

GLOBAL ATLAS OF ALLERGIC RHINITIS AND CHRONIC RHINOSINUSITIS

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ALLERGIC RHINITIS AND SLEEP APNEA

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INTRODUCTION

Nasal obstruction results in pathologic changes in airflow velocity and resistance and has been associated with obstructive sleep apnea syndrome (OSAS) as a potential etiologic factor by promoting more negative intraluminal pressure in the pharynx predisposing to pharyngeal occlusion and thus obstructive apnea events. Although clinical research examining the correlation between nasal obstruction and sleep-disordered breathing is limited, studies evaluating patients with either naturally occurring partial nasal obstruction (e.g. allergic rhinitis, septal deviation) or experimentally induced nasal occlusion show a clear relationship between nasal obstruction and nocturnal appearance of snoring, hypopneas, and apneas. In a population-based sample (n=4927), participants who often or almost always experienced nighttime symptoms of rhinitis were significantly more likely to report habitual snoring, chronic excessive sleepiness, or nonrestorative sleep than those who rarely or never had symptoms.

NASAL RESISTANCE AND SLEEP APNEA

Rhinitis is a risk factor for sleep-disordered breathing on the

KEY MESSAGES

- Allergic rhinitis can contribute to worsening of obstructive sleep apnea syndrome (OSAS) due to elevated inspiratory breathing workload
- Nocturnal allergic rhinitis and asthma can mimic symptoms of OSAS
- Patients with OSAS present with nocturnal snoring, choking, and stops of breathing. In addition, they suffer from chronic excessive sleepiness and nonrestorative sleep
- OSAS is diagnosed by polysomnography; a cardiorespiratory polygraphy can render first information about nocturnal breathing in patients suspected to suffer from OSAS
- Positive airway pressure therapy applied by a nasal mask is standard-therapy in OSAS, thus nasal breathing needs to be optimized

basis of the Bernoulli principle (stating that the wider the beginning of a duct is, the less the risk of collapse is and viceversa) and the Venturi effect (postulating that air must pass through a small tube faster than through a large tube if the passing volume of air and time remain constant). From this perspective upper airways behave like a Starling resistor: the obstruction at the inlet induces collapsing forces that manifest downstream in the collapsible segment, the pharynx.

SLEEP APNEA AS A DIFFERENTIAL DIAGNOSIS TO NOCTURNAL ALLERGIC RHINITIS AND ASTHMA

Allergic rhinitis and allergic asthma often show a worsening of symptoms during sleep, especially when a house dust mite sensitization is present. This leads to a poor sleep quality and daytime somnolence. In contrast to these symptoms, patients with OSAS present with habitual snoring, choking and stops of breathing (apneas) during sleep. In addition, patients with

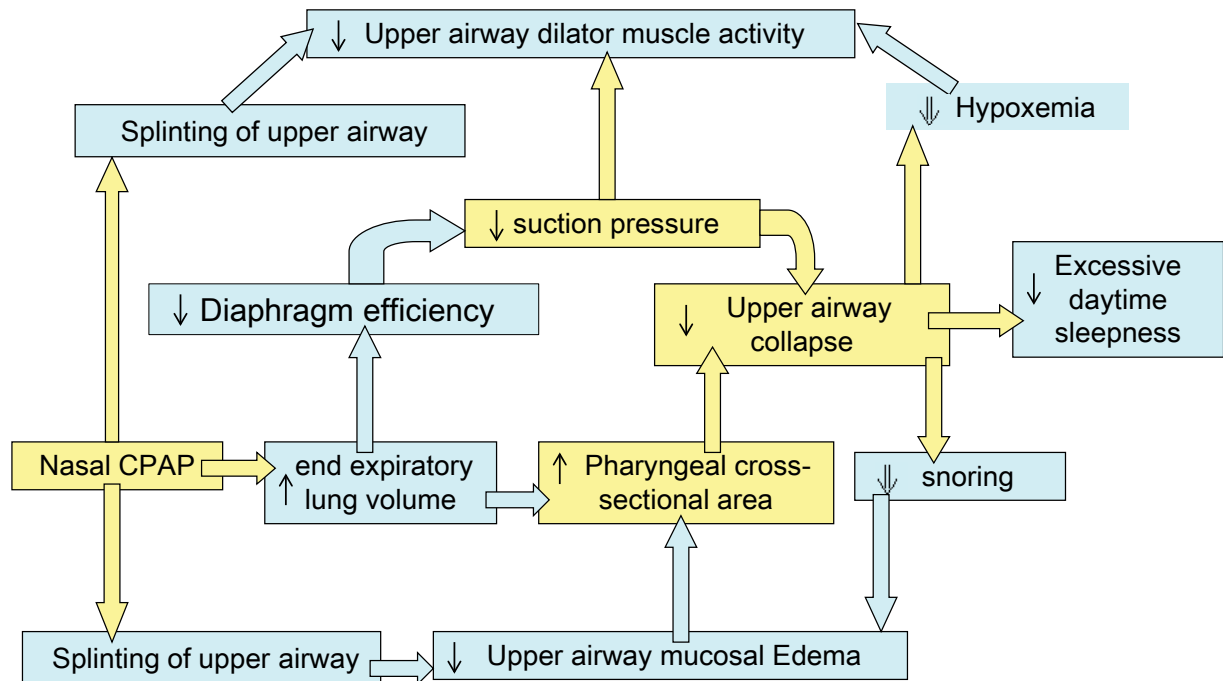


Figure 1 Potential physiological effect of nasal CPAP in patients with OSAS. (From *Breathing Disorders in Sleep* Mc Nicholas WT and Philipson Saunders Elsevier Science Limited 2002 pag.118)

OSAS suffer from chronic excessive sleepiness and nonrestorative sleep. In most cases, talking with the patient's partner can help differentiating the underlying diseases. OSAS can effectively be diagnosed by polysomnography in a sleep lab. A non-laboratory monitoring of sleep by cardiorespiratory polygraphy can render first information about nocturnal breathing in patients suspected to suffer from OSAS.

NASAL RESISTANCE AND CPAP THERAPY

CPAP (Figure 1) is, the most effective treatment for OSAS. with a compliance rate for CPAP of approximately 60%. Nasal congestion, irritation or runny nose can

be caused by the use of CPAP but, when concomitant rhinitis is present, its symptoms may interfere with CPAP adherence. Symptoms can be often alleviated by the use of a humidifier but a proper treatment of concomitant allergies, chronic sinus problems or a deviated septum must be considered.

KEY REFERENCES

1. Braido F, Baiardini I, Lacedonia D, Facchini FM, Fanfulla F, Molinengo G, et al. Sleep apnea risk in subjects with asthma with or without comorbid rhinitis. *Respir Care* 2014;**59**:1851-1856.
2. Duchna HW, Rasche K, Lambers N, Orth M, Merget R, Schultze-Werninghaus G. [Incidence of cutaneous sensitization to environmental allergens in obstructive sleep apnea syndrome]. *Pneumologie* 1997;**51**:763-766.
3. Georgalas C. The role of the nose in snoring and obstructive sleep apnoea: an update. *Eur Arc Otorhinolaryngol* 2011;**268**:1365-1373.
4. Kohler M, Bloch KE, Stradling JR. The role of the nose in the pathogenesis of obstructive sleep apnoea and snoring. *Eur Respir J* 2007;**30**:1208-1215.
5. Valipour A. The role of the nose in obstructive sleep apnea: a short review. *Pneumologie* 2014;**68**:397-400.
6. Young T, Finn L, Kim H. Nasal obstruction as a risk factor for sleep-disordered breathing. The University of Wisconsin Sleep and Respiratory Research Group. *J Allergy Clin Immunol.* 1997;**99**:S757-762.

Allergic rhinitis (AR) and chronic rhinosinusitis (CRS) affect more than 30% of the population worldwide and pose a huge burden on healthcare systems through direct and indirect costs. The European Academy of Allergy and Clinical Immunology called on all worldwide leaders to develop the “Global Atlas of Allergic Rhinitis and Chronic Rhinosinusitis”

The EAACI Global Atlas of Allergic Rhinitis and Chronic Rhinosinusitis was written by 218 authors from 38 countries and aims to increase awareness on the global epidemic and the burden of chronic inflammatory upper airways diseases and to warrant their recognition as a main concern in national health strategies.

Several priorities can be identified such as the development of novel tools for evaluation of subjective burden of the disease by the patients, improvement of the current clinical care pathways to obtaining a higher degree of control, research focused on determinants of uncontrolled and severe AR and CRS, altogether with a higher level of education of physicians, pharmacists and patients focusing on the benefits of proper diagnosis and adequate personalized treatment.

In view of the high need to optimize patient care in the epidemic of chronic upper airway diseases, a worldwide strategy to reduce the burden of chronic upper airway disease is warranted.

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