Sleep Apnea Tx in Diabetes Can Have Big Payoff

BY SUSAN LONDON

SEATTLE — Treating obstructive sleep apnea in patients with type 2 diabetes could improve glycemic control as much as using common antidiabetic drugs, according to the results of an observational study.

Blood glucose levels may be harder to control in cases of untreated OSA, Dr. Renee Simon Aronsohn reported at the annual meeting of the Associated Professional Sleep Societies.

Study results showed that mean glycosylated hemoglobin A_{1c} rose significantly from 6.5% in patients without OSA to 8.7% in those with severe OSA, she said.

The higher HbA_{1c} values also were significantly related to the number of episodes of oxygen desaturation of 3% or more during REM sleep.

In published reports, the prevalence of polysomnography-proven OSA in type 2 diabetes has ranged from 58% to 86%. "Despite this strikingly high prevalence of disease in patients with type 2 diabetes, the impact of OSA on glucose control in this patient population" has remained unknown, said Dr. Aronsohn, an endocrinology fellow at the University of Chicago.

She and her colleagues enrolled 54 patients seen in outpatient clinics during 2000-2008 who had physician-diagnosed type 2 diabetes and were on stable doses of medication. A total of 29 patients were women, and 29 were black.

'Untreated OSA may worsen glucose control and increase the need for more intensive pharmacotherapy.'

DR. ARONSOHN

Participants completed a diabetes and quality of life survey, performed wrist actigraphy monitoring for 5 days at home, underwent overnight laboratory polysomnography, and had a glycosylated HbA_{1c} measurement.

Patients were classified as having no OSA (apnea-hypopnea index less than 5), mild OSA (5-14), moderate OSA (15-29), or severe OSA (index of 30 or greater).

Overall, 76% of the patients had OSA (mild in 35%, moderate in 26%, and severe in 15%). Compared with their non-OSA counterparts, patients with OSA, on average, were older (60 years vs. 53 years), had a higher body mass index (35 kg/m^2 vs. 29 kg/m^2), and had a greater prevalence of diabetic complications (68% vs. 23%). The patients with OSA also had less total sleep time on polysomnography (6.3 hours vs. 7.2 hours), poorer sleep efficiency (81% vs. 90%), and less time spent in REM sleep (20% vs. 27%).

In a multivariate analysis that adjusted for potential confounders (age, sex, race, BMI, insulin use, duration of diabetes, and total sleep time), mean HbA_{1c} increased significantly across OSA categories, with values of 6.5%, 7.5%. 7.8%, and 8.7% among patients with no, mild, moderate, and severe OSA, respectively.

"It's important to note that the magnitude of the effect sizes we see here are comparable to—if not exceeding—those seen with widely used pharmacologic agents," Dr. Aronsohn said.

Dr. Aronsohn noted that a 100% increase in the number of obstructive events during REM sleep, from the median of 35 to 70 events per night, would result in a predicted increase in median HbA_{1c} from 7.2% to 7.7%. "This again is a clinically significant change in hemoglobin A_{1c} value," she pointed out.

"Our findings suggest that untreated OSA may worsen glucose control and increase the need for more intensive pharmacotherapy," she said. "Conversely, treatment of OSA may improve glucose control comparable to that of widely used pharmacologic agents."

Previous studies in patients with type 2 diabetes implicated sleep perturbations in poorer glycemic control, but failed to address OSA as a cause of the sleep problems, she said.

Studies assessing the impact of continuous positive airway pressure treatment on glycemic control in type 2 diabetes have been inconclusive and confounded by compliance issues, she noted. "So, our next step is looking at how treatment affects control."

Dr. Aronsohn reported that she had no conflicts of interest associated with the study. ■

GDI Predicts Diabetes Remission Post Bypass

BY BRUCE JANCIN

GRAPEVINE, TEX. — A patient's preoperative estimated glucose disposition index provides a potent predictor of the likelihood of type 2 diabetes remission after gastric bypass for severe obesity, results of a 270-patient series suggest.

"This is a nice practical application of a parameter you can determine very simply in your clinic … You can tell somebody whether they have a very good chance or less good chance of cure," Dr. Richard A. Perugini said at the annual meeting of the American Society for Metabolic and Bariatric Surgery.

Dr. Perugini of the University of Massachusetts, Worcester, reported on a consecutive series of 270 morbidly obese patients scheduled for laparoscopic gastric bypass for whom he determined the homeostatic model of assessment (HOMA)–estimated glucose disposition index. Seventy of these patients had type 2 diabetes.

The glucose disposition index (GDI) is the product of insulin sensitivity multiplied by beta cell sensitivity. It provides an indication of how advanced a patient's type 2 diabetes is. Both insulin sensitivity and beta cell sensitivity can readily be estimated by plugging data from an oral glucose tolerance test into the HOMA calculator developed by and available for free download from the Diabetes Trials Unit at the University of Oxford, England (www.dtu.ox.ac.uk).

Dr. Perugini found that 1 year post surgery, the patients in the top one-third of GDI values preoperatively had a 94% rate of diabetes remission (symptom free and off all diabetes medications). This was significantly greater than the 78% diabetes remission rate in patients in the middle tertile for GDI or the 71% rate for the lowest tertile.

In a multivariate logistic regression analysis incorporating patient age, gender, preoperative body mass index, and other variables, a presurgical HOMA-estimated that a GDI greater than 29 was an independent predictor of postsurgical diabetes remission, conferring a 7.9-fold increased likelihood of remission.

The only other significant predictive factor was preoperative use of insulin; insulin users had a 1 in 8 chance of diabetes remission after surgery.

Dr. Perugini noted that the traditional gold standard for studying insulin sensitivity and beta cell sensitivity is the insulin and glucose clamp. In his view, it's a test with major drawbacks.

"It's quite a cumbersome test, it's expensive, and it's not at all physiologic," the surgeon said. "Regardless of what your thoughts on the HOMA are, it actually works." ■

Tuning Fork Bested Monofilament In Diabetic Neuropathy Screens

BY MIRIAM E. TUCKER

ATLANTA — The clanging tuning fork test is far more accurate and sensitive than is the 10-g monofilament in screening diabetes patients for peripheral neuropathy, results from two studies suggest.

In fact, relying on the monofilament alone to screen patients for diabetic peripheral neuropathy (DPN) will miss all but the most severe, advanced cases, Dr. David S. Oyer and Dr. David Saxon said at the annual meeting of the American Association of Diabetes Educators.

But Dr. Andrew J.M. Boulton, chair of the American Diabetes Association's Foot Care Interest Group, said he believes that it's too soon to replace the monofilament with the CTF as a first-line screening test for diabetic neuropathy. The CTF results are "of course very interesting, and I think that this is certainly a useful addition to the monofilaments," he said in an interview, adding that they are consistent with last year's recommendation of using monofilaments together with one other of four tests. Dr. Boulton, who divides his time between the Manchester (England) Diabetes Centre and the division of endocrinology, diabetes, and metabolism at the University of Miami, noted that data from prospective studies also support the monofilaments.

Dr. Oyer presented data from two studies, one of which showed that the 10-g Semmes-Weinstein monofilament test was normal in more than two-thirds of patients who were found by the CTF test to have severe DPN. Guidelines from the American Diabetes Association—endorsed by the American Association of Clinical Endocrinologists—recommend the 10-g monofilament as the main screening tool for diabetic foot evaluation, along with a choice of one of four other tests. (Diabetes Care 2008;31:1679-85).

Dr. Saxon, an endocrinology resident at the University of Michigan, Ann Arbor, enumerated several limitations of the monofilament, including the fact that those distributed free by drug companies often are not reliable and do not always give 10 g of force. Moreover, cold monofilaments must be warmed up to work properly. After about 100 bends, monofilaments tend to "fatigue" and need to "rest" for 24 hours. Also, testing on a callus can give an inaccurate result, Dr. Saxon said.

In a previously published study, Dr. Oyer demonstrated reproducibility of the CTF in 12 patients with diabetes on whom he performed the test 10 times on the same toe for each. Scores ranged from 3.4 to 18.8 seconds, with a mean of 10.2 and standard deviation of 1.3 seconds, representing less than a 10% error.

In a second part of that study, a single reading from the right foot versus the left foot was compared in 30 randomly selected patients with diabetes. The vibration duration sensation averaged was 10.9 seconds on the right foot and 9.7 seconds on the left, said Dr. Oyer, an endocrinologist at Northwestern University, Chicago.

Monofilament testing was done in patients whose mean vibration duration was 8 seconds or less, and was consistently reported as normal among the 26 patients who had vibration durations of 5 seconds or more. Only at vibration perceptions of 4 seconds or less did the monofilament testing begin to demonstrate abnormal results (Endocr. Pract. 2007;13:5-10).

Dr. Oyer and Dr. Saxon stated that they had no conflicts of interest to disclose. ■