

# Sleep Apnea Tied to Retinopathy, Neuropathy

BY SHERRY BOSCHERT

FROM THE ANNUAL SCIENTIFIC SESSIONS OF THE AMERICAN DIABETES ASSOCIATION

SAN DIEGO – Obstructive sleep apnea in patients with type 2 diabetes predicts a three- to fourfold higher risk for diabetic peripheral neuropathy or sight-threatening retinopathy, separate analyses have found.

The results suggest that obstructive sleep apnea may play a role in the development of peripheral neuropathy and sight-threatening retinopathy in people with diabetes, Dr. Abd Tahrani and his associates reported at the meeting.

Ongoing studies are exploring the

possible mechanisms involved.

Further research also is warranted on the possibility that treating obstructive sleep apnea might affect the development or progression of retinopathy or neuropathy, added Dr. Tahrani of the University of Birmingham (U.K.), where he is a research fellow for the U.K. National Institute for Health Research.

The prospective studies recruited random patients from a hospital-based, outpatient diabetes clinic in the United Kingdom. Individuals were excluded if they had a known respiratory disorder, including obstructive sleep apnea.

Patients had a mean age of 59 years and a mean 11-year history of diabetes,

and 48% were white.

Participants underwent one night of home-based multichannel respiratory monitoring, and were considered to have obstructive sleep apnea if they had an apnea-hypopnea index of at least 5 events per hour.

In 224 patients who also were assessed for sight-threatening retinopathy, 63% had obstructive sleep apnea and 38% had sight-threatening retinopathy. Patients with obstructive sleep apnea were significantly more likely to have sight-threatening retinopathy (48%) than were patients without obstructive sleep apnea (20%).

The study defined sight-threatening retinopathy as the presence of preproliferative or proliferative retinopathy, maculopathy, or the need for laser treatment.

After adjustment for a wide range of possible confounders, patients with obstructive sleep apnea were 3.6 times more likely to have sight-threatening retinopathy, 5 times more likely to have advanced diabetic retinopathy, and 4.4 times more likely to have maculopathy than were patients without obstructive sleep apnea.

In a separate study by the same investigators involving 231 patients who were assessed for both obstructive sleep apnea and peripheral neuropathy, 65% had obstructive sleep apnea and 45% had diabetic peripheral neuropathy.

## VITALS

**Major Finding:** In adults with diabetes, the presence of obstructive sleep apnea predicted a 3.6-fold greater risk for sight-threatening retinopathy and a threefold greater risk for diabetic peripheral neuropathy, compared with patients without obstructive sleep apnea.

**Data Source:** Two separate prospective, observational cross-sectional studies of 224 patients in the retinopathy study and 231 patients in the neuropathy study who were recruited from a hospital-based, outpatient diabetes clinic.

**Disclosures:** Dr. Tahrani reported having no conflicts of interest.

In that study, patients with obstructive sleep apnea reported more neuropathic symptoms.

Among patients with obstructive sleep apnea, 60% had diabetic peripheral neuropathy, compared with 27% of patients without sleep apnea.

Obstructive sleep apnea conferred a significant threefold higher risk for peripheral neuropathy after adjustment for a wide variety of potentially confounding variables, Dr. Tahrani reported. The severity of peripheral neuropathy correlated with the severity of obstructive sleep apnea.

Obstructive sleep apnea was prevalent in 75% and 52% of white and South Asian patients, respectively. Likewise, diabetic peripheral neuropathy was more prevalent in whites (56% vs. 40%). Both differences were significant.

The lower prevalence of obstructive sleep apnea in the South Asian patients might be one reason for the lower prevalence of diabetic peripheral neuropathy, the investigators suggested. ■

## Take Sleep Apnea Seriously

These two studies definitely are helpful to clinicians caring for patients with diabetes. The relationships that these studies show between obstructive sleep apnea and retinopathy or neuropathy are not ones that have been reported previously.

It makes a lot of sense to me that this would happen. Obstructive sleep apnea and type 2 diabetes complications share common mechanisms of oxidative stress and inflammation.

The findings point to the significance of managing obstructive sleep apnea or any other sleep disorder. People need to take it much more

seriously than they have in the past.

All people with diabetes should be assessed for the quantity and quality of their sleep. In our area, some patients are assessed, and some are not. Some are assessed only for sleepiness, but in mild to moderate obstructive sleep apnea, they may not be sleepy, so that's not a good indicator of risk.

CHERYL TANNAS, R.N., is a diabetes educator at the University of Michigan, Ann Arbor, who provided these comments in an interview at the meeting. She is doing a doctoral dissertation on sleep disturbances in diabetes.

VIEW ON THE NEWS

# CV Impairments Seen in Diabetic Teens During Exercise

BY AMY ROTHMAN SCHONFELD

FROM THE ANNUAL MEETING OF THE ENDOCRINE SOCIETY

BOSTON – Independent of weight, type 2 diabetes negatively impacts both central and peripheral vascular function during exercise in adolescents, according to a small, prospective study.

These early changes are similar to those documented in adults with type 2 diabetes, said Dr. Teresa Pinto, who presented the findings at the meeting.

The study compared cardiovascular function in 13 adolescents (aged 12-20 years) with type 2 diabetes vs. 27 overweight or obese nondiabetic subjects and 19

nondiabetic, nonobese controls. Cardiac and femoral flow MRI images were taken at rest and during or immediately after submaximal exercise using a cycle ergometer specially designed for exercise within the MRI. Body composition was assessed using dual-energy x-ray absorptiometry (DXA), said Dr. Pinto, a pediatric endocrinologist now associated with Dalhousie University in Halifax, N.S. Dr. Pinto conducted the study at the University of Auckland (N.Z.).

At rest, no difference was found in cardiac output indexed for fat-free mass. During exercise, however, cardiac output/fat-free mass was significantly lower in the type 2 diabetes group, compared with both the obese and control groups.

Because cardiac output reflects both stroke volume and heart rate, Dr. Pinto then looked more carefully at stroke volume and its components, end-diastolic and end-systolic volume. She found that during exercise, those with diabetes were not able to increase their stroke volume as well as those in the other groups: Stroke volume increased by 11.1% in the control group and 5.98% in the obese group, but by only 0.76% in the diabetes group.

Looking at left end-diastolic volume, Dr. Pinto found evidence of diastolic dysfunction: The volume indexed for fat-free mass was significantly lower in the diabetes group, both at rest and during exercise. During exercise, end-diastolic volume decreased by 2.1% in the control group, by 0.9% in the obese group, and by 6.1% in the diabetes group. Likewise, end-systolic volume was sig-

## VITALS

**Major Finding:** During exercise, cardiac output/fat-free mass was significantly lower in adolescents with type 2 diabetes than in adolescents who were obese or in healthy controls.

**Data Source:** A nonrandomized, prospective study of cardiovascular function in 13 adolescents with type 2 diabetes, 27 nondiabetic, overweight or obese subjects, and 19 nondiabetic, nonobese controls.

**Disclosures:** Dr. Pinto said she had nothing to disclose. The study was funded by an unrestricted grant from Novo Nordisk.

nificantly lower in the diabetes group, compared with the controls, both at rest and during exercise, which suggested that the heart is trying to compensate for reduced end-diastolic volume by increasing contractility.

Dr. Pinto also studied femoral artery flow as a marker of peripheral vascular function. After exercise, significant deficits in those with type 2 diabetes were also found for average femoral artery flow per minute and net forward volume, both indexed for fat-free mass, compared with controls.

“This study suggests that some of the cardiac changes we see existing in adults with type 2 diabetes may already be present at a young age in adolescents. There is evidence in adults that gradual exercise training showed some reversibility of those early changes,” said Dr. Pinto. ■



The effects of exercise on cardiovascular function were assessed on MRI with use of a cycle ergometer.