

Changing Cardiac Care with Biograph 64

While the advent of the hybrid PET·CT imager was considered revolutionary and caused a fundamental change in patient management in oncology, continued innovations in the Biograph family of PET·CT hybrid imagers are bringing changes of the same magnitude in cardiology.

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Randy Patterson, MD,
Emory University,
Atlanta, GA, USA

Emory Crawford Long Hospital in Atlanta, GA, USA, was one of the first to adopt the newest PET·CT hybrid imager and incorporate the technology into its cardiology workflow.

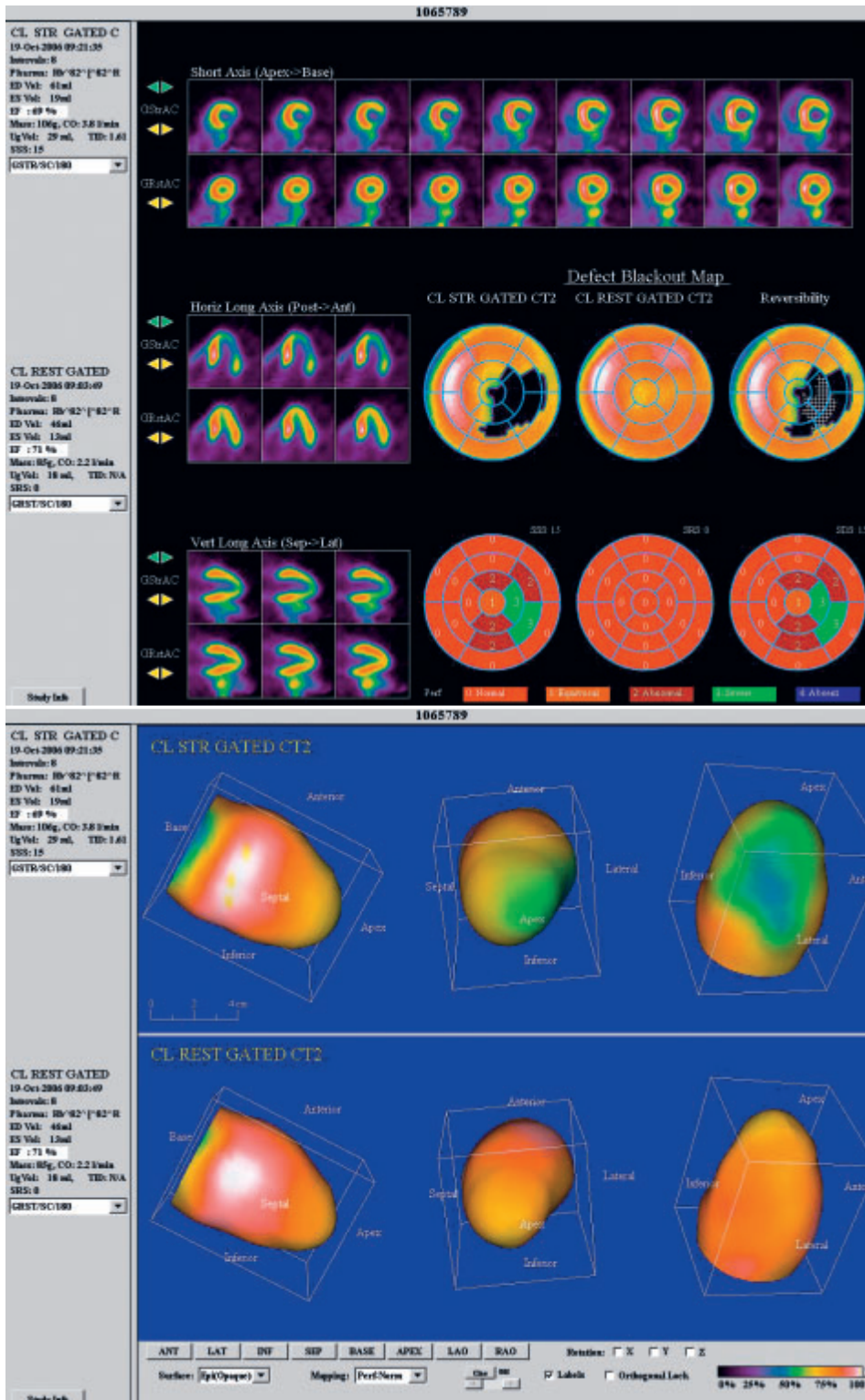
Randy Patterson, MD, Linton and June Bishop Professor of Medicine (Cardiology), is changing cardiac care at Emory with the new Biograph™ 64. He affirmed that the 64 slice capability of the computed tomography (CT) scanner has generated a lot of excitement. Patterson has an interesting perspective since he has worked with PET technology for more than 25 years and started using it daily in 1992. "At Emory, we already had a very busy PET center, doing more than 3,000 PET myocardial perfusion scans a year, but now, with the addition of Biograph 64, I think we're more productive and faster. Most importantly, we're providing higher quality images than we've ever been able to get before," he says.

Excited about applying the new technology to cardiology, where PET has long been used to assess viability in the heart, Patterson is interested in getting more conclusive results for his cardiology patients. "In general, PET·CT hasn't been used as much in cardiology as it has been in other areas, and we are eager to get people to think about PET in ways they haven't before," Patterson said. "The attenuation correction provided by CT certainly has a lot of advantages. Attenuation correction of the PET image with CT has taken a little work, but it has been great so far because it can avoid most motion artifacts due to misregistration."

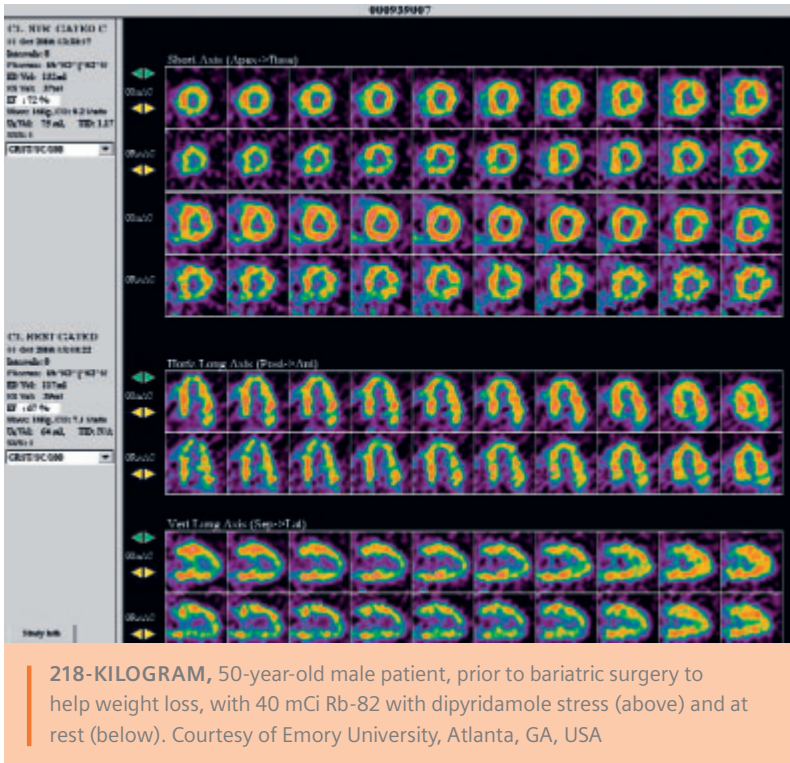
Over the next five or ten years, Patterson envisions that the cardiology workflow will change significantly based on new technology like Biograph 64. He believes that CT slice capability will most likely increase, but when

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IMAGES OF A 73-year-old female patient with chest pain. PET showed a moderate sized ischemic region, 21 to 25 percent of the left ventricle, left ventricular cavity dilation during dipyridamole stress (top row of top image), versus rest (bottom row of top image), ratio of 1.6/1.0. The lower image is a 3D display. Courtesy of Emory University, Atlanta, GA, USA



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combined with PET, 64-slice CT provides the CT capability that is state-of-the-art now. It can be used for a coronary CT angiography (CTA) and coronary calcium scoring, which is a vital addition. He also believes that the exact cardiac workflow needs to be perfected to determine which patients should get which tests and how they all fit together with PET results. "To some extent, the adoption of CTA has been slow, so clinicians are using it more infrequently, opting to depend on more conventional procedures such as cardiac catheterization, where using PET·CT is both less invasive and less risky for patients."

Clearly Beneficial

Recent case studies already show that 64-slice PET·CT is impacting cardiology patient management. Emory looks forward to using the technology to evaluate situations such as identifying which artery is supplying which part of the heart so that an exact correlation can be made about which artery was causing the patient's defect on the PET perfusion scan.

As the technology progresses, it will be possible to see which artery needs an angioplasty or bypass.

"Matching up a CT angiogram to say that it's the first obtuse marginal branch of the circumflex artery that is causing this defect in this wall of the heart can give you a much more exact map of what needs to be done; and which one gets an angioplasty or stent." This will be helpful in designing treatments for patients.

In terms of quality of care and cost effectiveness, Patterson sees many advantages of using 64-slice PET·CT in cardiology. Though the current CT angiogram does not provide the same level of resolution that is available with cardiac catheterization, Patterson believes that the combination of PET and CT, when used in the right situations, will precipitate the replacement of more cardiac catheterizations than using either test alone. For example, when all three coronary arteries have similar levels of flow limiting stenosis, it is often difficult to detect by conventional PET imaging. The addition of CT in this situation clarifies the diagnosis. Combining a PET scan with a CTA allows the ischemia to be correlated with the stenosis in the coronary arteries, as visualized by the CT. This is relevant to treatment, since angioplasty and bypass decisions are made based on the functional implication of coronary stenosis.

Patterson is also eager for the possibility to see exactly which artery is causing a perfusion defect. "You might say that this artery is causing a defect, and you already know that you catheterized it a year or two ago, and it's too small to do, or it's at a branch point where it would be technically very difficult to do a stent or an angioplasty. Perhaps you would be able to see that this is a patient on which you wouldn't do another catheterization."