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Editorial Open Access

Obstructive Sleep Apnea Syndrome and Dementia: is there a link?

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The prevalence of Obstructive Sleep Apnea Syndrome (OSAS) increases with age. Since dementia is also considered a disease of aging, the question arises as to whether there is a link between these two disorders. Does co-morbid OSAS cause further worsening of cognitive functioning and would it's treatment with continuous positive airway pressure (CPAP) improve these neurocognitive deficits?

In a recent, prospective study of 298 women without dementia, with a mean age of 82.3 years, women with sleep-disordered breathing (as defined in this study by an apnea-hypopnea index, i.e., AHI, of 15 or more events per hour of sleep) were found to have an increased risk of developing cognitive impairment as compared to women who had no sleep-disordered breathing [1].

Another cross-sectional study of 448 community dwelling women with a mean age of 82.8 years, found a significant association between objectively measured sleep-disordered breathing by polysomnography and cognitive impairment. In addition, the association between AHI and the Mini-Mental State Examination score was much greater in carriers of Apolipoprotein E epsilon4 (ApoE4) allele [2]. ApoE4 allele has been linked in prior studies to a higher risk of developing OSAS as well as early-onset Alzheimer's dementia.

Similar results have been found in pediatric studies. A study of 137 children aged 7-12 years found a lower general intellectual ability in all children with sleep-disordered breathing regardless of severity, as compared to controls [3].

Current literature also includes some negative studies regarding the link between OSAS and neurocognitive impairment. Notable amongst these is APPLES – Apnea Positive Pressure Long Term Efficacy Study [4], a recent study which found no correlation between AHI and neurocognitive performance after adjustment for education level, ethnicity and gender. The severity of oxygen desaturation however, was weakly associated with worse performance on some measures of intelligence, attention and processing speed. The limitations of this study included lack of a comparison group of adults without OSAS and the high education level of the study cohort which could have made them relatively resistant to the adverse impact of OSAS.

The overwhelming weight of current evidence links OSAS to worse neurocognitive functioning. This raises the obvious question as to whether treatment with CPAP could reverse or at least partially improve the cognitive impairment seen in OSAS patients.

A study of 17 treatment-naïve OSAS patients and 15 age-matched healthy controls revealed impairments in most areas of neurocognitive functioning, mood and sleepiness in the pre-treatment OSAS patients as compared to the controls [5]. Focal reductions in gray matter volume were also seen in OSAS patients in the left hippocampus, left posterior parietal cortex and right superior frontal gyrus. After 3 months of CPAP treatment, significant improvements in memory, attention and executive functioning were seen, along with a parallel increase in gray matter volume in the hippocampal and frontal areas of the brain.

Another study of 58 memory impaired patients with OSAS found that impaired verbal memory in OSAS patients may be reversible with optimal CPAP usage (defined in this study as 6 or more hours of CPAP usage per night) [6]. Thus, the degree of reversibility of cognitive impairment with CPAP usage would be influenced by the level of treatment adherence.

An elegant recent review of the recovery of cognitive function after CPAP treatment in OSAS patients [7] highlighted the results of several recent studies in this regard and also pointed out that a higher cognitive reserve at baseline might be protective against the adverse effects of OSAS on cognitive performance.

In summary, OSAS is a treatable condition with a significant and devastating impact on neurocognitive functioning. Thus, it is this author's opinion, that patients with dementia and milder forms of neurocognitive deficits, should be screened for OSAS as a cause of potentially reversible cognitive impairment. This evaluation should begin in the primary care physician's office as the first point of contact with the patient.

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