Treating Sleep Apnea in Alzheimer's Patients Helps Cognition

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Continuous positive airway pressure (CPAP) treatment seems to improve cognitive functioning in patients with Alzheimer's disease who also suffer from obstructive sleep apnea, according to the results of a randomized clinical trial conducted at the University of California, San Diego. The study – led by Sonia Ancoli-Israel, PhD, professor of psychiatry at the UC San Diego School of Medicine and one of the nation's preeminent experts in the field of sleep disorders and sleep research in aging populations – was published in the November issue of the *Journal of the American Geriatrics Society*.

The research team, including physicians from UC San Diego's departments of psychiatry, medicine, neurosciences and family and preventive medicine, and Veteran's Affairs San Diego Healthcare System, looked at 52 men and women with mild to moderate Alzheimer's disease and obstructive sleep apnea (OSA). OSA is a breathing disorder characterized by brief interruptions of breathing during sleep, caused by a temporary, partial, or complete blockage in the airway. The prevalence of OSA in patients with dementia has been estimated to be as high as 70 to 80 percent.

"Although it is unlikely that OSA causes dementia, the lowered oxygen levels and sleep fragmentation associated with OSA might worsen cognitive function," said Ancoli-Israel. "This study, which showed significant improvement in patients' neurological test scores after treatment with CPAP, suggests that clinicians who treat patients with Alzheimer's disease and sleep apnea should consider implementing CPAP treatment."

"Any intervention that improves cognition in patients with Alzheimer's disease is likely to result in greater independence for the patient and less burden on their caretakers," said co-author Jody Corey-Bloom, M.D., Ph.D., professor of neurosciences at UC San Diego and research at UC San Diego's Shiley-Marcos Alzheimer's Disease Research Center. She added that earlier results from the same study – published in the *Journal of the American Geriatrics Society* in 2006 – had shown that CPAP also reduced daytime sleepiness, a common complaint of Alzheimer's patients and their caregivers.

A CPAP machine is a breathing assist device worn over the mouth or nose, providing constant pressurized air and giving nighttime relief for individuals who suffer from sleep apnea. Participants were randomized to either therapeutic CPAP for six weeks, or a placebo CPAP for three weeks followed by therapeutic CPAP for an additional three weeks. Both groups received a complete battery of neuropsychological tests before treatment, at three and at six weeks.

A comparison of the randomized subjects receiving therapy over the first three-week period did not result in a statistically significant improvement in cognition, although all measures changed in the expected directions. However, after the placebo group was switched to therapeutic CPAP treatment, the group as a whole showed a significant improvement in cognition after three weeks of treatment.

Ancoli-Israel explained the discrepancy, stating that because of the smaller size of the first group of subjects – the half measured after three weeks on the therapy – a statistically significant difference couldn't be shown. However, when the before-CPAP scores of the entire group of Alzheimer patients were compared to post-therapy scores, the larger sample size demonstrated improved cognition.

"The change in scores for individual tests suggested improvements in verbal learning and memory as well as some aspects of executive function such as cognitive flexibility and mental processing speed," said Ancoli-Israel.

A relationship between symptoms of OSA and cognitive impairment has been identified in normal adults as well as in patients with dementia. According to the study's authors, most past studies examining the effect of CPAP on OSA in patients without dementia have reported improvements in cognition.

In a report published in the *American Journal of Geriatric Psychiatry* in February 2006 by these researchers, examining 30 patients with Alzheimer's disease and OSA, showed they were able to tolerate and adhere to the CPAP therapy. A fourth study by the research group, published in 2006 in the journal *Behavioral Sleep Medicine*, showed that elderly patients with dementia – particularly Alzheimer's disease – suffered more severe symptoms from sleep apnea, such as frequent awakenings, than OSA patients without dementia.

"The severity of these sleep disruptions may parallel the decline in cognitive functioning seen in elderly patients with Alzheimer's disease," said Ancoli-Israel. "While CPAP by no means treats the underlying cause of Alzheimer's disease, by improving patients' sleep patterns, the hope is that their overall cognitive functioning can also improve."

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