easily resolve approximately 1 cubic centimeter or 1 gram of myocardium. This is supported by data in the study under discussion and by our previous work. More recent data suggest that tomography with a revolving detector system also provides a means to measure infarct size accurately. It is true that imaging with an infarct-avid tracer might be expected to overestimate infarct size, just as imaging with a cold-spot agent might be expected to underestimate size. Singh et al. did certainly report a problem with overestimation when they converted infarct volume to mass (*12*). However, the most likely explanation for these findings is that the use of slice thicknesses that were smaller than the system's resolution resulted in difficulties in distinguishing real infarct distribution in a slice at the border of the infarct from blur artifact. Other studies have not verified a consistent overestimation, and our data do not support this contention (*13*). Indeed, when the distributions of Tc-99m PPi and TTC are compared in the left-ventricular slab, the relationship is virtually 1:1 (*14*). Thus, Dr. Bianco's concerns about system resolution and possible overestimations of infarct size using Tc-99m PPi are unwarranted. Indeed, we have found that Tc-99m PPi estimates of infarct size are much more accurate than those made with a perfusion marker such as Tl-201 (*15*).

Thirdly, Dr. Bianco complains that imaging with Tc-99m PPi for determination of infarct size is a futile effort since myocardial uptake is maximal at 2-5 days after infarction. We disagree. Studies have already demonstrated the prognostic importance of infarct size measurements obtained from planar Tc-99m PPi images (*16-18*). We also believe that Tc-99m PPi imaging may be most valuable in studies of therapies that attempt to limit infarct size. In simple terms, the problem is to define the distributions of the "myocardium at risk" and infarcted myocardium. The distribution of Tc-99m PPi makes it an ideal agent for marking the infarcted myocardium. The fact that the uptake of Tc-99m PPi is not maximal until 2-5 days after infarction does not detract from its value in the least, since we are concerned with ultimate infarct size. The effectiveness of an intervention might, for example, be judged by superimposition of the three-dimensional distribution of infarction (by tomographic imaging with Tc-99m PPi) and the three-dimensional distribution of the "myocardium at risk" (tomographic imaging of a perfusion or metabolic marker) (*19*).

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Re: Does the Corticoadrenal Adenoma with "Pre-Cushing" Syndrome Exist?

I read with interest the paper by B. Charbonnel et al. (*1*). In our experience we have been faced with a similar problem. Since 1971, when the adrenal glands of a Cushing's syndrome patient were first visualized with ^{131}I-19-cholesterol and, later on, 63-[^{131}I]iodomethyl-19-norcholest-5(10)-en-33o1 scintigraphic imaging has become an indispensable tool in the diagnosis of hyperfunctional syndromes of the adrenal cortex as well as the medulla. The method permits the assessment of the position, size, shape, and activity of adrenal glands. It facilitates the differentiation of a

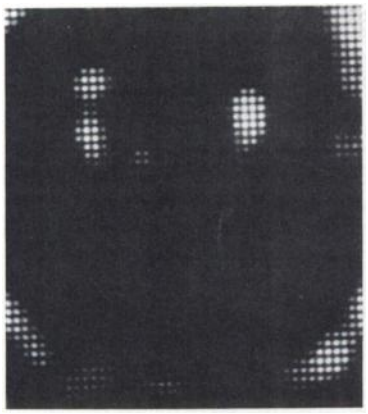

FIG. 1. Normal adrenal scintiscan (Protocol No. 3806)

cortical adenoma from bilateral hyperplasia. In the diagnosis of primary aldosteronism it is equivalent to venography and superior to arteriography (*2–4*). After dexamethasone suppression it becomes even more valuable.

As is true of all investigations used in nuclear medicine, thorough knowledge of the clinical problem and/or the results of hormone analyses is essential for correct interpretation of adrenal scan findings.

In over 90 patients we have found the results of hormone investigations generally to be in agreement with the scan findings. For about 30% of our subjects, however, the adrenal scans were more or less clearly pathologic, showing one or more hyperactive areas in one or both glands, even though clinical or laboratory evidence of adrenal disease was absent. We were surprised by the large percentage of false-positive results, since on the other hand we were able to obtain almost complete accord between scintigraphic and pathohistologic analyses in several Cushing's syndrome patients undergoing surgery.

The apparent disagreement between scan findings and clinical diagnosis is explained by the statistics of pathologists, who report that adrenocortical nodular hyperplasia is encountered daily in postmortem examinations of elderly patients (*5–7*). Siebenmann, considering also the smallest lesions, found nodular hyperplasia in 44% of autopsied normotensive patients (*6*). According to Thompson and Cotton it is present in 30% of these subjects (*8*). Walter and Israel likewise mention the high frequency of hyperplasia (*9*). Pathohistologic assessment often fails to determine the functional state of adenomas (*8*). From nuclear medicine literature, however, 63-[^{131}I]iodomethyl-19-norcholest-5(10)-en-33o1 is known to accumulate also in a functional adrenocortical nodules

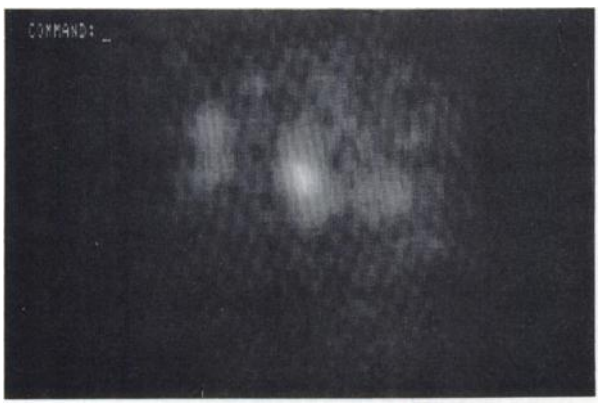

FIG. 2. Adrenal scintiscan showing one hyperative area in the right gland (Protocol No. 63182).

(*10*), since they contain nonsteroid lipids. It has also been reported that a hyperactive adenoma may be visible on scintiscan in subclinical Cushing's syndrome, when the disease is not yet demonstrable by other tests (*11*).

Scintillation scanning thus permits the detection of adrenal adenomas before they become clinically and chemically manifest. More often, however, adenomas and nodules detected by scintiscan when other evidence suggestive of adrenal disease is lacking probably represent a functionally insignificant finding. The differentiation between clinically significant and insignificant nodules would be made possible only by prolonged follow up of these patients.

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Reply

We agree with the general comments concerning usefulness of adrenal scintigraphy and the role of a clinical or hormonal diagnosis for correct interpretation of adrenal scan findings. It must be emphasized, however, that iodocholesterol is a marginal tool in the diagnosis of pheochromocytomas or for the accurate assessment of the size and shape of adrenal glands (computerized tomography is better for this latter purpose). In our own experience with adrenal scintigraphy (over 100 patients), we have not found 30% scan abnormalities without other evidence of associated adrenal disease.