



News Release

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PRESS CONFERENCE: May 20, 2014, 11:15 a.m., Room 27A, Upper Level

Session C110: Epidemiology and Genetics Of Sleep Disordered Breathing

Tuesday, May 20, 2014, 2:00 p.m. – 4:30 p.m.

Location: Indigo Ballroom A (Level 2), San Diego Convention Center

Sleep Apnea Tied to Hearing Loss in Large Study

ATS 2014, SAN DIEGO —Both high and low frequency hearing impairment have been linked with sleep apnea in a new study of nearly 14,000 individuals.

“In our population-based study of 13,967 subjects from the Hispanic Community Health Study/Study of Latinos, we found that sleep apnea was independently associated with hearing impairment at both high and low frequencies after adjustment for other possible causes of hearing loss,” said lead author Amit Chopra, MD, currently at the Albany Medical Center in New York. The study was presented at the 2014 American Thoracic Society International Conference.

All subjects underwent successful in-home sleep apnea studies and on-site audiometric testing at baseline. Sleep apnea was assessed with the apnea-hypopnea index (AHI), which indicates sleep apnea severity based on the number of apnea (complete cessation of airflow) and hypopneas (partial cessation of airflow) per hour of sleep. Sleep apnea was defined as an AHI \geq 15 events/hour. High frequency hearing impairment was defined as having a mean hearing threshold of greater than 25 decibels in either ear at 2000, 3000, 4000, 6000 and 8000 Hz, and low frequency hearing impairment was defined as having a mean hearing threshold of greater than 25 decibels in either ear at 500 Hz and 1000 Hz.

Among the 13,967 study subjects, 9.9% had at least moderate sleep apnea (AHI \geq 15), 19.0% had high frequency hearing impairment, 1.5% had low frequency hearing impairment, and 8.4% had both high and low frequency hearing impairment.

Hearing impairment was more common among individuals of Cuban and Puerto Rican descent and among those with a higher body mass index, self-reported snoring and/or sleep apnea. Sleep apnea was independently associated with a 31% increase in high frequency hearing impairment, a 90% increase in low frequency hearing impairment, and a 38% increase in combined high and low frequency hearing impairment in analyses adjusting for age, sex, background, history of hearing impairment, external noise exposure, conductive hearing loss and other factors. Increasing AHI was associated with a higher prevalence of high frequency, but not low frequency hearing impairment.

A limitation of this study was that the authors could not account for the impact of treatment of sleep apnea on their findings. However, it was rare for the participants to be on sleep apnea treatment in this cohort.

“Patients with sleep apnea are at increased risk for a number of comorbidities, including heart disease and diabetes, and our findings indicate that sleep apnea is also associated with an increased risk of hearing impairment” said Dr. Chopra. “The mechanisms underlying this relationship merit further exploration. Potential pathways linking sleep apnea and hearing impairment may include adverse effects of sleep apnea on vascular supply to the cochlea via inflammation and vascular remodeling or noise trauma from snoring .”

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** Please note that numbers in this release may differ slightly from those in the abstract. Many of these investigations are ongoing; the release represents the most up-to-date data available at press time.*

Abstract 56519

Sleep Apnea And Hearing Impairment In The Hispanic Community Health Study/Study Of Latinos

Type: Scientific Abstract

Category: 16.03 - Sleep Disordered Breathing: Epidemiology (SRN)

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Abstract Body

Introduction: Sleep apnea (SA) is associated with vascular inflammation and atherosclerosis. We hypothesize that SA is associated with hearing impairment (HI) via

vascular insufficiency of the cochlea, a hearing organ that is supplied by end arteries. This study assesses the independent association between SA and hearing impairment in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL).

Methods: HCHS/SOL is a population-based cohort of Hispanic/Latinos from 4 US sites. Our analytic sample consists of 13,967 participants. All completed baseline in-home sleep studies (Apnea Risk Evaluation System) and completed audiometric testing. We defined SA as an apnea-hypopnea index (AHI) ≥ 15 events/hour with oxyhemoglobin desaturation $\geq 3\%$. Respectively, high-frequency (HF), low frequency (LF) and combined high-low frequency (CF) HI were defined when the mean hearing threshold was greater than 25dB in either ear at 2000, 3000, 4000, 6000 and 8000 Hz (HF-HI), 500 and 1000 Hz (LF-HI), and both conditions present (CF-HI). Multivariable multinomial logistic regression was fit to test for the likelihood of HI. Separate models were fit to test differences in HI by SA severity.

Results: Among our study cohort (n=13,967), 52.2% (n=8,399) were women and the mean age was 41 years; 9.9% (n=1,576) of our sample had at least moderate SA, 28.8% (n=4,855) had HI; on further stratification of all HI 19.0% (n=3,248) had HF-HI, 8.4% (n=1,390) had CF-HI and 1.5% (n=217) had LF-HI. A higher prevalence of HI was associated with Cuban and Puerto Rican backgrounds, higher body mass index, snoring, and SA. Adjusting for age, sex, and US Hispanic/Latino backgrounds and multiple other potential confounders (hypertension, diabetes, dyslipidemia, cigarette and alcohol use, history of HI, history of snoring, conductive hearing loss and noise exposure), SA was independently associated with 31% increase in high-frequency HI (OR: 1.31 (1.06, 1.61)), 38% increase in high-low-frequency HI (OR: 1.38 (1.05, 1.81)), and 90% increase in low-frequency HI (OR: 1.90 (1.12, 3.21)). In separate analyses, dose response relations were seen between HF-HI and increasing AHI. Such a relation was not seen among those with LF-HI.

Conclusion: In the HCHS/SOL cohort, SA was significantly associated with HI at both HF and LF, independent of multiple confounders including presence of snoring, external noise exposure and conductive hearing loss. Future studies are required to assess the mechanisms involved in the association between SA and HI, specifically vascular inflammatory mechanisms.