International Journal of Advances in Medicine
Polu SR et al. Int J Adv Med. 2016 Feb;3(1):15-19
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: http://dx.doi.org/10.18203/2349-3933.ijam20151383

Research Article

Prevalence of hypothyroidism in obstructive sleep apnea

Sasikanth Reddy Polu, M. Ramakrishna Reddy*

[1]Department of Tuberculosis and Chest, Fathima Institute of medical sciences, Kadapa, Andhra Pradesh, India
[2]Department of Medicine, Fathima Institute of medical sciences, Kadapa, Andhra Pradesh, India

Received: 10 November 2015
Revised: 23 November 2015
Accepted: 25 November 2015

***Correspondence:**
Dr. M. Ramakrishna Reddy,
E-mail: rkmadakala@gmail.com

ABSTRACT

Background: Patients with OSA usually present with complaints of excessive daytime sleepiness, un-refreshing sleep, fatigue or insomnia. Earlier studies have suggested an influence on hypothyroidism whose incidence differed in different geographical areas and between races. This study was conducted to identify the prevalence of hypothyroidism in obstructive sleep apnea in our area.
Methods: Polysomnography was conducted on all patients referred for sleep apnea test after performing the regular clinical and physical examination. Blood tests were done to diagnose hypothyroidism. AHI and the Epworth Sleepiness scale was done for assessment for daytime sleep patterns. BMI was calculated for all patients.
Results: There was a predominance of males with OSA than females, though the incidence of hypothyroid was greater in females. 36 patients were found to be hypothyroid of which, 27 were previously detected cases and on medication. Only 9 patients (2.4%) were newly diagnosed cases. Male patients with hypothyroid were heavier in weight than the females or men without hypothyroid, had higher ESS, AHI and desaturation Index and low sleep efficiency and arousal index
Conclusions: There were more males than females having sleep apnea although the hypothyroidism was more common in females than in males. The prevalence of hypothyroidism was not significant than the normal population. Therefore, the detection of TSH in sleep apnea cases should be considered only if there are other risk factors and indications like obesity, persistent sleepiness despite therapy.

Keywords: Obstructive sleep apnea, Hypothyroidism, Prevalence, AHI

INTRODUCTION

Sleep apnea is a sleep disorder, which is characterized by shallow or infrequent breathing during sleep. Obstructive sleep apnea is the most common type which is caused by obstruction in the upper airway. It is usually associated with reduction in blood saturation. These pauses in breath may last for 20-40 seconds.[1] The patient is normally unaware of the problem, even on waking, and this is witnessed by the people around him. OSA is normally accompanied by snoring or other sequelae.[2-5] The spectrum of diseases involvement can range from mild dyspnea to more severe and life threatening respiratory failure.

These symptoms of OSA, i.e. daytime somnolence, lethargy and apathy are also seen in patients with hypothyroidism, thereby questioning a possibility of an association between these two disorders.[6-8]

The mechanism of the relationship between the two diseases could be due to the deposition of mucoproteins in the upper airway causing obstruction in the airway and disturbances of the regulatory control of pharyngeal

dilator muscles due to neuropathy and the possibility of airway depression.[9] Even though thyroxine is given as a replacement therapy, it does not resolve the sleep disordered breathing and treating sleep apnea does not cure hypothyroidism. Therefore, the treatment of both the disorders independent of each other is essential.[6,8,10]

Patients with OSA usually present with complaints of excessive daytime sleepiness, un-refreshing sleep, fatigue or insomnia. These patients may wake up at night with breathe holding, gasping, or choking.[11,12] The man risk factors are obesity, older age, family history, increasing neck circumference and male gender.[13,14] In women, menopause is the main risk factor.[15]

As the symptoms are similar, it is difficult to differentiate between the two diseases, often leading to misdiagnosis or under-recognition. A prevalence of 1-10% hypothyroidism among the patients with OSA has been reported in various studies using different criteria.

Several studies have suggested that environmental factors and ethnicity have a great influence on the prevalence of OSA as well as hypothyroidism.[16-18] As the prevalence of hypothyroidism in OSA may vary in different geographical regions, we have conducted this study to identify the prevalence of hypothyroidism in Obstructive sleep apnea patients in our area.

METHODS

This study was conducted in the department of Department of TB and Chest and Medicine at Fathima Institute of Medical Sciences, Andhra Pradesh, India. 372 patients who were referred for an overnight sleep study were included onto the study. All the patients were subjected to the regular clinical examinations and demographic details like age, weight, height, sex, etc. were noted during the initial screening by the sleep specialist. Mean values with standard deviation were calculated. The patients were asked questions about their sleep pattern, symptoms and snoring with reference to the Wisconsin Sleep apnea questionnaire. The Epworth Sleepiness scale also was done for assessment for daytime sleep patterns.

Patients with neuromuscular diseases, acutely ill patients, patients on drugs that may affect the thyroid function were excluded from the study. None of the patients included were on narcotics or other hypnotic drugs.

Blood was collected to determine serum thyroid stimulating hormone levels and thyroxine levels, within 2 weeks of the sleep apnea test. Based on the levels, the patients were divided into clinical hypothyroidism (if the TSH level was >5.0 µIU/mL and the FT4 level was <10.3 pmol/L), subclinical hypothyroidism if the TSH concentration was > 5.0 µIU/mL and the serum FT4 level was within the normal range.[19]

All the patients underwent polysomnography testing. The scoring of the electronic data was performed manually in accordance to the established criteria. OSA was defined according to the International Classification of Sleep Disorders. OSA was further classified as per American Academy of Sleep Medicine (AASM) criteria into mild OSA if the Apnea – Hypoapnea Index (AHI) was 1-14/h, moderate if the index was 15-29/h and severe if it was ≥ 30/h. Below 5 was considered normal. SaO_2 levels, sleep efficiency, arousal Index were also identified.

Statistical analysis

The Fisher's Exact Probability test was used for assessment of statistical significance.

RESULTS

Table 1: General Characteristics of the patients with OSA.

Males	268 (72%)
Mean Age	51.38 ± 3.56
Mean weight	98.3kg ± 13.29
BMI	38.1 ± 8.64
History of snoring	361 (97%)
Witnessed apnea	336 (93.1)
Day time somnolence	257 (69.1%)
Hypothyroidism	36 (9.6%)
Previously confirmed hypothyroidism	27 (7.3%)

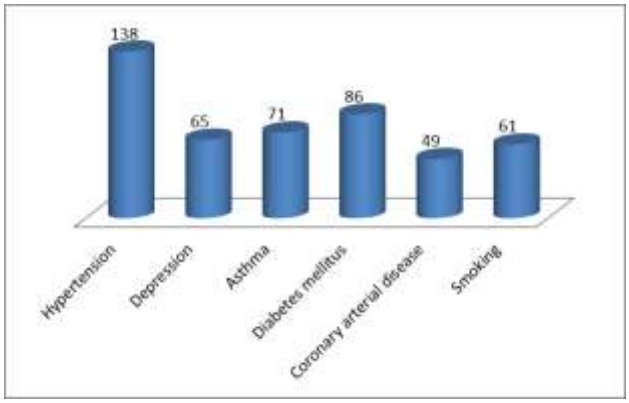

Figure 1: Risk factors in patients with OSA.

Out of the 372 patients, 268 (72%) were males and the rest females. The mean age for all the patients was 51.38 ± 3.56; weight was 98.3kg ± 13.29, BMI 38.1 ± 8.64. All patients except 11 had a history of snoring. Of them, 93% had relatives who witnessed the apneas. Day time somnolence was observed in 69% of the cases. 36 of the 372 patients had hypothyroidism. Of them, 27 were previously confirmed cases and on thyroxine treatment and 9 of them were diagnosed during the present study. Of these 9, 4 had subclinical hypothyroidism and 5 were clinical hypothyroid cases (Table 1).

We compared the male and female hypothyroid patients in OSA. Male patients with hypothyroid were heavier in weight than the females or men without hypothyroid, had more BMI though the females with hypothyroid were not far behind. The desaturation index was highest in males with hypothyroid rather than any other group. There was no significant difference in the time of SaO2 <90% among all the patients (Table 2).

Hypertension seemed to be a more prominent feature in the patients with OSA followed by diabetes, asthma and depression (Figure 1).

DISCUSSION

In our study hypothyroid was discovered during routine testing in 36 (9%) patients in people being tested for sleep apnea, 27 of whom were diagnosed earlier. This was reported by other studies.[6,7] The prevalence of previously undiagnosed hypothyroidism obtained in these studies (0.7 to 3.1%) was similar to our result. The prevalence of hypothyroid was higher in another study conducted by Popovici et al who reported a prevalence of 11%.[21]

Table 2: Gender comparison between normal and hypothyroid cases in OSA patients.

	Males		Females	
Characters	OSA patients without hypothyroid (value ± SD)	Hypothyroid OSA patients (value ± SD)	OSA patients without hypothyroid (value ± SD)	Hypothyroid OSA patients (value ± SD)
Age	49.23 ± 4.2*	58.78 ± 3.76	50.14 ± 7.5	53.87 ± 4.38
BMI	36.9 ± 4.2*	44.23 ± 3.23	39.2 ± 3.6	42.32 ± 3.45
ESS	9.9 ± 4	11.8 ± 8.2	7.9 ± 3.7	9.8 ± 3.4
AHI	56.8 ± 45.1	73.3 ± 24.9	55.2 ± 29.6	62.7 ± 14.7
Sleep efficiency	79.5 ± 12.6*	67.7 ± 21.6	73.9 ± 6.9	76.6 ± 12.4
Desaturation Index	30.9 ± 12.5*	48.4 ± 32.3	29.1 ± 9.3	40.7 ± 10.5
Time of SaO_2<90% (min)	18.5 ± 16.4*	32.8 ± 31. 6	33.2 ± 33.1	36.9 ± 32.5
Arousal Index	56.2 ± 32.6	53.6 ± 36.8	57.3 ± 21.7	73.5 ± 34.2

The prevalence of previously diagnosed hypothyroidism was observed in 7.3% cases in our study. This was higher than the prevalence reported in the studies by Lin et al and Meslier et al.[6,7]

We could not follow up these patients to identify the effect of thyroxine treatment on sleep apnea but in other studies, it was observed in a study by Skjodt that patients responded to thyroxine replacement therapy alone as sole treatment for their sleep apnea.[22] The same was observed by other investigators who observed positive response of OSA patients to thyroxine therapy.[23-25] In contrast, other studies observed that there was no response to thyroxine in OSA.[8,25]

We studied the difference between the two genders among the OSA patients with and without hypothyroidism. There was higher prevalence of hypothyroid in females with OSA compared to males although OSA was highly prevalent in males than females. This was in agreement with another study by Alotair et al who also reported a higher prevalence of hypothyroidism in females rather than males with sleep apnea[27], while in some western studies this prevalence was much lower.[6,20,23] This could be due to environmental factor, races and other quality of life.

In the present study, we found that there was not much difference in age and weight in the females with or without hypothyroid although there was a slight increase in the BMI in females with hypothyroid although it was not significant. In males there was a marked increase in weight as well as BMI among the hypothyroid patients compared to non hypothyroid patients. The risk factors were similar in all the four groups, though the desaturation levels, AHI scores, and SaO_2@<90% were higher in males with hypothyroid with OSA. These results were in accordance to a similar study by Bahammam and Miller et al.

Our study had many limitations. Association of hypothyroidism and OSA was not ascertained as the number of hypothyroid cases among the study population was too low. Moreover, the recently diagnosed hypothyroidism cases were very less compared to the previously diagnosed ones. The severity of the hypothyroidism in the treated and untreated could not be measured except to identify the history of the medication. The duration of the thyroxine use in the diagnosed cases were also not very many so as to identify if the medication has a positive effect on the sleep apnea. We therefore recommend the continuation of this study for a longer period on patients with recently diagnosed

hypothyroidism in OSA patients and the outcome of long term use of thyroxine on sleep apnea.

CONCLUSIONS

The overall prevalence of hypothyroidism in OSA patients in our area was 9.6%, while the previously diagnosed patients among these was 7.3%. Only around 2% of the cases were diagnosed during this study. There were more males than females having sleep apnea although the hypothyroidism was more common in females than in males. The prevalence of hypothyroidism was not significant than the normal population. Therefore, the detection of TSH in sleep apnea cases should be considered only if there are other risk factors and indications like obesity, persistent sleepiness despite therapy. Long term studies are warranted to identify the relevance of thyroxin therapy on OSA.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Obstructive Sleep Apnea Syndrome: The international classification of sleep disorders. Westchester, Illinois: American Academy of Sleep Medicine. 2001: 52-8.
2. Young T, Palta M, Dempsy J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle aged adults. N. Engl. J. Med. 1993;29;328(17):1230-5.
3. Bresnitz EA, Goldberg R, Kosinski RM. Epidemiology of obstructive sleep apnea. Epidemiol. Rev. 1994;16(2):210-27.
4. Millman RP, Fogel BS, McNamara ME, Carlisle CC. Depression as a manifestation of obstructive sleep apnea: reversal with nasal continuous positive airway pressure. J. Clin. Psychiatry. 1989;50(9):348-51.
5. Findley LJ, Levinson MP, Bonnier RJ. Driving performance and automobile accidents in patients with sleep apnea. 1992;13(3):427-35.
6. Lin C, Tsan K, Chen P. The relationship between sleep apnea syndrome and hypothyroidism. Chest. 1992;102(6):1663-7.
7. Meslier N, Giraud P, Person C, Badatcheff A, Racineux JL. Prevalence of hypothyroidism in sleep apnoea syndrome. Eur. J. Med. 1992;1:437-8.
8. Grunstein RR, Sullivan CE. Sleep apnea and hypothyroidism: mechanisms and management. Am J Med. 1988;85:775-9.
9. Attal P. Chanson. Endocrine aspects of obstructive sleep apnea: J Clin Endocrinol Metab. 2010;95(2):483-95.
10. Rajagopal KR, Abbrecht PH, Derderian SS, Pickett C, Hofeldt F, Tellis CJ. Obstructive sleep apnea in hypothyroidism. Ann Intern Med. 1984;101(4):491-4.
11. Park JG, Ramar K, Olson EJ. Updates on definition, consequences, and management of obstructive sleep apnea. Mayo Clin Proc. 2011;86:549-54.
12. Madani M, Madani F. Epidemiology, pathophysiology, and clinical features of obstructive sleep apnea. Oral Maxillofac Surg Clin North Am. 2009;21:369-75.
13. Bahammam AS, Alrajeh MS, Al-Jahdali HH. Binsaeed AA. Prevalence of symptoms and risk of sleep apnea in middle-aged Saudi males in primary care. Saudi Med J. 2008;29:423-6.
14. Tsara V, Amfilochiou A, Papagrigorakis JM, Georgopoulos D, Liolios E, Kaditis A, et al. Guidelines for diagnosing and treating sleep related breathing disorders in adults and children. Hippokratia. 2010;14:57-62.
15. Ancoli-Israel S, Klauber MR, Kripke DF, Parker L, Cobarrubias M. Sleep apnea in female patients in a nursing home. Increased risk of mortality. Chest. 1989;96:1054-8.
16. Brix TX, Hansen PS, Kyvik KO, Hegedus L. Cigarette smoking and risk of clinically overt thyroid disease: a population-based twin case-control study. Arch Intern Med. 2000;160(5):661-6.
17. Sichieri R, Baima J, Marante T, de Vasconcellos MT, Moura AS, Vaisman M. Low prevalence of hypothyroidism among black and Mulatto people in a population-based study of Brazilian women. Clin Endocrinol (Oxf). 2007;66(6):803-7.
18. Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, Spencer CA. Serum TSH, T(4), and thyroid antibodies in the United states population (1988 to 1994): National Health and Nutrition examination Survey (NHANES III). J Clin Endocrinol Metab. 2002;87(2):489-99.
19. Surks MI, Ortiz E, Daniels GH, Sawin CT, Col, Cobin RH. Subclinical thyroid disease: scientific review and guidelines for diagnosis and management. JAMA. 2004;291(2):228-38.
20. Winkleman, JW, Goldaman H, Piscatelli N, Lukas SE, Dorseyand CM, Cunningham S. Are thyroid function tests necessary in patients with suspected sleep apnea?. Sleep. 1996;19:790-3.
21. Popovici I, Khawaja I. Efficacy of thyroid function tests in patients suspected of having obstructive sleep apnea. Chest. 1997;112:149.
22. Skjodt NM, Atkar R, Easton PA. Screening for hypothyroidism in sleep apnea. Am J Respir Crit Care Med. 1999;160:732-5.
23. Millman RP, Bevilacqua J, Peterson DD, Pack AI. Central sleep apnea in hypothyroidism. Am. Rev. Respir. Dis. 1983;127:504-7.
24. Orr WC Males JC, Imes NK. Myxedema and obstructive sleep apnea. Am. J. Med. 1981;70:1061-6.
25. Skatrud J, Iber C, Ewart R, Thomas G, Rasmussen H, Schultze B. Disordered breathing during sleep in

hypothyroidism. Am. Rev. Respir. Dis. 1981;124:325-9.
26. Resta O, Carratù P, Carpagnano GE, Maniscalco M, Di Gioia G, Lacedonia D, et al. Influence of subclinical hypothyroidism and T4 treatment on the prevalence and severity of obstructive sleep apnoea syndrome (OSAS). J. Endocrinol. Invest. 2005;28:893-9.
27. Alotair H, Bahamman A. Gender differences in Saudi patients with obstructive sleep apnea. Sleep Breath. 2008;12(4):323-9.
28. Miller CM, Husain AM. Should women with obstructive sleep apnea syndrome be screened for hypothyroidism? Sleep Breath. 2003;7(4):185-8.

Cite this article as: Polu SR, Reddy MR. Prevalence of hypothyroidism in obstructive sleep apnea. Int J Adv Med 2016;3:15-9.