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Study Helps Explain Connection Between Sleep Apnea, Stroke and Death

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Description

Obstructive sleep apnea decreases blood flow to the brain, elevates blood pressure within the brain and eventually harms the brain's ability to modulate these changes and prevent damage to itself. The findings may help explain why people with sleep apnea are more likely to suffer strokes and to die in their sleep.

Newswise — Obstructive sleep apnea decreases blood flow to the brain, elevates blood pressure within the brain and eventually harms the brain's ability to modulate these changes and prevent damage to itself, according to a new study published by The American Physiological Society. The findings may help explain why people with sleep apnea are more likely to suffer strokes and to die in their sleep.

Sleep apnea is the most commonly diagnosed condition amongst sleep-related breathing disorders and can lead to debilitating and sometimes fatal consequences for the 18 million Americans who have been diagnosed with the disorder. This study identifies a mechanism behind stroke in these patients.

The study, "Impaired cerebral autoregulation in obstructive sleep apnea" was carried out by Fred Urbano, Francoise Roux, Joseph Schindler and Vahid Mohsenin, all of the Yale University School of Medicine in New Haven, Connecticut. It appears in the current issue of the *Journal of Applied Physiology*.

During sleep apnea episodes, the upper airway becomes blocked, hindering or stopping breathing and causing blood oxygen levels to drop and blood pressure to rise. The person eventually awakens and begins breathing, restoring normal blood oxygen and blood flow to the brain.

Ordinarily, the brain regulates its blood flow to meet its own metabolic needs, even in the face of changes in blood pressure -- a process known as cerebral autoregulation. This study found that the repeated surges and drops in blood pressure and blood flow during numerous apnea episodes each night reduces the brain's ability to regulate these functions.

Condition a health risk

Up to 4% of the population suffers from obstructive sleep apnea. In a previous study, Dr. Mohsenin and his colleagues showed that people with sleep apnea are three times more likely to suffer a stroke or die, compared to people in a similar state of health but without sleep apnea.

"After we found that sleep apnea is a risk factor for stroke and death, independent of other risk factors, we hypothesized that there must be something wrong with the regulation of blood flow to the brain," Dr. Mohsenin said. Participants included people with severe sleep apnea who experienced more than 30 apneas an hour during sleep time. The participants were about 47 years old, were free of cardiac disease and had not experienced any

strokes. The study also included a control group which did not have sleep apnea but was similar in most other ways.

The researchers monitored the participants' blood pressure while standing and squatting. Standing from a squatting position lowers blood pressure as can be experienced during normal daily activity. They also monitored the participants as they slept. The study found that the sleep apnea group:

- had lower cerebral blood flow velocity
- had significantly lower blood oxygen levels during sleep
- took longer to recover from a drop in blood pressure
- took longer to normalize blood flow to the brain

Identification is key

Overall, the findings indicate that repeated surges and drops in blood pressure and low oxygen levels eventually impair the body's ability to regulate blood flow to the brain. Sleep apnea may occur over a long period of time before the person becomes aware of it and seeks medical treatment. Here are the symptoms Dr. Mohsenin says to watch out for:

- After eight hours of sleep, you don't feel rested. During the day, you feel more and more tired, and by afternoon, you want to nap.
- You experience loud, habitual snoring that disturbs others.
- Your bed partner observes pauses in your breathing.

The treatment of obstructive sleep apnea with an airway pressurization mask has been shown to normalize cerebral autoregulation, although there are not yet any studies to show that it reduces the rate of stroke. Those who are being treated for sleep apnea should remain compliant with treatments, according to Dr. Mohsenin, including use of

- air pressurization mask or CPAP
- nasal inserts
- dental appliances
- weight reduction for the obese

In some cases, surgery may be advised.

Funding: Yale University, Department of Medicine and Yale Center for Sleep Medicine

Physiology is the study of how molecules, cells, tissues and organs function to create health or disease. The American Physiological Society (www.The-APS.org/press) has been an integral part of this discovery process since it was established in 1887.

