Sleep Apnea is a Risk Factor for Stroke

Written by Phil Vinall

Obstructive sleep apnea (OSA) is prevalent in the general population and has been linked to chronically elevated blood pressure and an increased risk of stroke and death. Mark Eric Dyken, MD, Sleep Disorders Center, University of Iowa College of Medicine, Iowa City, IA, discussed the relationship of OSA and stroke and emphasized the need for clinical trials to assess the effectiveness of OSA treatment in improving stroke outcomes.

Risk factors, treatment response, and short-term and long-term outcome of OSA in stroke patients are just starting to be studied. OSA is common, particularly in elderly male stroke patients with diabetes, nighttime stroke onset, and macroangiopathy, where it may have the potential to act as a precipitant to stroke. Although OSA can be treated with continuous positive airway pressure (CPAP), CPAP is used in a small percentage of patients due to compliance issues [Bassetti CL et al. *Stroke* 2006].

Simultaneous sympathetic and parasympathetic activation during episodes of apnea may be among the factors that connect OSA and stroke. Patients with OSA have high sympathetic activity when they are awake and experience further increases in blood pressure and sympathetic activity during sleep. These increases can be attenuated by treatment with CPAP [Somers VK et al. *J Clin Invest* 1995].

"If treatment is proven to reduce morbidity and mortality in a cost-effective manner, routine screening [for OSA] and more aggressive treatment might become standard care," concluded Dr. Dyken.

Sleep apnea is a significant risk of stroke or death from any cause, concluded Michael Zupancic, MD, Pacific Sleep Medicine Services, Scripps Memorial Hospital, La Jolla, CA. It is estimated that about 2% of women and 4% of men in the United States have sleep apnea [Young T et al. *N Engl J Med* 1993]. In addition, the risk of heart disease and stroke increases in snorers. The age-adjusted relative risk of ischemic heart disease between individuals who are classified as habitual or frequent snorers and nonsnorers is 1.91 ($p>0.01$). For both ischemic heart disease and stroke, the RR is 2.38 ($p>0.001$) [Koskenvuo M et al. *Brit Med J* 1987]. Although lower than for men, the RR for stroke and heart disease in women who snore also is increased.

A physiological explanation of snoring/sleep apnea was presented by Andrei V. Alexandrov, MD, Comprehensive Stroke Center, University of Alabama Hospital, Birmingham, AL, which he explained as the CBF steal phenomenon, or "reversed Robin Hood syndrome." Dr. Alexandrov described CBF steal as transient, spontaneous, or vasodilatory stimuli-induced velocity reductions in areas of the brain with poor hemodynamic reserve at the time of velocity increase in normal vessels. Such stealing of blood flow from poor flow areas to normal areas can lead to negative neurological changes. When associated with desaturation of oxygen—a common occurrence in sleep apnea—and with the natural blood pressure dip that is observed in sleep, Dr. Alexandrov believes that this would create a "perfect storm" during nocturnal sleep to further damage brain tissues with poor hemodynamic reserve [Alexandrov AV et al. *Stroke* 2007].