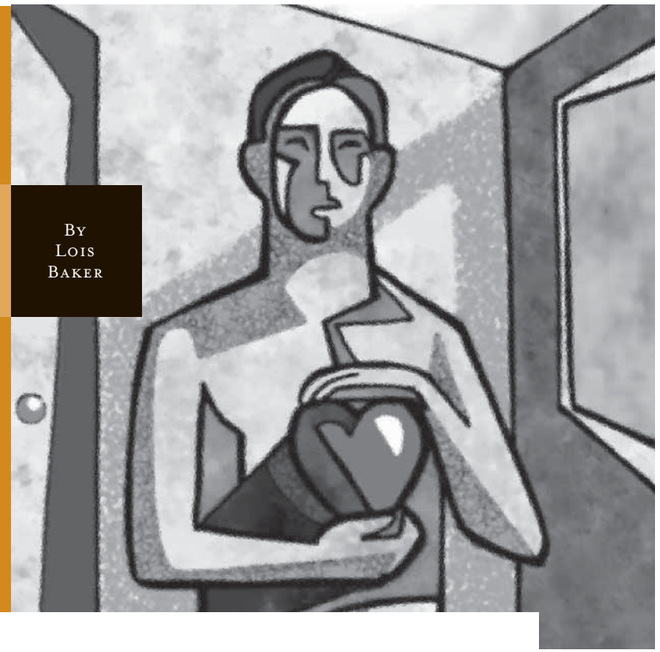
A Better Image

PET Imaging for Coronary Occlusion Cuts Costs, Invasive Procedures

By Lois Baker



Physicians need to know how badly heart vessels are blocked before they can decide how to treat patients at risk of having a heart attack.

One standard approach to "imaging" suspected blockages involves injecting a radioactive substance with a very short half-life into the bloodstream. The patient then undergoes an exercise stress test, and the radioactive material is tracked as it travels through the cardiovascular system, identifying narrowing or blockage.

That process is called single photon emission computed tomography, or SPECT.

A study published in the July 2007 issue of the *Journal of Nuclear Medicine* shows that a newer imaging method called positron emission tomography myocardial perfusion imaging, or PET MPI, provides a more accurate "picture" of coronary obstruction, reduces the need for follow-up invasive procedures by 50 percent, which reduces overall costs, and produces excellent clinical outcomes.

Michael E. Merhige, MD, clinical associate professor of nuclear medicine in the School of Medicine and Biomedical Sciences, is first author on the study.

"Our evidence has shown that invasive procedures such as coronary arteriography [inserting a cardiac catheter into an artery in the upper arm or thigh, threading it through the vessel and injecting a contrast medium directly into the heart], bypass surgery and stent placement are overused in the U.S.," says Merhige.

> "Using these procedures when noninvasive approaches work equally well, if not better, contributes to unnecessary health-care expenses without improved patient outcomes."

"Using these procedures when noninvasive approaches work equally well, if not better, contributes to unnecessary health-care expenses without improved patient outcomes."

Merhige is medical director of The Heart Center of Niagara, located in the Niagara Falls Memorial Medical Center, where he carried out his research.

The study analyzed the frequency of diagnostic arteriography, revascularization, costs and one-year clinical outcomes in 2,159 patients assessed with PET MPI. These results were compared with outcome data from two control groups totaling nearly 6,000 patients who were assessed with SPECT, matched to the PET group by pre-test likelihood of coronary artery disease.

The actual costs of the two procedures were similar, Merhige says, but the accuracy of PET MPI eliminated the need for additional coronary artery bypass grafting procedures in more than half of the participants. SPECT MPI also is less accurate than PET MPI in women and overweight patients, he notes.

"This study supports the idea that the future of cardiology lies in noninvasive imaging, combined with aggressive use of cholesterol-lowering drugs and lifestyle changes, such as better nutrition, regular exercise and smoking cessation," he says.

Also contributing to the study were cardiologists Brian J. D'Arcy, MD, and Anthony F. Perna, MD, UB clinical instructor of medicine, and nurses Victoria Shelton and Teresa Houston. BP

Blood component associated with kidney disease may be an indicator

Potential Marker for Pre-Diabetes

By Lois Baker

Pre-diabetes is diagnosed when the amount of glucose in the bloodstream begins to rise and remains above normal, an indication that it is not being properly absorbed by cells. An estimated 54 million Americans have been diagnosed with this condition, which, if not arrested, often develops into full-blown type 2 diabetes, a serious chronic disease linked to heart disease, stroke, kidney failure, blindness and nerve damage.

In a study published in the July 2007 issue of *Diabetes Care*, UB researchers report that high levels of a blood component called cystatin C, used to test for early-stage kidney impairment, were associated with a three-fold risk of progression to pre-diabetes in their study population.

"It's important to identify people at risk of pre-diabetes very early, because you can prevent this condition from developing by making changes in diet and lifestyle," says Richard P. Donahue, PhD, professor of social and preventive medicine in the UB School of Public Health and Health Professions and first author on the study.

"If further studies support our finding, testing for cystatin C could become an important part of a standard physical examination. Preventive measures could be in place before glucose intolerance has a chance to develop and take its toll," he adds.

The cystatin C investigation is based on the Western New York Health Study, conducted between 1996 and 2001, in which researchers collected baseline information on a number of health indicators, including fasting glucose, in a randomly selected cohort of healthy Erie and Niagara county residents.

The first follow-up to the baseline study took place between 2001 and 2004 and involved 1,455 of the original participants, all of whom had no known heart or kidney disease. Information on health indicators was collected once again.

Analysis determined that 91 people who had normal glucose levels in 1996 had developed pre-diabetes since then.

Levels of cystatin C then were measured in the blood samples taken at baseline of these 91 and were compared to cystatin C levels in samples from 273 participants from the original cohort who had not developed pre-diabetes.

Results showed a direct link between those with the highest levels of cystatin C and the development of pre-diabetes, says Donahue. The association didn't change when factors that are traditionally related to development of diabetes, such as weight, amount of blood glucose at baseline, smoking history, high blood pressure or alcohol use, were considered.

"Pre-clinical signs of renal impairment may occur before or coincident with pre-diabetes," adds Donahue. "These findings may suggest that those who have pre-diabetes also should be screened for early signs of kidney impairment, which itself is a major chronic illness and cause of much morbidity and mortality."

The study was supported by a grant to Donahue from the National Institute of Diabetes and Digestive and Kidney Diseases. BP

> These findings may suggest that those who have pre-diabetes also should be screened for early signs of kidney impairment, which itself is a major chronic illness and cause of much morbidity and mortality.