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Case Report

Association of Acromegaly and Central Sleep Apnea Syndrome

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Abstract

Acromegaly is usually characterized by the excessive secretion of growth hormone (GH) after the closure of epiphyseal plaques, resulting from functional pituitary adenomas. The most common manifestations of acromegaly are acral and soft tissue overgrowth, diabetes mellitus, hypertension, and heart and respiratory failure. In patients, obstruction of the upper airway may develop due to enlargement of the tongue and thickening of the tissues of the larynx; consequently, obstructive sleep apnea syndrome (OSAS) occurs commonly in acromegaly. Previous studies have shown an association between acromegaly and central sleep apnea syndrome (CSAS). Some of these described patients described showed that an elevation in the GH level may cause a defect in the respiratory drive. Most systemic diseases seen in acromegaly require effective treatment. We believe that it is necessary to perform effective treatments by examining respiratory disorders in sleep.

KEYWORDS: Acromegaly, obstructive sleep apnea, polysomnography, growth hormone

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INTRODUCTION

In patients with acromegaly, obstruction of the upper airway may develop due to enlargement of the tongue and thickening of the tissues of the larynx. Acromegaly is often associated with obstructive sleep apnea syndrome (OSAS). OSAS is due to craniofacial changes and acromegaly. Although the obstructive type of apnea was thought to be predominant, there are some reports suggesting that central apneic episodes have a high rate and are related to abnormalities of central respiratory control. The presence and importance of central sleep apnea in acromegaly are unsolved issues. Morphological changes so characteristic of acromegaly stand for an obstructive type of apnea.The hormonal milieu that determines the predominance of the type of apnea is not yet fully understood.

CASE PRESENTATION

A 51-year-old male patient presented with a complaint of breathlessness during his sleep. His medical history included surgery for a growth hormone (GH)-releasing pituitary adenoma in 2007. A recurrent adenoma was detected in follow-up magnetic resonance imaging performed in 2012; the size of the lesion had not changed in the follow-ups (Figure 1). Due to concomitant diabetes mellitus and hypertension, medical treatment was provided, and somatostatin was used as the GH antagonist. The patient had the phenotype of acromegaly and experienced sleep problems. Therefore, polysomnography (PSG) was performed to evaluate the patient with respect to sleep apnea syndrome. The patient did not complain of snoring or daytime sleepiness. His body mass index was 34.2 kg/m^2, and his Epworth sleepiness score was 2. The apnea-hypopnea index (AHI) was 58; 426 respiratory events occurred during sleep and 91 of these were obstructive, 5 were mixed, 287 were central sleep apnea, and 43 were hypopnea. The longest apnea duration was 34 s. With these findings, the patient was diagnosed as having "advanced grade central sleep apnea syndrome." The patient was evaluated to check whether he could undergo surgery, but surgery was not considered because of the localization of the lesion. An upper respiratory tract endoscopic examination did not reveal any pathology, and the patient was prescribed Continuous Positive Airway Pressure (CPAP) at a pressure of 9 cmH_2O. Polysomnographic findings are presented in Table 1.

Informed consent was obtained from the patient who participated in this study.

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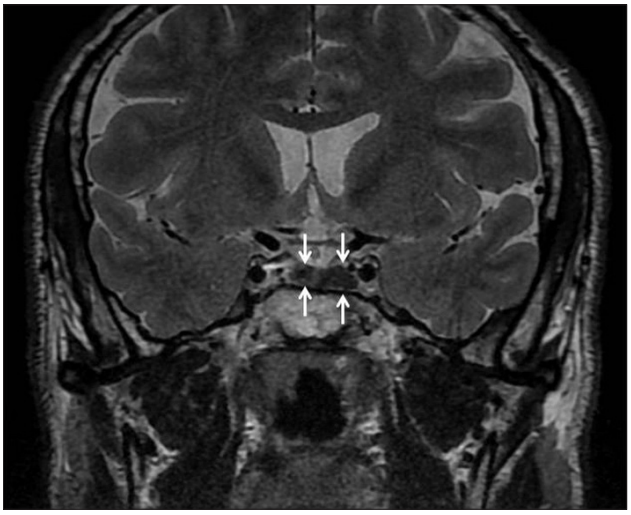

Figure 1. Magnetic resonance image of the patient

Table 1. Polysomnographic findings

	Polysomnography night	Titration night
Total sleep time (min)	441	389
Sleep efficiency (%)	89	93.7
REM (min)*/ (%)	76/17.2	90.5/23.3
Non-REM Stage 1 (min)*/ (%)	68.5/15.5	40.5/10.4
Non-REM Stage 2 (min)*/ (%)	202.5/45.9	144/37
Non-REM Stage 3 (min)*/ (%)	94/21.3	114/29.3
AHI	58	0.6
AHI_{REM}	39.5	0
AHI_{NREM}	6.8	0.8
AHI_{SUPINE}	112	3.1
$AHI_{LEFT-RIGHT\ SIDE}$	7.3-47.1	0
Number of central apnea	287	0
Number of obstructive apnea	91	0
Number of mixed apnea	5	0
Number of hypopnea	43	4
Alertness O2 saturation	96	96
Average O2 saturation	95	96
Minimum O2 saturation	82	91
ODI	44.5	0.2
Desaturation%	3.1	0
Longest apnea time duration (s)	34	0

AHI: Apnea-Hypopnea Index; ODI: Oxygen Desaturation Index; REM: rapid eye movement
*Sleep stages were denoted as a percentage of the total sleep time and in minutes
Desaturation%: That time is less than 90% oxygen saturation

DISCUSSION

Acromegaly is characterized by somatic findings due to soft tissue hypertrophy and systemic findings such as diabetes, heart failure, and hypertension. The somatic effect of increased GH and IGF-1 levels in the body is growth stimulation in skin, bone, cartilage, connective, and other epithelial tissues [1]. Hypertrophy of the respiratory mucosa and upper respiratory soft tissue and macroglossia lead to the development of OSAS, and its prevalence rate is reported to be 80-90% [2,3]. Central obesity increases the risk of OSAS by 2-4 times in the general population, and body composition alterations can partially explain the persistence of this respiratory disturbance in cured acromegalic patients. A reduction in water and lean body mass and an increase in body fat were observed after achieving biochemical control of the disease [4]. Patients with GH deficiency can develop central obesity and impaired glucose metabolism, thus increasing the risk of sleep disorders. GH/IGF-1 contributes to the disruption of respiratory control (respiratory instability), and GH levels contribute to the development of central apnea [5]. Besides data showing that sleep breathing disorders (SBDs) completely resolve with the treatment of acromegaly, there are results showing that SBDs persist due to permanent structural changes [6]. CPAP treatment is effective for controlling sleep disorders in acromegaly, while there are discordant results about GH/IGF-1 normalization and OSAS improvement. Chemla et al. [7] reported that acromegaly control (obtained with surgery or medical treatment) had no significant effect on polysomnographic indices. Extensive CPAP studies have shown several cardiovascular benefits; therefore, it is reasonable to suppose that treating OSAS can improve the long-term cardiovascular prognosis in acromegalic patients. Regarding comorbidities, diabeetes mellitus (DM) or Impaired Glucose Tolerange (IGT) was more prevalent in OSAS patients, probably because this sleep disorder decreases insulin secretion and increase insulin resistance, as already known [8]. Diabetes can have a negative impact on life expectancy in the general population; in the literature, it is described as an independent predictor of mortality in acromegaly. Therefore, this comorbidity should be considered and managed with specific treatments, including diet, physical activity, oral antidiabetic drugs, and insulin [9].

Positive Airway Pressure (PAP) treatment for acromegaly patients with OSAS should not be overlooked [6].

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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REFERENCES

1. Chanson P, Salenave S. Acromegaly.Orphanet J Rare Dis 2008;3:17. [CrossRef]

2. Hernández-Gordillo D, Ortega-Gómez Mdel R, Galicia-Polo L, et al. Sleep apnea in patients with acromegaly. Frequency, characterization and positive pressure titration. Open Respir Med 2012;6:28-33. [CrossRef]
3. Vannucci L, Luciani P, Gagliardi E, et al. Assessment of sleep apnea syndrome in treated acromegalic patients and correlation of its severity with clinical and laboratory parameters. J Endocrinol Invest 2013;36:237-42.
4. Colao A, Ferone D, Marzullo P, et al. Systemic complications of acromegaly: epidemiology, pathogenesis, and management. Endocr Rev 2004;25:102-52. [CrossRef]
5. Grunstein RR, Ho KY, Berthon-Jones M, et al. Central sleep apnea is associated with increased ventilatory response to carbon dioxide and hypersecretion of growth hormone in patients with acromegaly. Am J Respir Crit Care Med 1994;150:496-502. [CrossRef]
6. Akkoyunlu ME, Yakar F. Acromegaly and sleep disordered breathing. J Sleep Disord Ther 2013;2:5.
7. Chemla D, Attal P, Maione L, et al. Impact of successful treatment of acromegaly on overnight heart rate variability and sleep apnea. J Clin Endocrinol Metab 2014;99:2925-31. [CrossRef]
8. Kent BD, McNicholas WT, Ryan S. Insulin resistance, glucose intolerance and diabetes mellitus in obstructive sleep apnoea. J Thorac Dis 2015;7:1343-57.
9. Marin JM, Carrizo SJ, Vicente E, et al. Long-term cardiovascular outcomes in men with obstructive sleep apnea-hypopnoea with or without treatment with continuous positive airway pressure: an observational study. Lancet 2005;365:1046-53.[CrossRef]