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OBSTRUCTIVE SLEEP APNEA

Dr. Mekla Anusha*[1], G. Sisira Pushpa[2], K. Pranitha[3], M. Gayathri[4]

*[1]Assistant Professor, Department of Pharmacy Practice, Malla Reddy College of Pharmacy (MRCP), Maisammaguda, Telangana, India – 500100.
[2,3,4]Student, PharmD, Malla Reddy College of Pharmacy (MRCP), Maisammaguda, Telangana, India – 500100.

***Corresponding Author: Dr. Mekla Anusha**
Assistant Professor, Department of Pharmacy Practice, Malla Reddy College of Pharmacy (MRCP), Maisammaguda, Telangana, India – 500100.
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ABSTRACT
Obstructive Sleep Apnea (OSA) is a common sleep disorder marked by repeated episodes of partial or full blockage of the upper airway during sleep, causing interrupted sleep and possible drops in oxygen levels. These disturbances lead to significant effects, most notably Excessive Daytime Sleepiness (EDS), which is particularly hazardous in jobs that require high safety standards.

KEYWORDS: Obstructive Sleep Apnea (OSA) is a common sleep disorder marked by repeated episodes of partial or full blockage of the upper airway during sleep, causing interrupted sleep and possible drops in oxygen levels.

INTRODUCTION

Obstructive Sleep Apnea (OSA) is a disorder related to sleep that involves repeated episodes where the upper airway is partially or completely blocked during sleep, leading to intermittent apneas and hypopneas.[1] The Apnea–Hypopnea Index (AHI) is commonly used to measure the severity of OSA, indicating the average number of apnea and hypopnea events per hour of sleep. An AHI of 5 or more events per hour is generally used to diagnose OSA, while OSA syndrome is identified when this is accompanied by excessive daytime sleepiness.[1] The American Academy of Sleep Medicine classifies daytime sleepiness as mild, moderate, or severe, based on how much it disrupts daily activities.[1] The Epworth Sleepiness Scale (ESS) is the most frequently used tool to assess the level of daytime sleepiness.[2,3] Over time, changes in diagnostic techniques and definitions of apnea, hypopnea, oxygen desaturation, and sleepiness have affected the reported prevalence rates of OSA. In the earliest studies on prevalence, Obstructive Sleep Apnea (OSA) was considered rare. In those studies, sleep recordings were usually conducted only on individuals identified as high risk for OSA through an initial screening. The overall population prevalence was then estimated by assuming that those not screened did not have OSA. Using this method, the reported prevalence of OSA syndrome ranged from 0.7% to 3.3%.[4-8] Patients in sleep clinic cohorts are typically those referred for diagnostic testing due to symptoms indicative of OSA, most often habitual snoring combined with excessive daytime sleepiness. In contrast, population-based epidemiological studies evaluate all participants and identify OSA based solely on an Apnea–Hypopnea Index (AHI) of 5 or more. However, only a portion of these individuals show clinical symptoms such as snoring or daytime sleepiness, which are usually the features prompting clinical evaluation for sleep apnea.

CLINICAL CHARACTERISTICS

Witnessed apneas: These events are a good diagnostic predictor of OSAS but do not predict severity of the disorder. Concern by the bed partner about witnessed breathing pauses during sleep is a common reason for referral to a sleep clinic. Witnessed apnea is less common among female patients with OSAS and may be reported in up to 6% of the normal population.

Nocturnal choking or gasping: Many patients with OSAS report waking at night with a choking sensation, which can be quite frightening and presumably reflects an episode of outright wakening during an obstructive apnea. This choking almost invariably passes within a few seconds of wakening.

Insomnia: Sleep maintenance insomnia is often mentioned as a symptom of obstructive apnea and likely

reflects the disturbing effect on sleep of recurring arousal. However, most patients with OSAS have little difficulty in initiating sleep.

Other nocturnal symptoms: Several other nocturnal symptoms may be reported by patients or their bed partner such as nocturia, enuresis, frequent arousals, diaphoresis, and impotence and a cause–effect relationship with OSAS is supported by reports that these symptoms improve with continuous positive air pressure (CPAP) therapy.

Daytime Symptoms

Excessive daytime sleepiness: Although sleep apnea is the most common cause of excessive daytime sleepiness (EDS), it has not been found useful as a clinical feature to discriminate between patients with and without the disorder. Between 30 and 50% of the general population report significant sleepiness. Furthermore, several studies have found that the severity of EDS and sleep apnea do not correlate, which may reflect the fact that many other sleep disorders also cause EDS. One must also distinguish EDS from other symptoms such as fatigue and patients frequently underestimate the severity of sleepiness. This latter feature may reflect a genuine underestimation and/or a reluctance to admit the symptom for social or work-related reasons.

The severity of EDS can be assessed subjectively by various questionnaires, the most widely used being the Epworth Sleepiness Scale. The input of the partner can be useful in this assessment. Objective tests have some advantages but are expensive and time consuming. These include the Multiple Sleep Latency Test (MSLT), the maintenance of wakefulness test (MWT), and the Osler Test, the latter being the simplest to apply.

Other daytime symptoms Sleep apnea is reported to be associated with many symptoms other than EDS, such as fatigue, memory impairment, personality changes, morning nausea, morning headaches, automatic behavior, and depression. Although these features may be important in assessing the impact of sleep apnea on a patient and the effectiveness of therapy, there has been no systematic study of the capacity of these features to predict the presence or absence of OSA.

Physical Characteristics/Examination

Obesity: Obesity is common in OSAS, particularly upper body obesity, and there is evidence that patients with OSAS are particularly prone to having fat necks. Neck circumference is a strong predictor of OSAS and values less than 37 cm and greater than 48 cm are associated with a low and high risk, respectively.

Craniofacial anatomy: Anatomic factors that predispose to upper airway narrowing should be sought in the physical examination of a patient suspected of having OSAS. These include retrognathia, micrognathia, tonsillar hypertrophy, macroglossia, and inferior displacement of the hyoid. However, the most common physical finding in patients with OSAS is a nonspecific narrowing of the oropharyngeal airway, with or without an increase in soft tissue deposition.

Hypertension: A link between sleep apnea and hypertension has been consistently demonstrated in many studies, and the finding of hypertension in a patient with symptoms suggestive of OSAS increases the likelihood of the disorder. The likelihood of OSAS appears to be particularly high in patients with drug-resistant hypertension.

CLINICAL PRESENTATION

A 32 year old male patient was admitted to hospital with chief complaints sudden breathlessness and awakening during sleep since 4 years and snoring since 4 years.

Other investigations

- Apnea-Hypopnea index (AHI) -6.2 events/hr
- Epworth Sleepiness Scale (ESS) 22/24.

TREATMENT

Generic Name	Trade Name	Roa	Dose	Frqy	Therapeutic Action /Use
Tab. Zincovit	Multivitamine	Oral (PO)	1TAB	OD	treating and preventing nutritional deficiencies
Inj. Thiamine	Vitamin B	IV	100mg	TID	treating vitamin B deficiency disorders, such as beriberi and pellagra, and managing associated symptoms like fatigue, anemia, and nerve pain
Tab. Pan	Pantoprazole	Oral (PO)	40mg	OD	Irreversibly blocking the enzyme responsible for the final step of acid production in the stomach.
Tab. Restyl	Alprazolam	Oral (PO)	0.25mg	H/S	By binding to this site, alprazolam enhances the inhibitory effects of GABA, the brain's main calming chemical.
Neb. Duolin	Ipratropium Bromide	P/N	1.25mg/1RESP	STAT	blocking muscarinic acetylcholine receptors in the airways, which inhibits vagally mediated

					reflexes and prevents the smooth muscle from contracting
Neb. Budecort	Budesonide	P/N	500mg/1resp	STAT	by binding to and activating intracellular glucocorticoid receptors (GRs), leading to a reduction in inflammation, swelling, and mucus production.
Inj. Augument	Amoxicillin + Clavulanate	IV	75mg	STAT	amoxicillin is the antibiotic that kills bacteria, clavulanic acid is a beta-lactamase inhibitor that prevents bacterial resistance.
Inj. Dynapar-Aq	Diclofenac Sodium	IV	75mg	BD	by inhibiting the enzymes cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2), which reduces the production of prostaglandins
Inj. Hydrocort	Hydrocortisone	IV	100mg	BD	binding to the glucocorticoid receptor, which then translocates to the nucleus to alter gene expression, leading to its anti-inflammatory and immunosuppressive effects
Tab. Cetrizine	Citrizine Dihydrochloride	Oral (PO)	10mg	H/S	works by selectively blocking histamine H1 receptors in the periphery of the body.

CLINICAL PRESENTATION

Patient generally with Witnessed apneas., Nocturnal choking or gasping, snoring, fatigue, memory impairment, personality changes, morning nausea, morning headaches, automatic behavior, and depression.

DIAGNOSTIC EVALUATION

POLYSOMNOGRAPHY

In the polysomnographic assessment, an obstructive apnea was identified when the thermistor signal showed a reduction of more than 50% in amplitude compared with the baseline recorded during the previous two minutes, accompanied by a progressive increase in respiratory movement amplitude. The recording was considered abnormal or pathological when the apnea index (AI) reached a value of five or higher.

APNEA-HYPOPNEA-INDEX(AHI)

The Apnea-Hypopnea Index (AHI) is a key measurement for diagnosing and staging sleep apnea. It quantifies the average number of apnea (complete breathing stops) and hypopnea (partial breathing stops) events per hour of sleep, with a clinical investigation like a polysomnogram (PSG) being the standard method to determine it.

The severity is then categorized as:
normal -(fewer than 5 events/hour),
mild- 5−14 (events/hour),
moderate -15−29(events/hour),
severe -30+(events/hour).

EPWORTH SLEEPINESS SCALE

The Epworth Sleepiness Scale (ESS) is a self-administered questionnaire used to measure a person's general level of daytime sleepiness.

- 0–7: Unlikely to be abnormally sleepy.
- 8–9: Average amount of daytime sleepiness.
- 10–15: May be excessively sleepy, depending on the situation. You may want to seek medical attention.
- 16–24: Excessively sleepy and should seek medical attention.

MANAGEMENT

Management of Obstructive Sleep Apnea (OSA)

The management of OSA can be divided into several conservative and behavioral approaches, including weight reduction, regular physical activity, positional therapy, and avoidance of alcohol.

Weight loss: Body mass index (BMI) is a key factor influencing the severity of OSA. Research has shown that a 10% reduction in body weight can lead to about a 26% decrease in the apnea–hypopnea index (AHI). Losing weight reduces airway collapsibility and may even result in a near-complete improvement of apnea symptoms. Although bariatric surgery has been used for weight reduction, its effectiveness in treating OSA remains uncertain. Some studies report significant improvement, while others show minimal or no benefit. A large systematic review of over 22,000 patients indicated that successful weight loss can either resolve or improve OSA symptoms.

Exercise: Regular physical exercise is strongly recommended for individuals with OSA, as it helps reduce associated cardiovascular complications. The AHEAD (Action for Health in Diabetes) study demonstrated that lifestyle changes, including exercise, significantly improved OSA severity. A 10-year follow-up using polysomnography confirmed that intensive lifestyle interventions focused on weight reduction led to better OSA control.

Positional therapy: Positional sleep therapy encourages patients to sleep on their side rather than on their back, as the supine position tends to worsen airway obstruction. Devices such as vibratory alarms worn around the neck can alert patients when they roll onto their back during sleep, prompting them to change position. A Cochrane

review involving eight studies and 323 participants found that while positional therapy was less effective than CPAP in reducing AHI, it was often better tolerated and used for longer periods during the night.

Alcohol avoidance: Alcohol consumption is a known risk factor for OSA. A meta-analysis showed that individuals who consume alcohol have a 25% higher prevalence of OSA, experience longer apnea durations, and show lower oxygen saturation levels during sleep. These effects are believed to occur due to alcohol's depressive action on airway dilator muscles and nerves controlling the genioglossus muscle, which helps keep the airway open. Another systematic review covering 21 studies (1985–2015) concluded that alcohol use increases the risk of developing OSA by approximately 25%, especially among heavy drinkers.

DISCUSSION

The discussion focuses on the diagnosis and treatment of severe Obstructive Sleep Apnea (OSA) in a 32-year-old professional driver.[1]

The patient presented with major OSA risk factors, including a high Body Mass Index (BMI > 39 kg/m²) and a large neck circumference.[2] Clinically, he reported snoring and sudden breathlessness/awakening during sleep for four years.[3]

The severity was confirmed by an Epworth Sleepiness Scale (ESS) score of $22/24$, indicating severe sleepiness, and a diagnostic Apnea-Hypopnea Index (AHI) of 6.2 events/hr for OSA. The severity of EDS often does not correlate with the severity of sleep apnea.[5]

The primary treatment advised was Continuous Positive Airway Pressure (CPAP) therapy.[6]

CONCLUSION

A 32 years old male patient was admitted in the hospital with chief complaints of sudden breathlessness and awakening during sleep and snoring. After physical examination and other investigations, he was diagnosed with "OBSTRUCTIVE SLEEP APNEA"

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