^{123}I-MIBG Versus ^{18}F-FDG: Which Is Better, or Which Can Be Eliminated?

TO THE EDITOR: The excellent paper by Dr. Sharp and colleagues compared the diagnostic utility of ^{123}I-metaiodobenzylguanidine (MIBG) with ^{18}F-FDG (*1*). They found that ^{18}F-FDG is superior to ^{123}I-MIBG in stage 1 and 2 neuroblastoma and that ^{123}I-MIBG is superior to ^{18}F-FDG in stage 4 neuroblastoma.

The authors comment that for socioeconomic and radiation exposure reasons, a reduction in the total number of imaging procedures may be desirable in neuroblastoma patients. In this setting, what is important is not necessarily which test is superior. Rather, we want to know if one of these imaging tests can be safely eliminated. The answer is no. Not in early-stage neuroblastoma, and not in late-stage neuroblastoma.

The authors found that in 10 of 10 patients with early disease, ^{18}F-FDG was equivalent or superior to ^{123}I-MIBG. But the 95% confidence interval for this ranges from about 72% to 100%. Thus, it remains statistically possible that ^{18}F-FDG may be inferior to ^{123}I-MIBG in up to 3 of 10 patients. We thus conclude that ^{123}I-MIBG scanning cannot be safely eliminated in early neuroblastoma, although ^{18}F-FDG works particularly well.

In stage 4 disease, ^{123}I-MIBG was superior in 24 of 40 patients, whereas ^{18}F-FDG was better in 8 of 40 patients. Yes, 24 of 40 is different from 8 of 40 ($P < 0.001$), but so what? The more pressing question is whether 8 of 40 is significantly different from 0 of 40. That is, can we safely eliminate ^{18}F-FDG scanning in stage 4 patients? No. Their data indicate that up to 3 of 10 late-stage patients will benefit from ^{18}F-FDG scanning, even though ^{123}I-MIBG performs better.

The authors make a valuable contribution by giving us the relative superiority of each agent during the course of neuroblastoma. However, their data also indicate that ^{123}I-MIBG scanning cannot yet be safely eliminated, nor can ^{18}F-FDG scanning be safely eliminated, in the evaluation of early- or late-stage neuroblastoma.

REFERENCE

1. Sharp SE, Shulkin BL, Gelfand MJ, Salisbury S, Furman WL. ^{123}I-MIBG scintigraphy and ^{18}F-FDG PET in neuroblastoma. *J Nucl Med.* 2009;50:1237–1243.

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^{123}I-MIBG Scintigraphy and ^{18}F-FDG PET in Neuroblastoma

TO THE EDITOR: We read with great interest a recent article by Sharp et al. (*1*) in which the authors compared the diagnostic utility of ^{123}I-metaiodobenzylguanidine (MIBG) scintigraphy and ^{18}F-FDG PET in neuroblastoma. In this retrospective study, a total of 113 paired ^{123}I-MIBG and ^{18}F-FDG PET scans of 60 patients were compared.

The authors concluded that ^{18}F-FDG PET was superior to ^{123}I-MIBG scanning in detecting stage 1 and 2 neuroblastoma. Only 10 patients, however, had stage 1 or 2 disease, and of these, 5 patients were undergoing imaging for diagnosis and 5 for follow-up, indicating nonuniform patient groups with different clinical questions. Because the methods of statistical analysis were not described in the article, it was difficult to comprehend the results of the confidence intervals. The calculation of confidence intervals usually requires the assumption that the distribution of the sample population is normal; however, given the small sample size of the studied groups with stage 1 and 2, a normal distribution could not be expected. Thus, the conclusion that ^{18}F-FDG PET is superior for depicting stage 1 and 2 neuroblastoma is doubtful. We would appreciate information about the authors' methods of statistical analysis and their comments on the results for stage 1 and 2 neuroblastoma in regard to the statistical power of the tests.

The authors further concluded that ^{123}I-MIBG scanning was superior to ^{18}F-FDG PET in the evaluation of stage 4 neuroblastoma, "especially during initial chemotherapy, primarily because of the better detection of bone or marrow metastases." In contrast to these findings, Kushner et al. (*2*) reported a study of 51 patients with high-risk neuroblastoma in which ^{18}F-FDG PET was equal or superior to ^{123}I-MIBG scanning for "identifying neuroblastoma in soft tissue and extra-cranial skeletal structures, for revealing small lesions, and for delineating the extent and localizing sites of disease." Sharp et al. (*1*) mentioned and discussed the findings of Kushner et al. briefly and from another angle; for example, that Kushner et al. "primarily addressed appropriate follow-up for patients with progressive disease after primary tumor resection in the absence of cranial vault lesions." The authors, however, did not discuss the discrepancy of the results between the 2 studies. We would appreciate a discussion by the authors in this regard.

The authors described ^{123}I-MIBG as being inferior to ^{18}F-FDG PET in stage 1 and 2 neuroblastoma and superior to ^{18}F-FDG PET in stage 4 neuroblastoma, based on the numbers of scans and patients for which either of the 2 modalities detected more lesions. The authors, however, did not discuss whether the better performance of either modality resulted in a change in clinical stage or clinical management. We would appreciate information from the authors on this subject.

REFERENCES

1. Sharp SE, Shulkin BL, Gelfand MJ, Salisbury S, Furman WL. ^{123}I-MIBG scintigraphy and ^{18}F-FDG PET in neuroblastoma. *J Nucl Med.* 2009;50:1237–1243.