7	52.9	0.4212
Average O_2	58.2	55.9	0.1597
Arousal Index	02	91	0.1188
Smoking history	18	26	0.0182
Hypertension	**07**	20	0.1682

Table 2: Euthyroid vs. clinical hypothyroid OSA patients within gender

Characteristics	Female		Male	
	Euthyroidism	Clinical hypothyroidism	Euthyroidism	Clinical hypothyroidism
Age	52.1	52.3	42.1	50.1
BMI	42.7	42.8	33.4	44.0
ESS	88.57	90.48	12.1	11.8
Sleep Efficiency	70.4	77.46	76.8	60.4
Desaturation Index	50.78	54.78	52.68	75.9
Time	31.78	31.8	12.4	32.7
Minimum O_2	71.98	72.4	80.7	68.4
Arousal Index	54.1	51.8	55.4	75.8

Table 3: Euthyroid, clinically hypothyroid, and subclinically hypothyroid OSA patients' gender differences

Characteristics	Euthyroid		Clinical hypothyroidism	
	Male	Female	Male	Female
Age	52.1	52.3	42.1	50.1
BMI	42.7	42.8	33.4	44.0
ESS	88.57	90.48	12.1	11.8
Sleep Efficiency	70.4	77.46	76.8	60.4
Duration index	30.21	30.2	11.2	33.8
Time	70.67	71.8	81.8	67.5
Minimum Co2	53.2	50.3	54.3	74.7

Discussion

Subclinical hypothyroidism was prevalent among Saudi patients with OSA, particularly among female individuals. These findings corroborate the results of our previous study on gender disparities in OSA patients, which revealed a higher prevalence of hypothyroidism among female patients. Nevertheless, the study failed to differentiate between overt and covert hypothyroidism [11-13]. This study revealed a higher frequency of thyroid illness compared to previous studies conducted in Western societies. The incidence of clinical hypothyroidism in newly diagnosed cases did not exceed that observed in previous studies. However, the prevalence of subclinical hypothyroidism was greater compared to other studies. The occurrence of subclinical hypothyroidism was 11.5% among a group of 78 Italian patients with OSA, aligning with the results reported by Resta et al. Various factors, including race, environment, and socioeconomic level, are likely contributing to the differences observed in reported prevalence rates [12-14].

Another potential explanation for this disparity in prevalence could be referral bias, which refers to a variation in the population being referred. Previous research investigating thyroid illness in individuals with obstructive sleep apnea evaluated levels of thyroid stimulating hormone. individuals with elevated TSH levels were classified as hypothyroid. This did not permit distinguishing between overt and subclinical hypothyroidism. We categorized a significant number of patients with obstructive sleep apnea and high thyroid-stimulating hormone levels into two groups: those with clinically diagnosed hypothyroidism and those with subclinical hypothyroidism, based on their FT4 levels [13-15]. The prevalence of newly diagnosed clinical hypothyroidism in this study aligns with the bulk of prior investigations. Nevertheless, the prevalence of subclinical hypothyroidism was unexpectedly higher when compared to both previously published studies and non-OSA individuals. In comparison, Kapur et al. discovered a lower incidence of subclinical hypothyroidism in contrast to our own findings. Racial differences have been observed in the incidence of subclinical hypothyroidism, with the occurrence being one-third lower among whites in the United States and three times higher among blacks. Furthermore, the radioimmunoassay utilized by Kapur et al. was substituted with an alternate and more sensitive assay in this study [15-17].

The findings of this study demonstrated that hypothyroidism has distinct effects on males and females. Male OSA patients with hypothyroidism had significantly greater Apnea-Hypopnea Index, desaturation index, and time spent with arterial oxygen saturation below 90% compared to OSA patients with normal thyroid function, even though there were no changes in age, body mass index, respiratory characteristics, arousal index, or presence of other medical problems. The euthyroid men and females displayed distinct traits [16-18]. Compared to males with OSA, euthyroid females with OSA were characterized by being older, having a higher body weight, and spending more time with a SaO2 level of 90% or higher. Conversely, the distinctions were less noticeable in the clinically hypothyroid OSA group [17-19]. The evidence indicates that the severity of obstructive sleep apnea may be comparable in women with clinical hypothyroidism and women with normal thyroid function. The findings align with the results reported by Miller et al., who examined 118 women with OSA and saw no variations in age, BMI, respiratory disturbance index, or arousal index between women with normal thyroid function and those with an underactive thyroid.

Currently, there is no data to suggest that replacement therapy enhances longevity or decreases cardiovascular morbidity in people with subclinical hypothyroidism. However, the available results indicate that replacing thyroxine may be beneficial in certain situations, such as improving specific aspects of lipid profiles and left ventricular performance [18-20].

The occurrence of clinical hypothyroidism in patients with obstructive sleep apnea has been subject to thorough investigation, and the findings indicate significant advantages of replacement therapy in patients who are not obese. Individuals who were obese experienced a lesser degree of improvement. Nevertheless, the extent to which addressing subclinical hypothyroidism in people with OSA can enhance their quality of life remains undetermined. The study did not find any alterations in PSG values while examining the impact of treating subclinical hypothyroidism in patients with OSA [19-21]. A considerable fraction of patients with obstructive sleep apnea also experienced bronchial asthma in our investigation. While asthma is not rare, a prior study approximated that 35.1% of patients with OSA also experienced asthma. Another notable discovery of this study is the significant diagnostic effectiveness of PSG in patients who have clinical suspicion of OSA. Approximately 80% of individuals who were clinically suspected of having OSA were diagnosed with OSA with PSG. This finding is consistent with previous research, however it has not received significant attention or analysis [20-22].

Studies examining the prevalence of subclinical hypothyroidism in patients with obstructive sleep apnea may have been problematic due to their failure to account for the potential transient nature of the illness. Repeating TSH and FT4 readings after 12 weeks can help eliminate certain people with temporary hypothyroidism and decrease the number of patients initially diagnosed with subclinical hypothyroidism. Thyroid function tests have been reassessed for most patients, albeit not all [21-23].

Conclusion

Our data suggest that there is no need for regular thyroid function monitoring in patients with OSA, as the occurrence of newly recognized instances of clinical hypothyroidism is very rare. Subclinical hypothyroidism was common among patients with obstructive sleep apnea, however, the impact of addressing this condition on their overall health remains uncertain. We recommend against conducting routine thyroid function testing in OSA patients unless there are symptoms and clinical indications that suggest hypothyroidism.

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