tivity for transient defects without any loss of specificity supports the hypotheses that beginning imaging 2 min after exercise (3 min after $^{201}$TI injection) allows adequate myocardial uptake for accurate definition of normal from ischemic zones without undue interference from background blood activity.

It would be desirable to be able to identify a subset of patients who would benefit most by early imaging. However, we could find no significant differences between the group positive for transient defects using both the 2 min–2 hr and 18 min–2 hr set of images and the group positive on the 2 min–2 hr images alone. As indicated in the article, we compared a number of parameters between the two groups, including peak exercise double product, and found no significant differences. As we discussed, this may be due to a variety of factors.

We would expect that commencing imaging at 10 min compared to 18 min postexercise would offer some advantage. However, since redistribution may begin within several minutes after injection, there is likely to be a continuum in the loss of sensitivity for transient defects the longer imaging is delayed. Further, if three views are obtained beginning at 10 min, the second and third views would not start until ~18–20 min and 26–30 min, respectively, after exercise, assuming 6–8 min/view and 2 min between views. Thus, any excess delay in obtaining the first view may adversely affect subsequent views to a greater degree than the initial view itself.

Delayed imaging at 3 to 4 hr instead of 2 hr may have increased the degree of redistribution to some degree. However, both the 2-min and 18-min sets of images were compared with the same 2-hr delayed image for each patient. Therefore, an advantage for earlier imaging should still exist.

We concur that since single photon emission computed tomography images are often acquired over a 20–30 min interval, ongoing redistribution during the first 30 min after injection could affect the sensitivity of the technique. It may be, however, that the improved spatial contrast between normal and abnormal regions offsets some of this potential disadvantage.

We are cognizant of the physical and cost contraints which limit the availability of combined scintigraphic-exercise laboratories as well as the need to closely monitor certain patients for a period of time after exercise. In light of the results from our study, we would recommend that unnecessary delays between exercise and imaging be reduced as much as is practical given the particular circumstances in which the test is performed. In those laboratories in which it is feasible, commencing imaging several minutes after exercise appears advantageous.

References


James A. Rothendler
University Hospital
Boston, Massachusetts
Robert D. Okada
Massachusetts General Hospital
Boston, Massachusetts

Attenuation Correction and Lag Period in Gastric Emptying Studies

TO THE EDITOR: It is unfortunate that the recent paper by Moore et al. (1) did not refer to our paper (2), that was published some time before their manuscript was received. This paper and our previous work (3) addressed the areas covered in their article: namely the effect of tissue attenuation and the measurement of the lag period for digestible solid food emptying in radionuclide gastric emptying techniques.

Attenuation Correction

We are in full agreement with the authors with regard to their comments on tissue attenuation correction. Our studies, using a similar meal composition, demonstrated that significant errors in the measurement of gastric emptying rate will occur, particularly with solid meals, if no correction is made for tissue attenuation. In our study of solid emptying using the geometric mean of counts from two cameras (2), we found that a single anterior detector overestimated the 50% emptying time by an average of 15% (range 5–18%) while the posterior detector underestimated this parameter by 15% (range 4–22%). Large differences in the distances of the proximal and distal stomach from the detector surface were demonstrated by measurements from a lateral image of the stomach (mean difference = 5.7 cm). As the half value thickness for 140 keV photons from technetium-99m is 4.95 cm, these measured differences account for the errors in gastric emptying rate that were obtained.

In the large number of studies that we have performed over the past few years (in excess of 1,000 studies) we have observed considerable variation in stomach shape, as seen in the lateral projection. In some patients the effect of tissue attenuation was negligible, while in others the error was well in excess of 30%. Therefore, correction for this error is of the utmost importance for the accurate delineation of patient subgroups. The use of a lateral image of the stomach to derive correction factors (3) is an acceptable alternative to the use of geometric mean counts (2).

Lag Period

It is obvious that there is a period of time during which ingested food passes from proximal to distal stomach before it enters the duodenum. We disagree with Moore et al. (1) that the "lag period" is negligible and possibly artifactual. We have shown that this delay period is significant and that it is readily measured by our technique, both on the corrected time-activity curves and by visual inspection of the 2-min serial scintigrams.

The lag period for solid food using our test meal (100 g
conforms to a linear emptying pattern. Collins et al. are correct in their observation that a sampling interval of 10 min may not be too prolonged to detect a lag occurring within <10 min. Apparently there is some misunderstanding as to whether or not we believe a “lag period” exists. We never said “negligible” or “probably artificial.” We did say “We do not conclude that such an early emptying period does or does not exist but rather that an early emptying delay can be artifactually created by not employing appropriate techniques.” We, in fact, do encounter in individual studies early emptying delay periods (or “lags”) but the grouped data most closely conforms to a linear emptying pattern. Collins et al. are correct in their observation that a sampling interval of 10 min may be too prolonged to detect a lag occurring within <10 min.

Peter J. Collins
Michael Horowitz
Barry E. Chatterton
Royal Adelaide Hospital
Adelaide, South Australia

Iodine-131 Metaiodobenzylguanidine

TO THE EDITOR: We would like to comment on the article by Geatti O, et al. on the usefulness of scintigraphy with metaiodobenzylguanidine (MIBG) in the diagnosis and treatment of neuroblastoma (1).

The above authors observe that tumors with a higher catecholamine secretion show a better uptake of MIBG. They consider that previous treatment may reduce tracer uptake but does not preclude it.

We have studied 11 neuroblastoma patients in activity and 25 in complete remission. In two cases with normal catecholamines excretion the tracer uptake by the tumor was similar to the nine others with high catecholamine levels. A further five cases have been published of patients having normal catecholamines and positive MIBG (one suprarenal hyperplasia, one paraganglioma and three cases of neuroblastoma (2-6). On the other hand, two cases of pheochromocytoma with high excretion of noradrenaline and its derivatives with negative MIBG have been reported (7). These apparently contradictory results could probably be due to a disturbance in the process of synthesis, storage and release or in the recaptation of catecholamines that in normal adrenergic cells are closely linked and synchronized.

The cases of positive MIBG with normal catecholamine excretion could be explained by the disappearance or reduction of the synthesis, storage or release phases while recaptation persists. In the other hand the cases of negative tracer uptake and high levels of catecholamine would preserve the synthesis storage and release mechanism with some disturbance in the recaptation.

As to the influence of the previous treatment on the iodine-131 (131I) MIBG uptake by the tumor. In our experience it is directly correlated with the response to this treatment. When the treatment effectively reduces or eradicates the tumoral volume, the positivity diminishes or even disappears. On the other hand, when the treatment does not produce a lessening of the tumor mass, the radiopharmaceutical uptake does not change. In our opinion this clearly demonstrates the usefulness of [131I]MIBG scintigraphy in the evolutive control of neuroblastoma patients.

References

Peter J. Collins
Michael Horowitz
Barry E. Chatterton
Royal Adelaide Hospital
Adelaide, South Australia

REFERENCES

J.G. Moore
P.E. Christian
A.T. Taylor
N.P. Alazraki
Veterans Administration Medical Center
Salt Lake City, Utah

Letters to the Editor

The Journal of Nuclear Medicine