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Limited significance of iodomethylnorcholesterol uptake in adrenal visualization

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To the Editor: I read with interest the case of primary aldosteronism (PA) presented by Chen *et al.*[1] The clinical course, resolution of hypokalemia and hypertension by right adrenalectomy, and the pathological finding, a cortical microadenoma in the resected adrenal gland, support their diagnosis of aldosterone-producing adenoma of the right adrenal gland. However, I would like to comment about a potential pitfall in the usage of ^{131}I-6-beta-iodomethylnorcholesterol (^{131}I-NP-59) to detect the origin of aldosterone hypersecretion in PA.

The unilateral uptake of ^{131}I-NP-59 under dexamethasone suppression in PA could indicate aldosterone hypersecretion from the side with the uptake. However, cases of false-positive unilateral uptake in hyperplasia and cases of false negative localizations (bilateral positive, bilateral negative, and incorrect side-positive) in aldosterone-producing adenoma have been reported.[2,3] Therefore, the ^{131}I-NP-59 uptake would not properly indicate the side of aldosterone hypersecretion in some cases of PA. Adrenal vein sampling (AVS) is now considered the most reliable test for detecting the side of aldosterone hypersecretion in PA.[4] The treatment for PA, either adrenalectomy or medical treatment with a mineralocorticoid receptor antagonist, should be based on the result of AVS.

1. Chen YC, Wei CK, Chen PF *et al.* Seeking the invisible: I-131 NP-59 SPECT/CT for primary hyperaldosteronism. *Kidney Int* 2009; **75**: 663.
2. Gross MD, Shapiro B, Freitas JE. Limited significance of asymmetric adrenal visualization on dexamethasone-suppression scintigraphy. *J Nucl Med* 1985; **26**: 43–48.
3. Glodny B, Kuhle C, Cromme S *et al.* An assessment of diagnostic procedures preparatory to retroperitoneoscopic removal of adenoma in cases of primary hyperaldosteronism. *Endocr J* 2000; **47**: 657–665.
4. Funder JW, Carey RM, Fardella C *et al.* Case detection, diagnosis, and treatment of patients with primary aldosteronism: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab* 2008; **93**: 3266–3281.

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Response to 'Limited significance of iodomethylnorcholesterol uptake in adrenal visualization'

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We heartily thank Dr Tanemoto[1] for the interest in our article.[2] We agree that traditional planar adrenal scintigraphy with NP-59 and dexamethasone suppression has low sensitivity and specificity and cannot detect adenomas <1 cm in diameter. Despite the high adrenal avidity of NP-59, the computer hardware provides limited resolution and does not allow detection of early adrenal activity.[3]

Single-photon emission computed tomography (SPECT) provides spatial and quantitative data on adrenocortical uptake and allows detection of smaller lesions.[4,5] In NP-59 SPECT, the hallmark of diagnosis is early visualization before the fifth post-injection day.[4] The unilateral uptake signifies either frequent unilateral adrenal adenoma, or rare unilateral adrenal hyperplasia, both of which are surgically curable.[6] SPECT/CT, which uses an integrated dual-head gamma camera and a CT scanner, provides functional and anatomical imaging in one session, allows accurate localization of tumors, and enhances the accuracy of SPECT, all of which may affect clinical decision making.[7] Higher levels of sensitivity, specificity, positive predictive value, and negative predictive value can be attained by performing SPECT/CT with high-end CT.[8]

In our case, CT alone provided no evidence of a lesion, and traditional planar NP-59 scintigraphy alone indicated no uptake of radioactivity. However, radioactivity was evident after SPECT imaging, and this was localized by SPECT/CT. We did not use adrenal venous sampling because this method is invasive, is associated with various risks (even when performed by an experienced expert), and because of difficulty in approaching the right adrenal vein.[9]

By performing NP-59 SPECT/CT, we identified a cortical micronodule that was 815 μm in diameter, the smallest adenoma identified in a pathological examination at present. NP-59 SPECT/CT is a significant technical innovation that provides a noninvasive and promising alternative for the diagnosis of subtle primary hyperaldosteronism when there is a high clinical suspicion despite a negative confirmation test and negative CT scan.

1. Tanemoto M. Limited significance of iodomethylnorcholesterol uptake in adrenal visualization. *Kidney Int* 2009; **76**: 678.
2. Chen YC, Wei CK, Chen PF *et al.* Seeking the invisible: I-131 NP-59 SPECT/CT for primary hyperaldosteronism. *Kidney Int* 2009; **75**: 663.
3. Gross MD, Shapiro B, Freitas JE. Limited significance of asymmetric adrenal visualizeation on dexamethasone-suppression scintigraphy. *J Nucl Med* 1985; **26**: 43–48.
4. Hwang I, Balingit AG, Georgitis WJ *et al.* Adrenocortical SPECT using iodine-131 NP-59. *J Nucl Med* 1998; **39**: 1460–1463.
5. La Cava G, Imperiale A, Olianti C *et al.* SPECT semiquantitative analysis of adrenocortical ^{131}I-6β-iodomethyl-norcholesterol uptake to discriminate subclinical and preclinical functioning adrenal incidentaloma. *J Nucl Med* 2003; **44**: 1057–1064.
6. Rossi GP, Pessina AC, Heagerty AM. Primary aldosteronism: an update on screening, diagnosis and treatment. *J Hypertens* 2008; **26**: 613–621.
7. Ingui CJ, Shah NP, Oates ME. Endocrine neoplasm scintigraphy added value of fusing SPECT/CT images compared with traditional side-by-side analysis. *Clin Nucl Med* 2006; **31**: 665–672.

8. Pfannenberg AC, Eschmann SM, Horger M *et al.* Benefit of anatomical-functional image fusion in the diagnostic work-up of neuroendocrine neoplasms. *Eur J Nucl Med Mol Imaging* 2003; **30**: 835–843.
9. Lockhart ME, Smith JK, Kenney PJ. Imaging of adrenal masses. *Eur J Radiol* 2002; **41**: 95–112.

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Depression and nonadherence are closely related in dialysis patients

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To the Editor: Cukor *et al.*[1] very recently showed that dialysis patients were more depressed and had lower adherence to medication when compared with patients with renal transplantation. In addition, they found that lack of adherence to medical treatments is independently associated with depressive behavior as determined by the Beck Depression Inventory.

Previously we have observed very similar results in hemodialysis patients, although our study differs from the study by Cukor *et al.* in some methodological aspects.[2] We have shown that among 86 hemodialysis patients who were on the renal transplantation waiting list, 49 were nonadherent. In our study, clinical nonadherence was defined as skipping or shortening of dialysis sessions, interdialytic weight gain of $>5.7\%$ of body weight, a predialysis potassium level of >6 mEq/l, and a predialysis phosphorus level of >7.5 mg per 100 ml. We recorded sociodemographic and laboratory parameters. We also evaluated quality of life (by the SF-36) and depressive behavior by the Beck Depression Inventory. Although nonadherent patients had lower quality of life, and higher Beck Depression Inventory scores, nonadherence was associated only with Beck Depression Inventory scores in our study (odds ratio: 2.146; confidence interval: 2.052–2.350; *P*: 0.002).[2]

Nonadherence in dialysis patients was associated with increased mortality.[3] On the other hand, depression was considered the most common psychopathology among dialysis patients.[4] In light of Cukor *et al.*'s and our findings, we suggest that depression may be one of the permissive factors for nonadherent behavior in dialysis patients and thus related with increased mortality. In addition, treatment of depression may improve adherence. Longitudinal studies are needed to highlight these issues.

1. Cukor D, Rosenthal DS, Jindal RM *et al.* Depression is an important contributor to low medication adherence in hemodialyzed patients and transplant recipients. *Kidney Int* 2009; **75**: 1223–1229.
2. Akman B, Uyar M, Afsar B *et al.* Adherence, depression and quality of life in patients on a renal transplantation waiting list. *Transplant Int* 2007; **20**: 682–687.
3. Kaveh K, Kimmel PL. Compliance in hemodialysis patients: multidimensional measures in search of a gold standard. *Am J Kidney Dis* 2001; **37**: 244–266.
4. Cukor D, Cohen SD, Peterson RA *et al.* Psychosocial aspects of chronic disease: ESRD as a paradigmatic illness. *J Am Soc Nephrol* 2007; **18**: 3042–3055.

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Response to 'Depression and nonadherence are closely related in dialysis patients'

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We thank Drs Afsar and Akman for their letter.[1] We are gratified that our study[2] had results similar to their findings[3] even though the populations were quite different, as this shows the robustness of the relationship between nonadherence and depression. In further analyses of our data, we identified social support[4] as significantly associated with medication adherence ($r=0.28$, $P<0.05$) and depression ($r=-0.40$, $P<0.001$). In our exploratory model, depression emerged as a mediator, suggesting that the relationship between social support and medication adherence is attenuated through depressive affect.

The scientific study of nonadherence in end-stage renal disease (ESRD) populations is still in its infancy. The field lacks a standard assessment strategy or even an identified minimum threshold of adherence required to prevent complications. The studies thus far have been correlational in design; therefore, the direction of the relationships is undetermined. However, as depression is a common comorbidity,[5] all ESRD patients should be carefully screened for depression and treatment regimen adherence. Similarly, interventions to promote treatment adherence should address the level of depressive affect. Controlled trials to treat depression in ESRD are needed, as untreated depression may contribute directly, or be mediated through nonadherence, to poor outcomes. These studies should include objective assessments of depression and measure multiple outcomes, including the effect of psychological therapy on depression, quality of life, adherence, laboratory values, and mortality.

1. Afsar B, Akman B. Depression and nonadherence are closely related in dialysis patients. *Kidney Int* 2009; **76**: 679.
2. Cukor D, Rosenthal DS, Jindal RM *et al.* Depression is an important contributor to low medication adherence in hemodialyzed patients and transplant recipients. *Kidney Int* 2009; **75**: 1223–1229.