

Hybrid PET/CT Camera Boosts Cardiac Imaging

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NEW YORK — Cardiac PET/CT may become the best sequence for one-stop shopping in patients with known or suspected coronary artery disease, Marcelo F. Di Carli, M.D., said at the annual meeting of the American Society of Nuclear Cardiology.

Hybrid PET and CT cameras only became available in 2003, but it's already clear that they are a "powerful new technique for the efficient, noninvasive, combined evaluation of coronary and cardiac anatomy, and ischemia and tissue viability," said Dr. Di Carli, chief of the division of nuclear medicine at Brigham and Women's Hospital in Boston. The cameras allow physicians to simultaneously visualize myocardial perfusion, coronary artery calcification, and atherosclerosis.

During November 2003 to April 2004, Dr. Di Carli and his associates used PET/CT to examine the hearts of 364 patients, including patients as large as 173 kg (465 pounds). The image quality produced was rated as excellent for 76% of patients and good for another 21%. The small number of nondiagnostic PET images produced usually occurred because of patient motion, including respiratory motion.

The PET tracer used in these studies was rubidium 82, a marker of myocardial perfusion. This isotope is made by a generator; a cyclotron is not needed.

The perfusion images produced by this system are superior to what's available using single-photon emission computed tomography (SPECT), and the ECG gating that's possible with PET is also superior to SPECT, Dr. Di Carli said. A major factor is that PET imaging involves an attenuation correction that "allows detection of very subtle abnormalities that would be hard to see with SPECT," he said. Another advantage

of PET is that gating can be done during both stress and rest phases of imaging. The ability to gate during peak stress provides clearer images of perfusion defects.

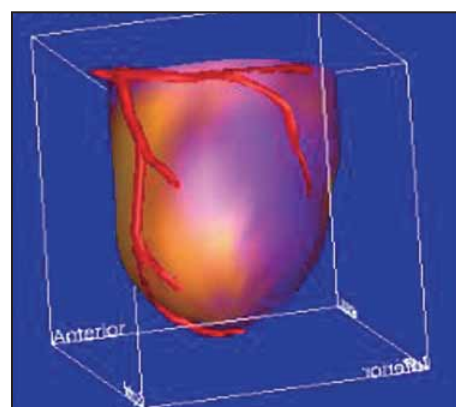
In the series of 364 patients imaged by Dr. Di Carli and his associates, diagnostic certainty was possible for 93% of the PET examinations. Coronary angiography was later done on 52 patients. The myocardial perfusion information obtained with PET was diagnostic for coronary disease with a sensitivity of 97% and was 94% accurate

in identifying normal coronary arteries. Balanced ischemia is a major source of error when using PET (or SPECT) to diagnose coronary disease because in these circumstances the perfusion image is uniform and fails to show a region of relatively reduced blood flow. But the ability to perform PET and CT simultaneously allows CT angiography and an increase in diagnostic accuracy.

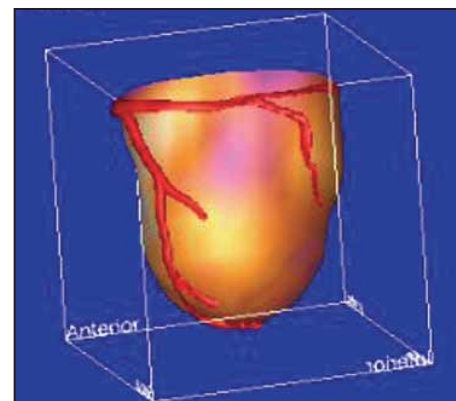
A complete examination of myocardial perfusion by PET and of coronary calci-

um by CT can be done in an average of 35 minutes. The total radiation dose used is less than for a 1-day stress-rest scan using technetium-99m sestamibi.

Compared with coronary CT alone, the addition of PET allows instant assessment of the functional significance of coronary stenoses. "PET acts as the flow wire for CT coronary angiography," Dr. Di Carli said. This helps boost the specificity of a diagnosis of stenoses in small, distal coronary arteries. ■



This image shows reduced blood flow (purple) to the heart in a stress test.



This image shows the blood supply (orange-yellow) to the heart at rest.

IMAGES COURTESY DR. MARCELO F. DI CARLI

From Critical to Controlled...



Hypertension - Tachycardia - SVT

- Onset of action: 2 minutes
- Half life: 9 minutes • Duration of action: 10 to 20 minutes
- Beta₁ selectivity at lower doses*

* Beta₁ selectivity is not absolute: at higher doses esmolol HCl begins to inhibit beta₂ receptors.

Contraindicated in patients with sinus bradycardia, heart block greater than first degree, cardiogenic shock, and overt cardiac failure.

Should not be used for treatment of hypertension due primarily to vasoconstriction associated with hypothermia or to prevent tachycardia and/or hypertension.

The most common side effect was hypotension; asymptomatic (25%) and symptomatic (12%), mainly dizziness and diaphoresis. Hypotension usually reverses within 30 minutes of decrease of dose or termination of infusion.

Relative Contraindications—Use with caution and monitor carefully during infusion for patients with LV dysfunction, CHF, hypotension, reactive airway disease, and diabetes. In general, patients with bronchospastic disease should not receive beta blockers. Due to the relative beta₁ selectivity and titratability, esmolol HCl may be used with caution in patients with bronchospastic disease. Titrate to the lowest possible dose.

Brevibloc
(esmolol HCl) INJECTION



From **CRITICAL**



To **CONTROLLED**



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