Ultrasonography of the neck in patients with obstructive sleep apnea

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Abstract

Introduction In resource-limited settings, obstructive sleep apnea (OSA) often goes undiagnosed as polysomnography (PSG) is expensive, time-consuming, and not readily available. Imaging studies of upper airway have been tried as alternatives to PSG to screen for OSA. However, racial differences in upper airway anatomy preclude generalizability of such studies. We sought to test the hypothesis that ultrasonography (USG), an inexpensive, readily available tool to study soft tissue structures of the upper airway, would have predictive value for OSA in South Asian people.

Methods Adult patients with sleep-related complaints suspicious for OSA were taken for overnight PSG. After the PSG, consecutive patients with and without OSA were studied with submental ultrasonography to measure tongue base thickness (TBT) and lateral pharyngeal wall thickness (LPWT).

Results Among 50 patients with OSA and 25 controls, mean age was 43.9 ± 11.4 years, and 39 were men. Patients with OSA had higher TBT (6.77 ± 0.63 cm vs 6.34 ± 0.54 cm, P value = 0.004) and higher LPWT (2.47 ± 0.60 cm vs 2.12 ± 0.26 cm, P value = 0.006) compared to patients without OSA. On multivariate analysis, TBT, LPWT, and neck circumference were identified as independent factors associated with OSA. These variables could identify patients with severe OSA with a sensitivity of 72% and a specificity of 76%.

Conclusion Patients with OSA have higher tongue base thickness and lateral pharyngeal wall thickness proportionate to the severity of the disease, independent of BMI and neck circumference. These findings suggest that sub-mental ultrasonography may be useful to identify patients with severe OSA in resource-limited settings.

Keywords Obstructive sleep apnea · Tongue base thickness · Lateral pharyngeal wall thickness · Apnea–hypopnea index

Abbreviations

USG	Ultrasonography	TBT	Tongue base thickness
MRI	Magnetic resonance imaging	CPAP	Continuous positive airway pressure
CT	Computed tomography	PSG	Polysomnography
OSA	Obstructive sleep apnea	AHI	Apnea/hypopnea index
LPWT	Lateral pharyngeal wall thickness	NC	Neck circumference
		WC	Waist circumference

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Introduction

Sleep is essential for a healthy, productive life. Chronically disturbed sleep can lead to serious neuro-cognitive and cardio-metabolic consequences. Obstructive sleep apnea (OSA) is the most common sleep-related disorder. It is estimated that globally at least 3–5% males and 2–7% females suffer from OSA [1]. The prevalence of OSA is even higher in India, with an estimated prevalence of 9.6% [2]. Early diagnosis and treatment with CPAP therapy can lead to improvement in cardio-metabolic disturbances and quality of life [3].