

## Case of Adrenal Incidentaloma with <sup>131</sup>I-adosterol Scintigraphy Showing High Uptake Despite No Significant Physical or Endocrinological Abnormalities

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## Case Report

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### A Case of Adrenal Incidentaloma with $^{131}\text{I}$ -adosterol Scintigraphy Showing High Uptake Despite No Significant Physical or Endocrinological Abnormalities

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A 57-year-old woman was readmitted to our hospital for further evaluation of a left adrenal incidentaloma measuring 24 mm × 19 mm, which had initially been discovered four years earlier by computed tomography (CT), and had remained unchanged in size (Fig. 1a). A T1-weighted in-phase magnetic resonance image (MRI) showed a left adrenal gland nodule and a T1-weighted out-of-phase MRI showed relative signal loss within the lesion, as compared with the signal loss of the spleen and paraspinal muscle, findings characteristic of an adenoma (Fig. 1b). She had no clinical manifestations of endocrinological abnormalities. Endocrine evaluation revealed a normal plasma adrenocorticotrophic hormone (ACTH) level (0900h 12.7 pg/ml) and cortisol levels also showed a normal pattern (0900h 13.5 μg/dl, 1700h 9.7 μg/dl, 2100h 3.5 μg/dl). Furthermore, plasma cortisol was completely suppressed by overnight administration of 1 mg of dexamethasone (1.2 μg/dl). The other endocrinological data were : plasma aldosterone, 79.9 pg/ml ; plasma renin activity, 1.4 ng/ml/hr ; urinary metanephrine, 0.08 mg/day ; urinary normetanephrine, 0.15 mg/day. The CRH (corticotropin-releasing hormone) test showed normal increases in ACTH (from 11.9 pg/ml to 95.4

pg/ml) and cortisol (from 12.5 μg/dl to 30.5 μg/dl). Then,  $^{131}\text{I}$ -labeled adosterol scintigraphy was performed 7 days after 37 MBq of  $^{131}\text{I}$ -6β-iodomethyl-19-norcholest-5 (10) -e-3β-ol (NCL-6- $^{131}\text{I}$ ) had been injected. Posterior imaging with data collection was carried out for 20 minutes with a gamma camera (PICKER PRISM 2000XP, Picker, England) fitted with a high energy parallel-hole collimator. Unexpectedly,  $^{131}\text{I}$ -labeled adosterol scintigraphy revealed apparently high uptake in the left adrenal gland (Fig. 1c). These laboratory findings had shown no significant changes in the four years since the incidentaloma was first identified.

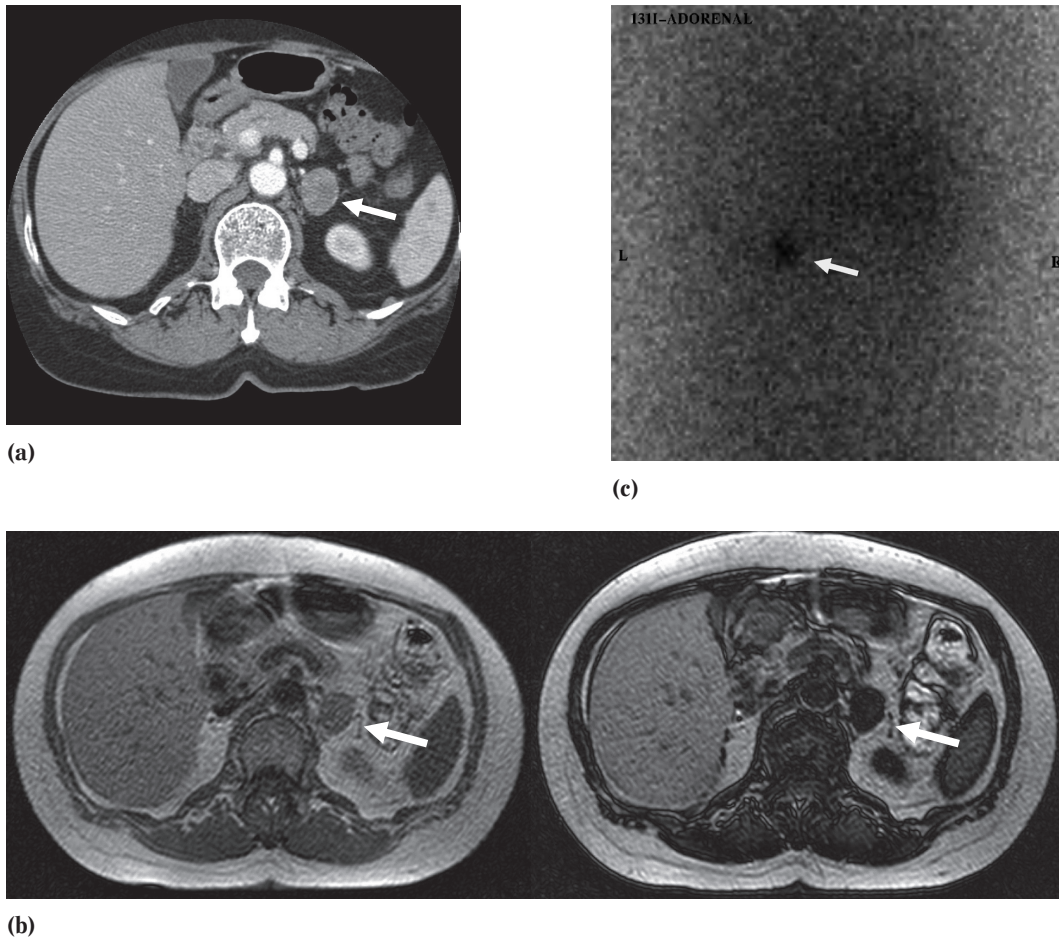
In general, increased tumor uptake of  $^{131}\text{I}$ -labeled adosterol raises the possibility of a functional cortical adenoma<sup>1)2)</sup>. However, some reports have recently demonstrated that patients with unilateral concordant visualization on adrenal scintigraphy of adrenal incidentalomas have various endocrinological abnormalities, but have few symptoms and lack endocrinological evidence of typical Cushing's syndrome<sup>3)4)</sup>. Therefore, the entity termed preclinical Cushing's syndrome or subclinical Cushing's syndrome was introduced<sup>5)</sup>.

We can speculate as to the possible mechanisms underlying the  $^{131}\text{I}$ -labeled adosterol scintigraphic findings of abnormally high uptake in the left adrenal gland in this case.

First, cholesterol is stored as cholesterol esters and used for steroid hormone biosynthesis, but

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**Fig. 1** (a) Abdominal CT imaging shows an oval-shaped tumor in the left adrenal gland (approximately 24mm in maximum diameter). (b) A T1-weighted in-phase MR image (left) shows a homogeneous mass in the left adrenal gland with signal intensity similar to that of the paraspinal muscle. A T1-weighted out-of-phase MR image (right) shows a decrease in the mass signal intensity relative to those of the paraspinal muscle and spleen, which is consistent with intra-cytoplasmic fat. (c)  $^{131}\text{I}$ -labeled adosterol scintigraphy shows apparently high uptake in the left adrenal gland with no uptake in the right adrenal gland.

the radioiodocholesterols appear not to be used for steroid biosynthesis. Therefore, the concentration of  $^{131}\text{I}$ -labeled adosterol indicated cholesterol uptake but did not necessarily reflect steroid biosynthesis accurately. In other words, no correlation was observed between endocrinological data and adrenal scintigraphic intensity. Second, the normal adrenal cortex might have been compressed behind the tumor, thereby elevating the quantitative  $^{131}\text{I}$ -labeled adosterol uptake ratio of the left adrenal gland.

In conclusion, although the precise reason for  $^{131}\text{I}$ -labeled adosterol scintigraphy showing high uptake in the left adrenal gland in this case

could not be determined, unilateral concordant visualization on adrenal scintigraphy is not an unusual finding in patients with adrenal incidentalomas as shown in this case, and adrenal scintigraphy may serve as a useful tool for assessing the possibility of even weak steroidogenesis in adrenal incidentalomas.

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(和文抄録)

## <sup>131</sup>I-アドステロールシンチグラフィーが陽性所見の 非機能性副腎偶発腫瘍の一例

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症例は57歳, 女性. 4年前に指摘された, 24mm × 19mm の左側副腎偶発腫瘍の再評価目的で入院となった. MR 所見でも腺腫を示唆され, 内分泌学的身体所見は認めなかった. 内分泌学的検査では, コルチゾールは正常な日内リズムで, デキサメサゾン 1 mg 抑制試験で十分な抑制を認めた. 早朝 ACTH 値は正常で, CRH 負荷試験においても正常な反応がみられた. レニン-アルドステロン系や副腎髄質ホルモンは正常であり, 以上から非機能性副腎腺腫と診断した. ところが<sup>131</sup>I-アドステロールシンチグラフィー検査では患側に陽性所見を認めた. この4年間に於いて腫瘍のサイズを含めてこれらの検査所見に著変を認めていない. 一般に<sup>131</sup>I-アドステロールシンチグラフィーの異常集積は機能性副腎腺腫の存在を示唆するが, 最近ではプレクリニカルクッシング症候群においても同様の所見が得られることが報告されている. 本症例において非機能性副腎腺腫と考えられた患側に陽性所見を得た原因として, <sup>131</sup>I-アドステロールシンチグラフィーの取り込みはコレステロールの摂取を示唆し, 必ずしも正確なステロイド合成を示していない可能性や, 正常副腎組織が腫瘍に圧排されて, <sup>131</sup>I-アドステロールの取り込みが亢進したように認識された可能性が推測されるが明らかではない. 今回<sup>131</sup>I-アドステロールシンチグラフィーが陽性所見である非機能性副腎偶発腫瘍の一例を経験したが, <sup>131</sup>I-アドステロールシンチグラフィーの陽性所見の副腎偶発腫瘍は決して稀ではなく, <sup>131</sup>I-アドステロールシンチグラフィーは副腎偶発腫瘍における微弱なステロイド合成を評価する一つの有用な検査であることが示唆された.