BMIPP in Hypertrophic Cardiomyopathy

TO THE EDITOR: We read with interest the paper by Kurata et al. on myocardial SPECT with ^{123}I-beta-methyl-branched fatty acid in hypertrophic cardiomyopathy (*1*). In light of the poor spatial resolution of the imaging system they used, we are, however, concerned by their contention of finding a larger apparent left ventricular size with ^{123}I-BMIPP than with ^{201}Tl.

Indeed, the ratio of the apparent left ventricular size in the early ^{123}I-BMIPP study to that in the ^{201}Tl study was 1.20 ± 0.03. Assuming a circular shape of the left ventricle, the surface area would be given by $\pi(d/2)^2$, d being the inner diameter of the cavity. Therefore, the ratio of the left ventricular diameter in the ^{123}I-BMIPP study to that in the ^{201}Tl study would be $(1.20)^{1/2}$, or 1.095. Taking 55 mm as a normal left ventricular diameter (which, being the normal end-diastolic dimension, is an overestimation in normal hearts, and even more so in cases of hypertrophic cardiomyopathy), the absolute difference between the diameter in the ^{123}I-BMIPP and ^{201}Tl studies would be $0.095 \times$ 55 mm, or 5.23 mm at most. This, however, is far beyond the spatial resolution of an imaging system with a FWHM of 21 mm. In other words, the increase of the left ventricular surface area of 20%, as measured by the authors, would go undetected.

The theory of error propagation predicts the relative error on the ratio of the surface areas to be four times the relative error on the diameter. Taking $0.5 \times$ FWHM, or 10.5 mm, as the error (which is an underestimation), and 55 mm as the diameter (which is an overestimation), the relative error on the diameter is at least 19%, leading to an error on the ratio of no less than 76%. Therefore, the mean value that was determined experimentally to be 1.20 might vary between 0.29 and 2.11.

One might argue that this is not in keeping with the reportedly low standard errors. The method of generating the left ventricular outline, however, tends to maximize the surface area, because it is based on a search for maximal activity on radii. Together with the coarse spatial resolution, this could enhance the reproducibility of the measurements, thus explaining the low standard errors obtained with the phantom. Reproducibility, however, is distinct from precision.

One might also criticize our reasoning by saying that our way of calculating the errors is not relevant, because in reality the surface area was not calculated, but measured directly. In fact, the way of measuring the surface area—counting the number of pixels on a line per line, or column per column, basis and then adding these numbers—is correctly modeled by the calculation we use; the only assumption we make is that the left ventricular outline is a circle.

At last, the significant difference found between the ratio in a heart phantom and that in the patient's hearts is open to criticism, because it is unfair to compare the measurements in the patients (each performed once) with the repetitively determined value in the phantom, and secondly because the size of the phantom is not mentioned.

In conclusion, the data presented do not support the conclusion that in hypertrophic cardiomyopathy, the apparent left ventricular size measured with ^{123}I-BMIPP exceeds that with ^{201}Tl. No matter how sophisticated the methodology used, spatial resolution that is not in the images from the very beginning cannot be recovered.

REFERENCE

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Application of a Continuous Ventricular Function Monitor with Miniature Cadmium Telluride Detector to Patients with Coronary Artery Bypass Grafting

TO THE EDITOR: We read with great interest the fine editorial presented by Dr. Lahiri and the preceding work of Dr. Taki in the March 1992 issue of the *Journal* (pages 448–449 and 441–447, respectively). Capintec has been involved in the technique Dr. Lahiri describes as the ambulatory VEST for several years. The appropriate name of the system referenced is the CAPINTEC-VEST or C-VEST; both are registered trade names of our company. I am sure that the omission of our name was unintentional.

Publications correlating this technique with established methodologies (*1*) and during balloon angioplasty (*2*) and upright bicycle exercise (*3*) have shown close correlation with the gamma camera. Further investigations, including response to snow shoveling (*4*), mental stresses (*5,6*) and post-surgery (*7*), have correlated well with gated blood-pool studies.

The techniques described by Drs. Taki and Lahiri help expand the boundaries of nuclear medicine, a vision shared by science and industry.

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