Sleep Apnea Associated With Hyperglycemia in Diabetes

**By Mary Ann Moon**

Sleep apnea appears to have an immediate effect on nighttime blood glucose levels in people with concomitant type 2 diabetes. Dr. Maria Pallayova said at the annual meeting of the European Association for the Study of Diabetes.

Previous studies have documented the independent association between sleep-disordered breathing (SDB) and abnormal glucose metabolism. However, the findings of this study, which used continuous glucose monitoring, provide a closer look at the immediate glycemic response to apneic episodes.

Medtronic/Mimed’s continuous glucose monitoring system (CGMS) was used on severe type 2 diabetes patients with type 2 diabetes on diet or oral hypoglycemic therapy. Eight of the patients had severe SDB and a mean hemoglobin A1c level of 7.4%. The other 22, who did not have SDB, had a mean HbA1c level of 6.5%. Those with SDB were referred to a sleep laboratory for overnight polysomnography, and the CGMS data were collected. In the study, the CGMS monitor was worn during sleep by both groups throughout the night. In contrast, those with severe untreated SDB had frequent episodes of sleep apnea/hypopnea (mean apnea/hypopnea index 7.64 episodes/hour) with severe oxygen desaturation (oxygen saturation 82.5%, minimal oxygen saturation 49.13%), followed by significant increases in blood glucose levels up to 12.3 mmol/L (221 mg/dL).

The nocturnal increment in blood glucose was 1.11 mmol/L (19.98 mg/dL) in the SDB group, significantly greater than the group of 0.2 mmol/L (3.6 mg/dL) seen in the patients without SDB, and was strongly correlated with severe oxygen desaturation. The peak of apnea-induced hyperglycemia tended to occur within an hour of severe oxygen desaturation, and the hyperglycemia lasted for a mean of 48 minutes post hypoxia before returning to normal, Dr. Pallayova noted.

The researchers found significant differences in both overall mean nocturnal glucose values—8.24 mmol/L (148.3 mg/dL) in the severe SDB group, compared with 6.15 mmol/L (110 mg/dL) in those without sleep apnea—and morning fasting glucose levels (8.01 vs. 6.6 mmol/L [144.2 vs. 118.8 mg/dL]).

However, there were no significant differences between the groups in day-time CGMS glucose levels, and no associations were seen between arousal frequency and nocturnal hyperglycemia, she reported.

‘Obstructive sleep apnea is not only obstruction; it is a cardiovascular and metabolic nightmare.’

**Dr. Pallayova**

Guided Breathing Device Lowers Blood Pressure in Type 2 Patients

**By Miriam Tucker**

COPENHAGEN — Self-treatment with a biofeedback device that guides breathing can significantly lower blood pressure among patients with type 2 diabetes, Dr. Moshe H. Schein reported at the annual meeting of the European Association for the Study of Diabetes.

The device, called RESPeRATE, is made by InterCure Ltd., Lod, Israel. It was approved for use by the Food and Drug Administration in 2002 for use in stress reduction and as an adjunctive treatment for hypertension, together with other pharmacologic and nonpharmacologic interventions. It works by using melodic tones to guide the patient through progressively slower inhalation and exhalation.

Previous data have shown that the device-guided technique results in significant blood pressure reductions among hypertensive patients who use it at home on a daily basis (J. Hum. Hypertens. 2001;15:271-8).

In the new study, a total of 60 patients with type 2 diabetes who had blood pressures greater than 130/80 mm Hg were randomized to the use of the device for 15 minutes a day along with usual treatment, or to usual treatment alone for 8 weeks. The group was 60% male, with a mean age of 64 years and a mean body mass index of 30 kg/m².

At baseline, mean blood pressure was 149/82 mm Hg in the treatment group and 146/81 mm Hg in the control group, even though the majority—79%—of the treatment group were taking blood pressure medication, said Dr. Schein, director of the Family Medicine Unit, Hadassah University Hospital, Jerusalem.

Systolic blood pressure dropped by 9.5 mm Hg in the group using the device, compared with an increase of 2.1 mm Hg among the controls, a significant difference between the two groups. The change in pulse pressure also was significantly different at 2 months: it dropped by 5.9 mm Hg from a mean of 67 mm Hg at baseline in the guided-breathing group, and increased by 3.6 mm Hg from a mean of 66 mm Hg in the controls.

Diastolic blood pressure dropped slightly in both groups, by 3.5 mm Hg in the guided-breathing patients and by 1.9 mm Hg among the controls, an insignificant difference.

There was a dose-response relationship between use of the device and systolic blood pressure reduction: The longer the patient spent in the slow breathing exercise, the greater the drop. (Although patients had been told to perform the device-guided breathing exercise daily, they actually did it for a mean of 3.6 sessions per week. However, each session lasted 15.9 minutes, slightly longer than the instructed 15 minutes.)

The device-guided breathing exercise was progressive: It started with just 2 of the 30 (7%) of the controls, with 8 of 30 (27%) in the device group, compared with just 2 of the 30 (7%) of the controls. Dr. Schein reported.