

Novel therapy improves cardiovascular health in central sleep apnea patients

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Researchers have demonstrated the effectiveness of a novel treatment that stimulates the nerve that controls the diaphragm to normalize the breathing of patients who suffer from both heart failure and central sleep apnea.

"Many heart failure patients suffer from central [sleep apnea](#), which a number of studies have shown increases mortality in these patients," said Shahrokh Javaheri, MD, professor emeritus of medicine at the University of Cincinnati and medical director of Sleepcare Diagnostics in Mason, Ohio.

Systolic heart failure describes a [medical condition](#) in which the heart no longer pumps blood strongly enough to meet the body's needs. According to the [American Heart Association](#), the number of Americans living with heart failure is estimated at 5.8 million—a number that is expected to grow as people live longer and the population ages. Heart failure is also the leading cause of hospitalization among Medicare patients

Dr. Javaheri and his colleagues will present the results of their study, "Single Night Transvenous Nerve Stimulation Improves Central Sleep Apnea in Systolic Heart Failure Patients," during the ATS 2011 International Conference, in Denver.

In this study, Dr. Javaheri and his colleagues conducted an acute, prospective investigation of 16 patients with a mean age of 59 and a

mean body mass index of 27 kg/mk2. All 16 patients were diagnosed with [heart failure](#) (mean left ventricular ejection fraction of 30 percent) and central sleep apnea.

The patients served as their own control group, receiving on one night phrenic nerve stimulation and no therapeutic intervention on another. The intervention, which acts like a pacemaker for the nerve, dramatically reduced the number of times patients stopped, or almost stopped, breathing; improved blood oxygenation levels while sleeping; and resulted in a healthier heart rate.

Compared to the control night, phrenic nerve stimulation resulted in the virtual elimination of central sleep apnea as measured by the central apnea Index (25 ± 14 vs. 3 ± 4 /hour, $p \leq 0.001$). There was a significant decrease in the apnea-hypopnea index (47 ± 12 vs. 24 ± 15 /hour, $p=0.002$) and in the associated arousal index (32 ± 12 vs. 16 ± 10 /hour, $p=0.001$) and in the reduced number of times the patient experienced 4 percent oxygen desaturation (31 ± 11 vs. 16 ± 12 /hour, $p=0.002$). Overnight sleep heart rate decreased significantly (73.3 ± 17.1 vs. 71.1 ± 16.3 bpm, $p=0.002$).

The current best treatment for these patients is Continuous Positive Airway Pressure (CPAP). In about half of all patients, CPAP suppresses central sleep apnea and improves cardiovascular health and mortality, according to Dr. Javaheri. However, even among those patients that could be helped by CPAP, many cannot tolerate sleeping an entire night with a nasal mask, so the percentage of patients helped by CPAP is considerably lower.

"Our research suggests," said Dr. Javaheri, "that there is a new therapy—one that, unlike CPAP and other existing mask-based therapies, could be tolerated by all [patients](#)."

Dr. Javaheri added that a randomized clinical trial is now needed to determine the clinical implications on long-term phrenic nerve stimulation on morbidity and [mortality](#) of [heart failure patients](#) with central [sleep](#) apnea.

Provided by American Thoracic Society

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