

Does PET Offer Little Additional Value when Compared with SPECT?

TO THE EDITOR: It is rather embarrassing to write to the editors criticizing the article that the editors themselves have written, but in this case it probably should be done. We are referring to the commentary by Fischman and Strauss (1) concerning the comparison of PET and SPECT.

In their discussion of comparative myocardial perfusion studies with ^{82}Rb PET and ^{201}Tl SPECT, the authors fault the comparative study of Go et al. (2), which shows significantly higher sensitivity and accuracy with ^{82}Rb PET, by stating that, unfortunately, the ^{201}Tl SPECT studies were done by stress/redistribution rather than by stress/reinjection. The implication was that the SPECT sensitivity would be higher if the redistribution study were done with ^{201}Tl reinjection.

This statement is, of course, nonsense. Sensitivity of detection of coronary artery disease (CAD) is based entirely on the stress study and has nothing to do with the redistribution, reinjection or rest study. The latter measurement is performed to distinguish ischemia from scar, not normal subjects from abnormal subjects. In their own paper (3), in which the authors quote the "higher sensitivity" of the reinjection method, this higher sensitivity refers to the sensitivity in distinguishing ischemia from scar not higher sensitivity in identifying CAD.

In the authors' last sentence of that paragraph, they conclude that in the case for PET versus SPECT for myocardial perfusion, "the jury is still out" (1). The phrase "only if the prosecutors are still confused" could be added.

The authors' views on the value of PET imaging for determining myocardial viability are also somewhat cavalier. Although the reports of Bonow et al. (4) and Tamaki et al. (5) were quoted, no mention was made of the work of Brunken et al. (6), where in twelve patients 58% of the segments with a fixed ^{201}Tl uptake showed myocardial glucose utilization, or Cook et al. (7), who reported that of 33 patients with fixed defects determined by a true resting ^{82}Rb myocardial perfusion procedure, nine patients (27%) demonstrated viable myocardium with ^{18}F FDG. Of course, the work of Brunken et al. was done with 4-hr thallium redistribution so that some portion of the 58% could well be ischemic. Even if the reduction due to ischemia would be expected to be 31% of the fixed defect segments (3), myocardial glucose utilization would still be present in 28% of the remaining persistent segments.

Although no claims were made for identifying "all" viable regions, the superiority of FDG PET over any potassium analog reinjection or rest study appears well established. It is not clear how much additional work is necessary to convince the Committee on Advanced Cardiac Imaging and Technology of the Council on Clinical Cardiology of the American Heart Association (8) that these PET results are more than "tantalizing" (1).

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Science Behind Clinical PET

TO THE EDITOR: Fischman and Strauss (1) have made an extremely important contribution to the subject of clinical PET. Their editorial is clear, concise and informative. They have furthermore addressed the issues up front.

The authors are correct in pointing out that it appears that nuclear physicians writing or talking about clinical PET are opponents or proponents. This unfortunate difference of philosophies is not with PET, but rather with the clinical application of PET at this period of time where cost/efficiency considerations dominate the opinion of nonphysicians about medical practice. Yet, nobody in nuclear medicine would disagree with the proposition, as correctly stated in the editorial, that PET is a unique modality in which our field can grow.

A most critical section in the editorial relates to a discussion on the additional value of PET when compared with SPECT. Of the 57 lines devoted to this section, 40 (= 70%) discuss nuclear cardiology issues. In consideration of myocardial perfusion imaging, the conclusion is that the jury is still out. I agree with the authors that the work of Gould has been enthusiastically performed. However, a key question in perfusion imaging still remains: given a patient with CAD, how is the decision made as to whom should be offered SPECT investigation and whom should be given a PET study? Consider the radioisotopes that are available: ^{201}Tl , $^{99\text{m}}\text{Tc}$ -hexamibi, $^{99\text{m}}\text{Tc}$ -teboroxime, ^{82}Rb , ^{13}N -ammonia, ^{62}Cu -PTSM and ^{15}O . Detectors available are planar Anger