

A Second Chance for the Ailing Heart

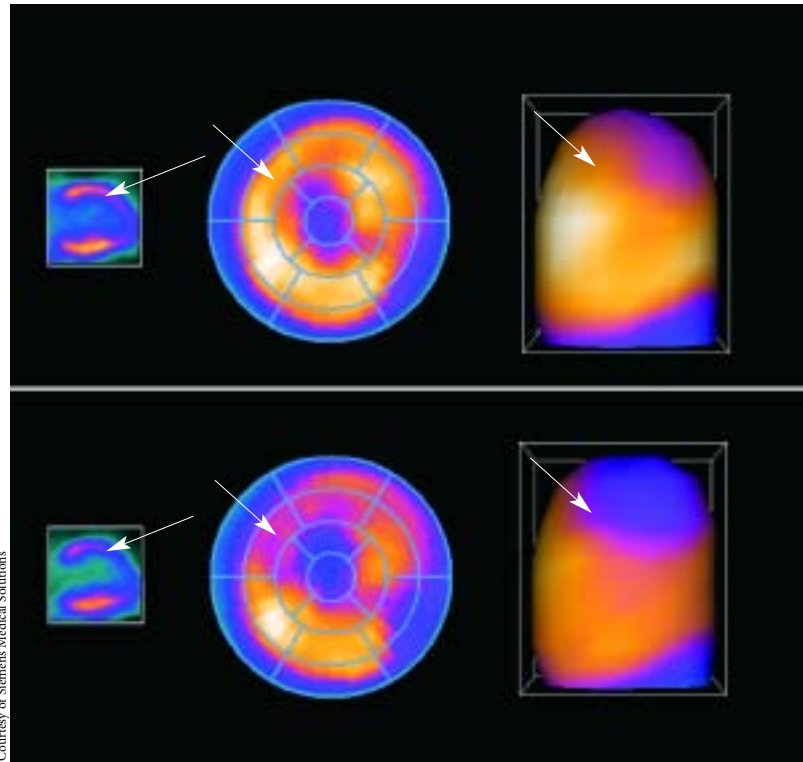
Advances in biomedical technology are making organ transplantation safer and more effective. For some, it is even helping to avoid the need for transplantation altogether. Patients with severe coronary artery disease may become candidates for heart transplant when prolonged nutrient and oxygen deprivation due to blocked arteries has killed portions of their heart muscle. But using PET (positron emission tomography) imaging to detect cardiac viability can offer these hearts a second chance.

When an area of the heart is starved of blood by a blocked artery, the heart muscle (or myocardium) in that area dies and forms scars. If enough of the heart muscle has been compromised in this way, the organ can no longer do its job of pumping blood through the body. Decreased blood flow doesn't always kill myocardium, however. It can also simply render portions of the heart muscle dormant. Often referred to as "hibernating myocardium," such living muscle is under-active, but can be revived by procedures to restore blood flow (revascularize) such as coronary artery bypass or angioplasty and stenting.

But first, hibernating myocardium must be properly detected. Routine tests that measure the amount of blood flow (perfusion) to the heart, such as the thallium test, can underestimate the amount of hibernating myocardium that is present. PET, with its ability to detect cell metabolism, can distinguish the faint activity of dormant heart muscle. For this purpose, PET is recognized as offering the highest accuracy level of any non-invasive cardiac test. "In analyzing a given area of the myocardium, a PET scan will reveal living cells in 40% of patients whose thallium test showed no living tissue," says **Sabahat Bokhari, MD**, *Assistant Professor of Medicine*, and *Director of Cardiac PET* at the Columbia University Kreitchman PET Center. In addition to being more precise, PET is safer than other nuclear cardiac scans because the radioactive "tracer" compounds administered during PET scans are short

The Centers for Medicare and Medicaid Services (CMS) currently has approved reimbursement for cardiac PET scans in patients with cardiovascular disease. Some private insurers also cover cardiac PET on a case-by-case basis. Cardiac PET is used to:

- ⌘ Delineate blood-flow patterns
- ⌘ Assess the viability of heart muscle
- ⌘ Determine the optimal treatment path — identifying whether a patient is a candidate for coronary angioplasty, coronary artery bypass graft surgery, or heart transplantation.




Courtesy of Siemens Medical Solutions

HIBERNATING HEART MUSCLE

An FDG PET scan (top) indicates there is living muscle in a place where a blood flow scan (bottom) shows there is little circulation.

lived (or have a short half-life), remaining in the body for a much briefer amount of time.

Before undergoing a PET scan for myocardial viability, patients receive an injection of a radio-labeled glucose compound called FDG that can be tracked by the PET scanner. Glucose (a form of sugar) is required by the body's cells for nutrition, and the FDG taken up by the tissues appears on the PET scan as areas of increased brightness. Scar tissue in the myocardium, where there is no living activity, appears dark. Hibernating myocardium, meanwhile, appears brighter. With such a picture, the cardiologist is in a position to make an informed decision about whether the patient requires heart transplant, or whether they would benefit from a revascularization procedure. Furthermore, the scan can assist the physician in deciding which type of treatment will be right for the patient. 

For a PET cardiac viability referral, please contact your cardiologist. For more information, call the Columbia Kreitchman PET Center at 212.923.1555.