Low Vitamin D Predicts Coronary Calcification

BY BRUCE JANCIN

FROM A CONFERENCE ON PRACTICAL WAYS TO ACHIEVE TARGETS IN DIABETES CARE

KEYSTONE, COLO. – Vitamin D deficiency strongly predicted rapid progression of coronary artery calcification in adults with type 1 diabetes in a large, prospective study.

The association between low vitamin D and progression of coronary artery calcification was independent of the standard coronary artery disease risk factors. This suggests vitamin D may be related to early coronary atherosclerosis through a novel pathway, Dr. Marian Rewers observed at the conference, sponsored by the University of Colorado and the Children's Diabetes Foundation at Denver.

The findings came from the prospective CACTI (Coronary Artery Calcification in Type 1 Diabetes) study. This portion of CACTI included 374 type 1 diabetes patients with a mean age of 40 years. More than half were women. Coronary artery calcification (CAC) was measured by electron-beam CT at baseline and 3- and 6-year follow-up. Serum 25-hydroxyvitamin D was measured at the 3-year mark.

One-quarter of the subjects had insufficient vitamin D – a serum level of 20-30 ng/mL. Another 10% were vitamin D deficient. Deficiency was associated with a 3.3-fold increased likelihood of CAC at 3 years after adjustment for age, gender, and hours of exposure to daylight. Patients with vitamin D insufficiency had an adjusted significant 1.8-fold increased risk, said Dr. Rewers, principal investigator for CACTI.

Among subjects who were free of CAC at the 3 years, vitamin D deficiency predicted development of CAC between years 3 and 6 of follow-up. A novel finding in CACTI was that vitamin D deficiency at 3 years was a significant predictor of developing CAC during the next 3 years only in the subgroup with the vitamin D receptor M1T CC genotype. Vitamin D deficiency in patients with the CC genotype was associated with a 6.5-fold increased likelihood of CAC, compared with that of subjects with a normal vitamin D level.

Vitamin D may be related to early coronary atherosclerosis through a novel pathway.

DR. REWERS

In contrast, vitamin D deficient patients with the CT or TT genotypes weren't at significantly increased risk, noted Dr. Rewers, professor of pediatrics and preventive medicine, and clinical director of the Barbara Davis Center for Childhood Diabetes at the university.

CAC is a well-established marker of arterial plaque burden and a strong predictor of future coronary events. The CACTI findings suggest vitamin D may be involved in the early stages of CAC.

Audience members asked Dr. Rewers and other speakers how much vitamin D they're taking.

"Every time I come home from a medical meeting I take more vitamin D," quipped Dr. David M. Kendall, chief scientific and medical officer for the American Diabetes Association and a diabetologist at the University of Minnesota, Minneapolis. He was referring to evidence suggesting benefits ranging from cardioprotection to anticancer and antidementia effects and beyond.

Like Dr. Kendall, Dr. Matthew C. Riddle now takes 2,000 mg of vitamin D daily.

"We don't know the answer as to the 'right' amount. But the risk vs. benefit is appealing. There are some real potential benefits," said Dr. Riddle, professor of medicine at Oregon Health & Science University, Portland. ■

VITALS

Major Finding: Vitamin D deficiency was associated with a 3.3-fold increased likelihood of CAC being present at 3 years after adjusting statistically for age, gender, and hours of exposure to daylight.

Data Source: 374 type 1 diabetes patients with a mean age of 40 years in the CACTI study.

Disclosures: The CACTI study was funded by the National Institutes of Health. Dr. Rewers declared having no relevant financial interests.

Home Urine Test Classifies Juvenile Diabetes Types

BY MICHELE G. SULLIVAN

FROM THE ANNUAL MEETING OF THE EUROPEAN ASSOCIATION FOR THE STUDY OF DIABETES

LISBON – A single in-home test of urinary C-peptide creatinine ratio appears to differentiate type 1 diabetes from a genetic form of the disease – maturity-onset diabetes of youth.

The test saves children and parents from the stress and inconvenience of a blood test, and discriminates maturity-onset diabetes of youth (MODY) from type 1 diabetes with 100% sensitivity and 85% specificity, Dr. Rachel Besser said at the meeting.

"MODY is frequently misdiagnosed as type 1 diabetes in children, and inappropriately treated with insulin," said Dr. Besser of Peninsula Medical School, Exeter (England). "This test is clinically useful even in patients with a very short duration of disease."

In addition to guiding treatment, the test, which is a simple kit designed to be administered after a normal, diabetic-healthy evening meal, can pinpoint which children should undergo genetic testing for MODY, she said. "We ask the children to empty their bladders before eating, have a dinner that contains healthy carbohydrates, and then take the test about 2 hours later."

Parents mail the sample to a laboratory where the urinary C-peptide creatinine ratio (UCPCR) is measured. A boric acid solution preserves the biomarker for up to 72 hours while en route to the lab.

Dr. Besser and her colleagues examined the test's efficacy in 96 children who had been diagnosed with type 1 diabetes and 29 children who had confirmed MODY (10 with the HNF1A/4A subtype and 19 with the GCK subtype). All of the children had a mean disease duration of 3 years. The mean age of the type 1 patients was 13 years; the MODY patients had a mean age of 14 years.

The test differentiated the two disorders quite well, Dr. Besser said. UCPCR was significantly lower in the type 1 samples than in the MODY samples (median 0.05 vs. 3.41 nmol/mmol). With the use of a cutoff of at least 1.4 nmol/mmol, the test correctly discriminated MODY from type 1 diabetes with 100% sensitivity and 85% specificity. Fourteen of the patients diagnosed with type 1 diabetes met the cutoff point of at least 1.4 nmol/mmol. ■

VITALS

Major Finding: An in-home urine test discriminated type 1 juvenile diabetes from maturity-onset diabetes of youth with 100% sensitivity and 85% specificity.

Data Source: A confirmatory study of 125 children, 96 of whom had been diagnosed with type 1 diabetes and 29 with MODY.

Disclosures: Dr. Besser had no financial disclosures.

Continuous Glucose Monitor Accurate After Cardiac Surgery

BY MIRIAM E. TUCKER

FROM THE ANNUAL MEETING OF THE EUROPEAN ASSOCIATION FOR THE STUDY OF DIABETES

LISBON – Although microcirculation in cardiac surgery patients is impaired during the first few hours in the ICU, the degree of impairment was not great enough to affect the accuracy of continuous glucose monitors in a prospective, observational study of 60 patients.

Hyperglycemia, hypoglycemia, and glucose hypervariability are associated with increased mortality in critically ill patients after cardiac surgery. The accuracy of continuous glucose monitoring (CGM) in critically ill patients has been uncertain, said Dr. J. Hans DeVries, an endocrinologist at the University of Amsterdam.

"These results support CGM use in cardiac surgery patients, with quite good sensor accuracy in patients with a low severity of illness," he said at the meeting.

The patients had a mean age of 65 years; 48 of the 60 were male. Nearly a third (27%) had diabetes. Thirty-two (53%) of the patients had only coronary artery bypass surgery, 16 (27%) had only valve surgery, and 12 (20%) had both procedures. Their APACHE score predicting mortality was low, 0.01. Total ICU stay was 23 hours. Hemodynamic parameters were fairly good, with a microcirculatory function index of 2.8 (out of 3.0). The proportion of perfused vessels was high, 0.97. The patients' peripheral temperature was low, 32.8 °C.

The Medtronic Guardian REAL-Time and the Abbott FreeStyle Navigator sensors were placed subcutaneously in the abdominal wall of each patient prior to surgery. The Navigator performed slightly better than did the Guardian. Microcirculation was measured by microvascular flow index, perfused vessel density, and proportion of perfused vessels using sublingual sidestream dark-field imaging; tissue oxygenation was obtained with near-infrared spectroscopy. Tissue oxygenation and perfused vessel density were impaired in the first hours after surgery, but at no point were any microcirculatory parameters significantly associated with sensor accuracy. For the Navigator CGM, lower peripheral temperature and higher APACHE IV scores were significantly associated with decreased sensor accuracy. For the Guardian, lower peripheral temperature was significantly associated with decreased sensor accuracy.

The study results showed 'quite good sensor accuracy in patients with a low severity of illness.'

DR. DEVRIES

The EASD's European Foundation for the Study of Diabetes funded the study. Dr. DeVries disclosed ties with Dexcom, Abbott, and Medtronic. ■