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. Tahani 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, out-patient 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 preretinal 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, 67% had obstructive sleep apnea and 45% had diabetic peripheral neuropathy.

In that study, patients with obstructive sleep apnea reported more neurocognitive 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. Tahani added. 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.

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 a small, prospective study.

These early changes are similar to those documented in adults with type 2 diabetes, said Dr. Teresa Pin-tou, 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 non diabetic subjects and 19

nondiabetic, obese 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 significantly 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 in adolescents 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.