The Homburg Cream and Sugar study

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The Homburg Cream and Sugar (HCS) study was designed to determine whether the measurement of postprandial triglyceride in addition to the assessment of glucose tolerance and traditional risk factors might improve the prediction of cardiovascular events.

To facilitate the study, an oral metabolic test protocol was developed to assess triglyceride and glucose tolerance prospectively. The test consisted of an oral fat load (250 ml cream drink containing 75 g fat) followed by a glucose drink (250 ml water with 75 g glucose) three hours later. (Patients with medical treatment for diabetes received only the cream drink.) Two sets of measurements were taken: first, fasting and postprandial triglyceride (TG) concentrations; and second, insulin concentrations and glucose tolerance.

This sequential testing was performed in 514 consecutive patients with stable coronary artery disease (CAD) undergoing coronary angiography. Eighteen months later they were followed-up for assessment of the primary composite endpoint of cardiovascular death or hospitalisation for cardiovascular events.

Results of the study showed that the combined testing of postprandial glucose and triglyceride tolerance is feasible in clinical practice. However, a number of specific conclusions emerged, notably that in the total cohort postprandial TG concentrations did not correlate with the number of primary endpoint events; fasting TG levels were found to be predictive, but this association was lost in multivariate analysis.

However, both fasting and postprandial TG levels were strongly correlated with glucose metabolism: patients with normal glucose tolerance had lower fasting TGs and a lower absolute postprandial TG increase than those with impaired glucose metabolism (although the mean relative TG increase was comparable). Thus, in patients with normal glucose tolerance both fasting and postprandial TG levels were identified as independent markers for cardiovascular outcomes. In those with impaired glucose tolerance, however, postprandial TG levels did not predict outcomes.

"This is the first prospective study to assess postprandial triglycerides and glucose tolerance at the same time in a representative cohort of patients with coronary artery disease," said investigator Professor Ulrich Laufs from the from Saarland University Hospital, Homburg, Germany. "While the combined sequential test protocol did allow the prediction of cardiovascular outcomes in the total cohort of patients with CAD, we did find that in CAD patients with diabetes and impaired glucose tolerance, absolute fasting and postprandial TG levels were high but not independently predictive of cardiovascular outcomes. In contrast, in patients with CAD and normal glucose tolerance, both fasting and - with superior risk prediction - postprandial TG concentrations were independent markers for cardiovascular outcomes."

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