Loss of ^{123}I-Metaiodobenzylguanidine Uptake by the Heart in Parkinson's Disease

TO THE EDITOR: I read with interest the article by Satoh et al. (*1*) reporting on the usefulness of myocardial metaiodobenzylguanidine (MIBG) scintigraphy for diagnosing Parkinson's disease.

Recently, decreased accumulation of cardiac MIBG in patients with Parkinson's disease has been reported, and researchers have suspected that the involvement of ganglionic and postganglionic sympathetic neurons causes this decrease (*2*). Although Satoh et al. reported that the heart-to-mediastinum (H/M) count ratio in patients with Hoehn and Yahr (HY) stage I Parkinson's disease was normal, it has been reported elsewhere that the H/M ratio can be low in many patients with HY stage I Parkinson's disease (*2,3*). This discrepancy in results was not explained. I believe this discrepancy was caused by the small number of patients with HY stage I Parkinson's disease.

The heterogeneity in Satoh et al.'s (*1*) central nervous system (CNS) control group also presents some problems. Their CNS control group consisted of patients with cerebrovascular disease (CVD) and patients with neurodegenerative diseases such as progressive supranuclear palsy (PSP), spinocerebellar degeneration (SCD), and amyotrophic lateral sclerosis (ALS). Although it is conceivable that patients with CVD have normal cardiac accumulation of MIBG, reduced cardiac MIBG uptake in patients with PSP, SCD, and ALS has been found (*2,4,5*). I do not understand the logic of including patients with these diseases in 1 series, or the necessity of comparing the cardiac uptake of MIBG between PD and SCD or ALS.

REFERENCES

1. Satoh A, Serita T, Seto M, et al. Loss of ^{123}I-MIBG uptake by the heart in Parkinson's disease: assessment of cardiac sympathetic denervation and diagnostic value. *J Nucl Med.* 1999;40:371–375.
2. Yoshita M, Hayashi M, Hirai S. Iodine 123-labeled metaiodobenzylguanidine myocardial scintigraphy in the cases of idiopathic Parkinson's disease, multiple system atrophy, and progressive supranuclear palsy. *Clin Neurol.* 1997;37:476–482.
3. Orimo S, Ozawa E, Nakade S, Sugimoto T, Mizusawa H. ^{123}I-metaiodobenzylguanidine myocardial scintigraphy in Parkinson's disease. *J Neurol Neurosurg Psychiatry.* 1999;67:189–194.
4. Kazuta T, Hayashi M, Yoshita M, Hirai S. Iodine-123-labeled metaiodobenzylguanidine myocardial scintigraphy evaluation of Machado-Joseph disease. *Clin Neurol.* 1998;38:97–101.
5. Druschy A, Platsch G, Feistel H, et al. Decreased sympathetic innervation in early stage of amyotorophic lateral sclerosis (ALS) by [^{123}I]MIBG-SPECT—a follow up study [abstract]. *Clin Auton Res.* 1997;7:204.

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Reply: We appreciate the comments of Yoshita, who reported that the H/M ratio was low in many of Hoehn and Yahr (HY) stage I patients with Parkinson's disease (*1*). In our study (*2*), the H/M ratio in HY stage I patients with Parkinson's disease was normal. Myocardial metaiodobenzylguanidine (MIBG) scintigraphy was performed in 6 HY stage I patients with Parkinson's disease on admission and 1 y later. The H/M ratio on admission was in the normal range in all patients but decreased in 3 of 6 patients 1 y later, and HY stage in these patients was determined to be stage II. The other 3 patients' disease remained classified as HY stage I, but the H/M ratio decreased in 2 of 3 patients. Orimo et al. (*3*) reported that 5 of 9 patients with HY stage I Parkinson's disease showed a normal H/M ratio, and the H/M ratio of patients with HY stage I was significantly higher than that in patients with stages III, IV, and V Parkinson's disease (*3*). These results indicate that the H/M ratio may be decreased at the time of examination even in patients with HY stage I disease.

In our article (*2*), the central nervous system (CNS) control group consisted of patients with CVD, PSP, CBD, and ALS. The H/M ratios of these neurodegenerative diseases (SCD, 2.13; PSP, 2.0; CBD, 2.06; ALS, 2.1) were not decreased compared with the ratio of CVD. For this reason, we included these patients with neurodegenerative diseases as the CNS control group. Reduction of cardiac MIBG uptake in patients of with PSP, SCD, and ALS have been reported (*1,4,5*). Some patients with these neurodegenerative diseases showed reduction of cardiac MIBG uptake, but the degree and the frequency of the reduction of cardiac MIBG uptake were less significant than that in patients with Parkinson's disease (*1,4,5*).

REFERENCES

1. Yoshita M, Hayashi M, Hirai S. Iodine 123-labeled metaiodobenzylguanidine myocardial scintigraphy in the cases of idiopathic Parkinson's disease, multiple system atrophy, and progressive supranuclear palsy. *Clin Neurol.* 1997;37:476–482.
2. Satoh A, Serita T, Seto M, et al. Loss of ^{123}I-MIBG uptake by the heart in Parkinson's disease: assessment of cardiac sympathetic denervation and diagnostic value. *J Nucl Med.* 1999;40;371–375.
3. Orimo S, Ozawa E, Nakade S, Sugimoto T, Mizusawa H. ^{123}I-metaiodobenzylguanidine myocardial scintigraphy in Parkinson's disease. *J Neurol Neurosurg Psychiatry.* 1999;67:189–194.
4. Kazuta T, Hayashi M, Yoshita M, Hirai S. Iodine 123-labeled metaiodobenzylguanidine myocardial scintigraphy evaluation of Machad-Joseph disease. *Clin Neurol.* 1998;38:97–101.
5. Druschy A, Platch G, Feistel H, et al. Decreased sympathetic innervation in early stage of amyotrophic lateral sclerosis (ALS) by ^{123}I-MIBG-SPECT: a follow up study [abstract]. *Clin Auton Res.* 1997;7:204.

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Small-Animal PET Cameras

TO THE EDITOR: I read with interest the July 1999 editorial by Tornai et al. (*1*), which praised the development of and results from a small-animal PET scanner, microPET (University of California, Los Angeles, Los Angeles, CA) (*2*). I would like to suggest that microPET is not quite as "state-of-the-art" as the authors asserted, at least as far as field-of-view, spatial resolution, and sensitivity are concerned.

My institution's dual-detector, 3-D, HIDAC-PET camera (*3*)—which consists of 5 million lead, 0.5-mm-diameter, gas-avalanche

counters—achieves the following:

- an axial field-of-view of 21 cm, which is 12 times larger than microPET;
- a 3-D submillimeter spatial resolution and therefore a volumetric resolution <1 μl, which is 8 times better than microPET;
- an absolute sensitivity of 8.9 Hz/kBq, which is 60% better than microPET;
- and a sensitivity, for a cat's-head phantom (5.5 cm diameter and 6 cm long), of 918 Hz/kBq/mL, which is 15 times better than microPET.

This HIDAC camera has provided imaging results that have been acclaimed by S. Cherry, the designer of microPET (personal communication, September 1997). The HIDAC camera has been in regular use at the MRC Cyclotron Unit at Hammersmith Hospital (London, UK) since February 1999, where quantitative biologic applications are being investigated. At Oxford Positron Systems, we have now delivered a commercial, quad-detector camera that provides a 3-fold improvement in sensitivity, a 5-fold shorter electronic dead time, and a maximum coincidence counting rate of 500000 Hz.

3-D HIDAC-PET cameras have existed for many years, and earlier work has been documented in this journal (*4*). The technology is well proven commercially, as hundreds of systems for autoradiography (InstantImager; Packard Bioscience, Downers Grove, IL) are in operation worldwide.

REFERENCES

1. Tornai MP, Jaszczak RJ, Turkington TG, Coleman RE. Small-animal PET: advent of a new era of PET research. *J Nucl Med.* 1999;40:1176–1179.
2. Chatziioannou AF, Cherry SR, Shau Y, et al. Performance evaluation of microPET: a high-resolution lutetium oxyorthosilicate PET scanner for animal imaging. *J Nucl Med.* 1999;40:1164–1175.
3. Jeavons AP, Chandler RA, Dettmar CAR. A 3D HIDAC-PET camera with sub-millimetre resolution for imaging small animals. *Trans Nucl Sci.* 1999;46:468–473.
4. Townsend DW, Frey P, Jeavons AP. High density avalanche chamber. *J Nucl Med.* 1987;28:1554–1562.

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Procedure Guideline for Gastric Emptying and Motility

TO THE EDITOR: The procedure guideline for gastric emptying and motility by Donohoe et al. (*1*) covers the field extensively and merits full attention. Solid and liquid test meals were extensively discussed, but the use of semisolid test meals was only treated as a side issue of minor importance and barely mentioned. Semisolid meals combine emptying characteristics of liquid and solid meals. The emptying of liquids depends more on pressure gradients between the stomach and duodenum and is more influenced by gravity than by muscular propulsion. The emptying of solid meals, however, is primarily influenced by the effectiveness of mastication, which in turn influences the duration of grinding within the antrum (*2*). This process is known to triturate food particles to a size of less than 1 mm, causing a lag period of variable duration before gastric contents are passed into the duodenum. The disadvantages of liquids and solids ingested separately or in combination may be avoided by the use of a semisolid test meal (*3,4*).

Donohoe et al. (*1*) asserted, "if a patient cannot tolerate the ingestion of a standard solid or liquid meal study, that the procedure should not be done." However, a semisolid meal could replace solid or liquid meals because its consistency is variable and may be adapted as required. Such meals exhibit the linear emptying characteristics of solid meals, particularly when their consistency is more stiff than liquid. When prefabricated, ready-made mixes are used, their preparation is simple and requires little time. Such commercially available products avoid the inconvenience of multistep cooking and offer additional advantages. They maintain the same nutritive density and osmolality, a constant fat–carbohydrate–protein ratio, and constant electrolyte and spice concentrations. Differences in these properties are known to influence the rate of gastric emptying (*5*). Fluctuations are likely to occur when multicomponent solid meals are individually prepared. Meals of vegetable origin are generally palatable, light, and easily digestible even in patients with digestive disorders. They are acceptable for vegetarians and should not elicit objections that are based on religious preferences or special dietary restrictions. These properties characterize semisolid meals as valuable intermediates between liquid and solid meals that should not be neglected when the choice of test meal is considered.

REFERENCES

1. Donohoe KJ, Maurer AH, Ziessman HA, Urbain JLC, Royal HD. Procedure guideline for gastric emptying and motility. *J Nucl Med.* 1999;40;1236–1239.
2. Urbain JLC, Siegel JA, Charkes ND, Maurer AH, Malmud LS. The two component stomach: effects of meal particle size on fundal and antral emptying. *Eur J Nucl Med.* 1989;15:254–259.
3. Lipp RW, Hammer HF, Schnedl W, et al. A simple scintigraphic method for continuous monitoring of gastric emptying. *Eur J Nucl Med.* 1993;20:260–263.
4. Leb G, Lipp RW. Criteria for labelled meals for gastric emptying studies in nuclear medicine. *Eur J Nucl Med.* 1993;20:185–186.
5. Moore JG, Christian PE, Coleman RE. Gastric emptying of varying meal weight and composition in man. Evaluation by dual liquid- and solid-phase isotopic method. *Dig Dis Sci.* 1981;26:16–22.

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Prognostic Value of FDG PET Imaging in Malignant Pleural Mesothelioma

TO THE EDITOR: We read with interest the article by Benard et al. (*1*), which illustrated the potential value of FDG PET imaging in patients with mesothelioma to indicate prognosis. This article provides an opportunity to highlight another specific role of FDG PET in patients with pleural thickening or pleural plaques needing a diagnosis. FDG PET, by its functional nature, provides information about metabolically active areas and may be used as a guide to the most appropriate area to biopsy for better yield. This use of the PET complements its other functions in oncology: diagnosis, staging, and grading of tumors; evaluation of residual masses; prognostication; and monitoring of response to treatment. In particular, for tumors that are infiltrative, spreading, or bulky, which may have variability in histology (ranging from cystic