## PET Imaging of Adrenal Cortical Tumors with the $^{11}$ß-Hydroxylase Tracer $^{11}$C-Metomidate

**TO THE EDITOR:** We read with interest the article by Bergström et al. (*1*) and agree that new approaches to the functional localization of the adrenal cortex would be of value in clinical decision making. We compliment them on their development of the $^{11}$ß-hydroxylase inhibitor $^{11}$C-metomidate. Their data demonstrate that high-quality PET scans of a variety of adrenocortical tumors can be obtained with $^{11}$C-metomidate. This small series of adrenal neoplasms with diameters ranging from 2 to 10 cm comprised adrenal adenomas (2 with primary aldosteronism), adrenal hyperplasia, and adrenal carcinoma, all of which imaged. In 6 other patients (2 with adrenal cysts), an adrenal metastasis, a pheochromocytoma, myelolipoma, and a mesenchymal tumor did not image.

Although $^{11}$C-metomidate appears to allow discrimination of adrenocortical neoplasms from nonadrenocortical neoplasms, it does not distinguish adrenal adenoma from adrenal carcinoma. Furthermore, there is overlap of $^{11}$C-metomidate uptake kinetics and standard uptake value between normal adrenal cortex and the adrenal cortical neoplasms studied. Perhaps more data will better define these groups. Whether any $^{11}$C-labeled radiopharmaceutical will have widespread clinical use will depend on the close proximity of a cyclotron, sophisticated radiochemical synthetic capacity, and PET imaging, a combination that is not widely available.

$^{131}$I-iodomethylnorcholesterol (available through a simplified, investigative new drug application with the U.S. Federal Drug Administration) and $^{75}$Se-selenocholesterol (both commercially available in Europe and Japan) distinguish nonhyperfunctioning, benign adrenal adenoma from other space-occupying adrenal lesions with high sensitivity, specificity, accuracy, and cost-effectiveness (*2*,*3*). Thus, despite the time necessary to obtain images (4–5 d after injection), the procedure can be integrated easily into an evaluation of a patient with an adrenal mass (*3*,*4*). The positive predictive value of $^{131}$I-$^{6}$ß-iodomethylnorcholesterol (NP-59) is 100% for lesions ≥2 cm in diameter (*3*,*5*). Sensitivity has been shown to decrease in lesions <2 cm in diameter, but specificity remains high even for small adrenal lesions (*5*).

We disagree with the assertion that CT and MRI lack specificity in the evaluation of the adrenal mass. Non–contrast-enhanced CT, delayed imaging 1 h after contrast-enhanced CT, and opposed-phase chemical-shift MR have all been reported to have high sensitivity and specificity in adrenal mass character (*4*).

Bergström et al. (*1*) correctly stated that final assessment of this novel method must await investigation and analysis in an adequately powered study, but they counterintuitively suggested that $^{11}$C-metomidate be used as one of the first methods for evaluating adrenal incidentalomas. Widespread clinical use of $^{11}$C-metomidate PET imaging will require demonstration of diagnostic accuracy, therapeutic impact, and cost effectiveness comparable with or better than that of the existing imaging modalities.

It must be emphasized that glucocorticoids are not used routinely in every patient undergoing adrenal scintigraphy with NP-59. We and others have reserved dexamethasone suppression for non–glucocorticoid-secreting adrenal lesions (primary aldosteronism and adrenal hyperandrogenism) in which suppression of the inner zones of the cortex has been shown to improve diagnostic performance. The use of dexamethasone suppression in the evaluation of incidentalomas may result in misdiagnosis. Regardless of the imaging procedure(s) chosen, however, an appropriate biochemical work-up to exclude adrenal cortical or medullary hyperfunction must be performed before any type of scintigraphic study (*4*).

### REFERENCES

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**REPLY:** We read with interest the comments by Gross et al. regarding our article in *The Journal of Nuclear Medicine* (*1*). Gross et al. write that CT and MRI have 100% specificity, which suggests no need for other noninvasive diagnostic methods. On the other hand, Gross et al. describe the NP-59 scintigraphy as a valuable and cost-effective investigation. In our experience, in a large proportion of patients, neither CT nor MRI solves the differential diagnostic problems for incidentalomas, which is why we believe it beneficial to develop additional strategies to optimally manage these patients. In this context, PET may be of value, both with the new tracer $^{11}$C-metomidate and with the previously documented $^{11}$C-hydroxyephedrine with specificity for pheochromocytomas and FDG to discriminate between metastatic nonadrenal carcinomas and adrenal lesions.

The value of $^{11}$C-metomidate must, of course, await further evaluation in larger patient groups, and the approximately 50 patients we have so far investigated with $^{11}$C-metomidate will be complemented by a European multicenter trial, which has recently been initiated. This trial should provide sensitivity and specificity

data and perhaps include a sufficient number of patients to assess the potential for discrimination between adrenal adenoma and cancer.

PET might be regarded as expensive and unavailable, but we have seen that PET with FDG is gaining in availability that, a few years ago, could not be foreseen. Specific tracers that seem to have a clinical role could, in the same manner, be used more widely if labeled with more long-lived positron-emitting radionuclides than $^{11}C$.

## REFERENCE

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