

## The effects of CPAP treatment on nasal mucosa in patients with obstructive sleep apnea

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**Abstract** The aim of the study was to demonstrate the effects of nasal CPAP treatment on the morphology and function of nasal mucosa in patients with obstructive sleep apnea (OSA). Patients with complaints relevant to OSA underwent respiratory function tests, arterial blood gas analyses and polysomnography. Saccharine test and nasal biopsies were performed to assess the mucociliary transport time and to observe the histopathological changes in patients with apnea–hypopnea index  $\geq 15$  in whole night polysomnography. Tissue samples were obtained from middle and inferior turbinates and septal mucosa to observe the degree of inflammation and fibrosis by semiquantitative means. Biopsies and mucociliary transport test were performed before and 3 months after the initiation of CPAP

treatment. A total of 25 patients with a mean age of 52 were enrolled in the study. While the pretreatment mucociliary transport time before and 3 months after the treatment were 10.50 and 11.50 min respectively. The difference between these values was statistically insignificant. Mean apnea–hypopnea index was 63.19, while mean partial oxygen pressure was 75.46 mmHg. Nasal CPAP treatment was introduced with a mean pressure of 9.54 cmH<sub>2</sub>O. The degree of inflammation and fibrosis was found to be significantly increased after CPAP treatment. Nasal CPAP leads to alterations in mucosa. Efforts should be directed to make CPAP treatment a safer method via protecting the morphologic and functional properties of the nasal mucosa.

**Keywords** Obstructive sleep apnea · nCPAP · Nasal · Mucosa · Mucociliary transport · Fibrosis · Inflammation

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### Introduction

Obstructive sleep apnea (OSA) is a relatively common entity with an incidence of 2–4% [1]. Daytime sleepiness, snoring and cardiovascular complications are among the well-known signs and symptoms of the disease. Continuous positive airway pressure (CPAP) is a treatment modality suitable for some of the OSA patients. Nasal CPAP is usually an effective and safe treatment option, but it may sometimes have side effects like cerebrospinal fluid leakage [2], conjunctivitis [3] and epistaxis [4], nasal congestion and dryness [5].

Mucociliary transport plays a crucial role in the defense mechanisms of respiratory system and is mostly useful against gases, smoke, dust and pollens [6]. Ciliary cells may undergo some changes due to inhaled irritants and various agents [7, 8]. Nasal mucociliary function may be altered by mechanical ventilation methods like nasal