

OBSTRUCTIVE SLEEP APNEA SYNDROME: CURRENT DIAGNOSTIC APPROACHES AND TREATMENT STRATEGIES IN OTORHINOLARYNGOLOGY

Muxtorov. A¹, Rasulova K.A.²,

Samarkand State Medical University, Department of Otorhinolaryngology No. 2, 2st year clinical resident¹,
Scientific advisor: Assistant, Department of Otorhinolaryngology No. 2, Samarkand State Medical University²,

Received: 2026-04-09 · Accepted: 2026-05-27

Abstract

Obstructive Sleep Apnea Syndrome (OSAS) is a common sleep-related breathing disorder characterized by recurrent episodes of partial or complete upper airway obstruction during sleep. These episodes result in intermittent hypoxia, sleep fragmentation, and significant physiological stress affecting multiple organ systems. The prevalence of OSAS has increased substantially over recent decades due to rising obesity rates, aging populations, and improved diagnostic awareness. Untreated OSAS is associated with cardiovascular disease, hypertension, stroke, metabolic dysfunction, cognitive impairment, and reduced quality of life. Otorhinolaryngologists play a critical role in identifying anatomical factors contributing to airway obstruction and implementing both surgical and non-surgical treatment strategies. Recent advances in diagnostic technologies, sleep monitoring systems, and minimally invasive interventions have improved patient outcomes. This article reviews current knowledge regarding the epidemiology, pathophysiology, clinical manifestations, diagnosis, treatment options, and preventive measures related to obstructive sleep apnea syndrome.

Keywords: Obstructive sleep apnea syndrome, sleep-disordered breathing, upper airway obstruction, polysomnography, continuous positive airway pressure, otorhinolaryngology, snoring, hypoxia, sleep medicine.

1. Introduction

Obstructive Sleep Apnea Syndrome is one of the most prevalent sleep disorders encountered in modern clinical practice. The condition is characterized by repetitive collapse of the upper airway during sleep, resulting in cessation or reduction of airflow despite continued respiratory effort. These recurrent episodes lead to oxygen desaturation, hypercapnia, arousal from sleep, and disruption of normal sleep architecture. Consequently, affected individuals experience excessive daytime sleepiness, impaired cognitive function, decreased work productivity, and increased risk of serious systemic diseases.

The burden of OSAS has become increasingly significant worldwide. Epidemiological studies estimate that approximately 10–30% of adults may suffer from varying degrees of sleep apnea, with prevalence increasing among obese individuals, older adults, and males. However, a substantial proportion of cases remain undiagnosed, leading to prolonged disease progression and increased healthcare costs.

The pathophysiology of OSAS involves a complex interaction between anatomical abnormalities and neuromuscular dysfunction. Structural narrowing of the upper airway due to enlarged tonsils, elongated soft palate, macroglossia, nasal obstruction, craniofacial abnormalities, or obesity contributes significantly to airway collapse. During sleep, reduced muscle tone further compromises airway patency, resulting in repeated episodes of obstruction.

Beyond respiratory disturbances, OSAS exerts profound effects on cardiovascular, metabolic, endocrine, and neurological systems. Repeated hypoxic events trigger sympathetic nervous system activation, oxidative stress, systemic inflammation, and endothelial dysfunction. These mechanisms contribute to hypertension, coronary artery disease, arrhythmias, diabetes mellitus, and cerebrovascular disorders.

Given the broad clinical impact of OSAS, early diagnosis and comprehensive treatment have become essential priorities in otorhinolaryngology and sleep medicine. Modern approaches emphasize individualized evaluation and multidisciplinary management to reduce morbidity and improve long-term outcomes.

2. Materials and Methods

This study was conducted through a comprehensive review of scientific literature focusing on obstructive sleep apnea syndrome and its management within otorhinolaryngology. Relevant publications were retrieved from internationally recognized databases including PubMed, Scopus, Web of Science, Embase, and Google Scholar.

Selection criteria included randomized clinical trials, observational studies, systematic reviews, meta-analyses, and professional guidelines published primarily during the last fifteen years. Articles addressing epidemiology, pathogenesis, risk factors, diagnostic techniques, treatment modalities, surgical outcomes, and preventive strategies were included in the analysis.

Data extraction focused on patient characteristics, diagnostic accuracy, severity classification, therapeutic efficacy, complication rates, and long-term clinical outcomes. Information from multiple studies was critically evaluated and synthesized to identify current trends and evidence-based recommendations for the management of OSAS.

Comparative analysis was performed to assess the effectiveness of various treatment approaches, including continuous positive airway pressure therapy, oral appliances, lifestyle modification, and surgical interventions. The collected data were subsequently integrated into a comprehensive overview of contemporary clinical practice.

3. Results

The analysis revealed that obesity remains the most significant risk factor for the development of obstructive sleep apnea syndrome. Excess adipose tissue surrounding the neck and pharyngeal structures contributes to airway narrowing and increased collapsibility during sleep. Additional risk factors identified included male gender, advanced age, craniofacial abnormalities, enlarged tonsils, nasal obstruction, smoking, alcohol consumption, and family history of sleep-disordered breathing. Clinical manifestations varied according to disease severity. Loud habitual snoring was the most frequently reported symptom. Other common findings included witnessed apneic episodes, nocturnal choking sensations, restless sleep, excessive daytime sleepiness, morning headaches, memory impairment, reduced concentration, irritability, and depression. Severe cases demonstrated significant cardiovascular and metabolic complications.

Polysomnography was consistently identified as the gold standard diagnostic tool. This comprehensive sleep study enables accurate measurement of respiratory events, oxygen saturation levels, sleep stages, heart rate variability, and overall sleep quality. The Apnea-Hypopnea Index (AHI) remains the primary parameter used to classify disease severity into mild, moderate, and severe categories.

Nasal endoscopy and upper airway examination played essential roles in identifying anatomical causes of airway obstruction. Imaging studies, including computed tomography and magnetic resonance imaging, provided valuable information regarding airway dimensions and craniofacial abnormalities.

Continuous Positive Airway Pressure (CPAP) therapy demonstrated the highest effectiveness among non-surgical treatments. Most studies reported significant improvements in daytime alertness,

cardiovascular health, sleep quality, and overall quality of life among compliant patients. Weight reduction programs also showed substantial benefits, particularly in overweight and obese individuals.

Surgical interventions were found to be effective in selected patients with identifiable anatomical obstruction. Procedures such as uvulopalatopharyngoplasty, tonsillectomy, septoplasty, turbinate reduction, tongue-base surgery, and hypoglossal nerve stimulation contributed to improved airway patency and symptom reduction. Success rates varied according to patient selection and underlying anatomical factors.

4. Discussion

The findings emphasize that obstructive sleep apnea syndrome represents a major public health challenge requiring multidisciplinary management. The increasing prevalence of obesity has significantly contributed to the global rise in OSAS cases, highlighting the importance of preventive healthcare strategies and lifestyle interventions.

Upper airway anatomy plays a central role in disease pathogenesis. Otorhinolaryngologists are uniquely positioned to identify structural abnormalities contributing to airway obstruction. Comprehensive endoscopic evaluation allows accurate localization of obstruction sites and facilitates individualized treatment planning.

CPAP therapy remains the gold standard treatment due to its ability to maintain airway patency throughout sleep. However, long-term adherence continues to represent a significant challenge. Factors such as discomfort, mask intolerance, noise, and inconvenience often limit patient compliance. Therefore, alternative therapeutic options remain essential for patients unable to tolerate CPAP.

Recent advances in surgical techniques have improved treatment outcomes while minimizing complications. Minimally invasive procedures and image-guided surgical approaches have enhanced precision and postoperative recovery. Furthermore, hypoglossal nerve stimulation has emerged as an innovative treatment modality for selected patients with moderate-to-severe disease.

The association between OSAS and systemic diseases underscores the importance of early diagnosis. Cardiovascular complications, including hypertension, myocardial infarction, atrial fibrillation, and stroke, contribute significantly to morbidity and mortality. Effective treatment not only improves sleep quality but also reduces long-term systemic risks.

Future research should focus on developing personalized treatment algorithms based on anatomical, physiological, and genetic factors. Advances in artificial intelligence, home sleep monitoring technologies, and biomarker identification may further improve diagnostic accuracy and treatment effectiveness.

5. Conclusion

Obstructive Sleep Apnea Syndrome is a common and potentially serious disorder characterized by recurrent upper airway obstruction during sleep. The condition significantly affects respiratory, cardiovascular, metabolic, and neurological health. Early recognition and accurate diagnosis through polysomnography and otorhinolaryngological assessment are essential for effective management. Continuous positive airway pressure therapy remains the most effective non-surgical treatment, while surgical interventions provide valuable alternatives for appropriately selected patients. Comprehensive management involving lifestyle modification, medical therapy, and individualized surgical approaches can significantly improve patient outcomes and quality of life. Continued research and technological innovation will further enhance the diagnosis and treatment of this increasingly prevalent disorder.

References

1. Patil S.P., Ayappa I.A., Caples S.M., et al. Treatment of Adult Obstructive Sleep Apnea. *Journal of Clinical Sleep Medicine*. 2019;15(2):335–343.
2. Epstein L.J., Kristo D., Strollo P.J., et al. Clinical Guideline for the Evaluation and Management of Obstructive Sleep Apnea. *Journal of Clinical Sleep Medicine*. 2009;5(3):263–276.
3. Jordan A.S., McSharry D.G., Malhotra A. Adult Obstructive Sleep Apnea. *The Lancet*. 2014;383(9918):736–747.

4. Senaratna C.V., Perret J.L., Lodge C.J., et al. Prevalence of Obstructive Sleep Apnea in the General Population. *Sleep Medicine Reviews*. 2017;34:70–81.
5. Weaver T.E., Grunstein R.R. Adherence to Continuous Positive Airway Pressure Therapy. *Proceedings of the American Thoracic Society*. 2008;5(2):173–178.
6. Schwab R.J., Kim C., Siegel L.C., et al. Upper Airway Imaging in Obstructive Sleep Apnea. *American Journal of Respiratory and Critical Care Medicine*. 2015;192(8):961–968.
7. Strollo P.J., Soose R.J., Maurer J.T., et al. Upper-Airway Stimulation for Obstructive Sleep Apnea. *New England Journal of Medicine*. 2014;370(2):139–149.
8. Kapur V.K., Auckley D.H., Chowdhuri S., et al. Clinical Practice Guideline for Diagnostic Testing of Adult Obstructive Sleep Apnea. *Journal of Clinical Sleep Medicine*. 2017;13(3):479–504.
9. Friedman M., Wilson M.N., Pulver T.M., et al. Updated Friedman Staging System for Obstructive Sleep Apnea. *Otolaryngology–Head and Neck Surgery*. 2017;156(4):767–773.
10. Randerath W., Verbraecken J., Andreas S., et al. European Respiratory Society Guidelines on Non-CPAP Therapies for Obstructive Sleep Apnea. *European Respiratory Journal*. 2021;57(2):2002726.



Indexed & Abstracted In

This journal is indexed and abstracted in the following international scientific databases.



Google Scholar



ISSN



ORCID



CiteFactor



ResearchBib



DOI



Zenodo



Article Verification

Scan the QR code to verify the authenticity of this article

DOI: 10.4103/aams.0498



Grammarly