Giant Adrenal Cyst Incidentally Detected by Ordinary Multiphasic Health Testing System: A Case Report

Junji Iwasaki1; Haruo Takeda2; Ryouko Kubo1; Shuji Kitashiro1; Tamaki Nagata1; and Junko Takahama2

1 Osaka Kanpo Health Care Center, and 2 Department of Radiology, Higashi Osaka City General Hospital

ABSTRACT

Adrenal glands are usually not included objects of ordinary multiphasic health testing system. Whereas, it is sometimes experienced that an adrenal abnormal lesion is detected during the health check-up unexpectedly. Between 1995 and 2002, we have examined 79,051 people in our health care center and found only 5 adrenal abnormalities, 3 adrenal tumors, 1 calcification and 1 cystic lesion by abdominal ultrasonographic (US) study.

The frequency of detecting adrenal abnormalities in our center was about 0.015%. There were no difference of frequency between female and male and also their site of lesion.

They have no symptoms and their laboratory data showed no special abnormalities. The mean size of four adrenal incidentalomas (except one calcification case), was 49 ± 14 mm (mean ± SD). Among these 5 cases, case 1 showed unusually large (70 mm in diameter) cystic lesion, and was the first experience for us. This case had undergone precise examinations in the general hospital. The cystic lesion was not enhanced by contrast material in computed tomographic (CT) study.

Multiplaner magnetic resonance imaging (MRI) strongly suggested the mass was right adrenal origin, and it showed low intensity in T1 weighted and high intensity in T2 weighted method. The mass had a thin wall and a homogenous content. All these results suggested that the mass was an uncomplicated adrenal cyst except its size, therefore careful observation was decided to continue without doing any more invasive examinations.

Key Words Adrenal Cyst; Incidentaloma; Multiphasic Health Testing

INTRODUCTION

Recent remarkable progress of the tools for image diagnosis, such as US, CT and MRI enables to detect incidental tumors or tumor-like lesions of many organs which are clinically asymptomatic. Especially, in case of adrenal gland, without using these image diagnostic methods, it may almost be impossible to find out asymptomatic incidentalomas. We report here the frequency of detecting adrenal abnormal lesions within our multiphasic health testing system during recent eight years, and also mention about one rare case of giant adrenal cyst.

SUBJECTS AND METHODS

Between 1995 and 2002, 79,051 subjects (42,149 males and 36,902 females) received routin medical health check-up in Osaka Kanpo Health Care Center. Ultrasonographic abdominal scanning (SONO-LAYER-α SSA-250A, 3.75 MHz, TOSHIBA) revealed some abnormal findings of the adrenal gland in 5 subjects among them, 3 tumors, 1 calcification and 1 cyst.

RESULTS

The profiles of these five subjects are shown in Table 1. They were consisted of two females and three males, and their ages were distributed from 23 to 75. The size of four tumorous lesions (one calcification case was omitted) was 49 ± 14 mm (mean ± S.D.). Three right and two left side of adrenal gland was involved, and all of them were unilateral. Four of them showed normal body mass index (BMI) but only case 3 was obese (BMI = 28.5). We could not get any more information about case 3 afterward, but at least at that time, he showed no other significant abnormality which suggested the existence of some hormonal imbalance. All cases were free from any symptom, and their arterial blood pressure, serum levels of sodium and potassium and urinalysis were all within normal range. Three of them (case 1, 2, 5) were followed up and underwent precise examinations, but the rest were left undiagnosed because of no more information. Case 5 underwent surgical operation and diagnosed as a benign, non-functioning adenoma. Case 2 showed multiple small calcifications in the right adrenal gland, but the gland itself was not tumorous, and also she was absolutely symptom-free, therefore only observation was continued. Case 1 showed unusually giant cystic lesion in the right adrenal gland, and was introduced immediately to Higashi-Osaka City General Hospital for receiving a precise examination. The results of further examinations are mentioned afterwards as a case report.

CASE REPORT

A 23 year old female have had a routin multiphasic health testing in our center in late 2002. This was the first chance of health check-up for her, and she was unexpectedly pointed out the existence of a giant mass lesion in the position of the right adrenal gland by abdominal US, though the origin was not clearly defined at that time. Afterwards, the mass was suggested as an adrenal origin by CT and MRI. Clinically she had no complaint all, and physical examination also could not point out any abnormality.

She weighed 58.1 kg, and her height was 159.7 cm (BMI = 22.8). Her arterial blood pressure was normal (100/62 mm Hg), and also her ECG was within normal limit. Glycosuria, albuminuria and microscopic hematuria were not seen. Serum electrolyte imbalance was not existed and renal function was not disturbed. Fasting plasma glucose and HbA1c were within normal range, and any other routin laboratory data showed no abnormal values. Serum cortisol, aldosteron and plasma catecholamines were also within normal levels (Table 2). The large adrenal mass was approximately 70 mm in size, and seemed to be a simple cyst with...
Table 1  Clinical profiles of 5 cases with adrenal lesion.

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Sex</th>
<th>Site of lesion</th>
<th>Type of lesion</th>
<th>Size (mm)</th>
<th>Symptoms</th>
<th>BMI</th>
<th>Arterial BP</th>
<th>s-Na/K</th>
<th>Urinalysis</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23</td>
<td>f</td>
<td>r</td>
<td>cyst</td>
<td>70</td>
<td>none</td>
<td>22.8</td>
<td>100/62</td>
<td>138/3.9</td>
<td>normal</td>
<td>yes</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>f</td>
<td>r</td>
<td>calcification</td>
<td>—</td>
<td>none</td>
<td>21.9</td>
<td>105/60</td>
<td>141/3.9</td>
<td>normal</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>59</td>
<td>m</td>
<td>l</td>
<td>tumor</td>
<td>48</td>
<td>none</td>
<td>28.5</td>
<td>133/81</td>
<td>139/4.9</td>
<td>normal</td>
<td>no</td>
</tr>
<tr>
<td>4</td>
<td>43</td>
<td>m</td>
<td>l</td>
<td>tumor</td>
<td>43</td>
<td>none</td>
<td>20.9</td>
<td>113/63</td>
<td>141/3.9</td>
<td>normal</td>
<td>no</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>m</td>
<td>r</td>
<td>tumor</td>
<td>33</td>
<td>none</td>
<td>22.0</td>
<td>103/63</td>
<td>137/4.1</td>
<td>normal</td>
<td>yes</td>
</tr>
</tbody>
</table>

f : female, m : male, r : right, l : left, BMI : body mass index, BP : blood pressure

Table 2  Serum adrenal hormone levels in case 1.

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Value</th>
<th>S : standard range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortisol</td>
<td>15.9 µg/dl</td>
<td>(S: 3.8–18.4)</td>
</tr>
<tr>
<td>Aldosterone</td>
<td>14.1 ng/dl</td>
<td>(S: 3.6–24.0)</td>
</tr>
<tr>
<td>Adrenalin*</td>
<td>&lt;0.01 ng/ml</td>
<td>(S: &lt;0.10)</td>
</tr>
<tr>
<td>Noradrenalin*</td>
<td>0.50 ng/ml</td>
<td>(S: 0.10–0.50)</td>
</tr>
<tr>
<td>Dopamin*</td>
<td>&lt;0.01 ng/ml</td>
<td>(S: &lt;0.03)</td>
</tr>
</tbody>
</table>

S : standard range, *: plasma levels

**Fig. 1** Ultrasonograms. Ultrasonographic image shows a simple cystic mass with thin wall and homogenous content in the position of right adrenal gland.

**Fig. 2** Contrast-enhanced CT. Abdominal computed tomography demonstrates large right adrenal cystic mass. The mass is not calcified and not enhanced by contrast material.

**Fig. 3** Coronal MRI. Frontal MRI shows a homogenous, sharply defined mass on the right kidney. Asterisk indicates co-existing hemangioma of the liver.

**Fig. 4** Axial MRI. The large adrenal mass shows low intensity in T1 (a) and high intensity in T2 (b) weighted method respectively in the transverse section of MRI.

homogenous serous content, by US (Fig. 1).

From all her laboratory data and physical examinations, the cystic tumor mass seemed to be non-functioning. She had undergone precise examinations in general hospital, and CT revealed large size of hypoattenuating right adrenal mass which was not enhanced by contrast material (Fig. 2). The cyst wall was thin and calcification was not found both inside the cyst and the wall. MRI
with different directions almost confirmed the mass as an adrenal origin (Fig. 3). The mass showed low intensity in T1 weighted, and high intensity in T2 weighted method (Fig. 4a, 4b), and the results were compatible with an uncomplicated cyst. Normal structure of the right adrenal gland could not be detected by either CT or MRI. Although for the definite diagnosis, some invasive examination, such as angiographic study or US- or CT-guided aspiration puncture, might be necessary, but at this point, as the possibility of its malignancy was very low, it was decided to observe carefully by US, CT and/or MRI every three months without carrying out such an invasive examination.

DISCUSSION

In according to the remarkable progress of the non-invasive diagnostic tools, such as US, CT and MRI, the chance to find out adrenal incidental tumor is increasing recently, whereas the case of adrenal cyst seems to be remained still rare. Saruta et al. summarized 149 adrenal incidentalomas found between 1983 and 1987 in Japan, and reported that among several reasons to discover them, the second popular reason was by ordinary health checking (29.5%). The most frequent reason was by the precise examination for hypertension (40.9%, Table 3).[1] In according to the literature, the incidence of all adrenal incidentalomas was about 0.3–0.8%,[1,11] but exact frequency of adrenal cyst was not so clearly defined yet. In autopsy studies, the incidence ranges from 0.06%[3] to 0.18%.[4] We could find only 5 adrenal abnormal lesions among 79,051 persons, 4 incidentalomas and 1 calcification, in these 8 years of our health check-up system. Because of the existence of many repeaters among 79,051 persons, the true frequency of incidental adrenal abnormality in our institution is difficult to know, but averaged frequency by every one year is supposed to be around about 0.015%. Although our percentage is low, it may be because of the following reason. Generally, when it is used for mass screening, the sensitivity of US becomes rather lower than CT or MRI for the organs that are ordinarily not included as targets of routin health check-up system.

The mean size of our 4 adrenal incidentalomas (3 solid tumors and 1 cyst) was 49±14 mm (mean±S.D.), and it is considered that if the tumor is larger than 30 mm at least, it will never be left unnoticed by US even in our routin health check-up system. Belldegrun reported the incidence of adrenal cysts, which are happened to be found by 12,000 series of abdominal CT, as 0.02%.[5]

As Case 1 is the first case of adrenal cyst for us, it would be not appropriate to discuss the frequency of our own center here. According to the recent review of Tanuma et al., totally 233 cases of adrenal cystic lesions were reported in Japan until 2001.[6] Adrenal cysts occur in all ages, but are more commonly found between 3rd and 6th decades.[1] The cysts are found more often in female than in male by a margin of 3:1,[8] or 2:1.[9] They are usually solitary, and involve only one side but rarely both sides of adrenal gland (right 42.1%, left 57.5% and bilateral 0.4%).[10] In case of the small cyst, most of patients have no symptoms, but if it is large, there can occur some complaints due to the pressure on surrounding organs, as shown in Table 4.[6]

It is not clear that from what size these symptoms may occur, but our case was absolutely symptom free, even she had such a large cystic lesion as approximately 70 mm.

Usually the diagnosis of the cyst is relatively easy by US or CT.

In general, these diagnostic tools can differentiate cystic lesion from solid mass and define its origin. But it sometimes becomes difficult when the mass lesion is large and its content does not show the typical feature of uncomplicated cyst. In such a case, because of the atypical imaging features i.e., thickening or irregularity of the cyst wall, or stippled central or thick peripheral calcification, the possibility that the cystic mass might be the result of adrenal hemorrhage (pseudocyst), or a part of cystic degeneration of an adrenal tumor,[10,11] cannot be excluded. MRI with multi-planer sections would be very helpful for the diagnosis of these complicated cysts, but still there exist some difficult cases which require some invasive examinations.[12]

In our case, the cyst itself seems to be an uncomplicated, but the possibility, that its origin is not the right adrenal gland but the right kidney or other retroperitoneal organs, cannot be excluded completely without any invasive studies.

Foster classified adrenal cysts into four categories and Tanuma et al. recently reported the frequency of each category in Japan (Table 5).[6] Pseudocysts are most common (62.9%), and parasitic cysts, which are mainly caused by the echinococcal infection, are not reported yet in Japan. As our case underwent no invasive examinations, the histological diagnosis remained unknown.

Rozenblit indicates that adrenal cyst, smaller than 50–60 mm with homogenous near-water attenuation and thin wall (3 mm or less) is
Table 6  Treatment strategy of adrenal cystic lesions.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>US or CT Guided Cyst Puncture</th>
<th>Surgical Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>Adrenal Cystic Lesion</td>
<td>Contrast enhancement (+) or Heterogenous or Ill defined or Size &gt; 50 mm</td>
</tr>
<tr>
<td>Contrast enhancement (+) and Homogenous and Sharply defined and Size ≤ 50 mm</td>
<td>Watery element with low intensity in T1 and high in T2 weighted method</td>
<td>Non-watery element without typical intensity as an uncomplicated cyst</td>
</tr>
<tr>
<td>Symptoms (-)</td>
<td>MRI</td>
<td></td>
</tr>
<tr>
<td>Symptoms (+)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Inoue et al.,[12] partially modified.)

likely to be benign, but gives caution if the cystic lesion does not apply completely to those criteria. He reported 13 cases of cystic adrenal disease diagnosed by CT, which consequently included 1 cystic carcinoma and 1 pheochromocytoma.[7] Inoue et al. proposed the treatment strategy of these adrenal cystic diseases,[12] and it seems very practical and useful for the patient like our case (Table 6). Except its large size (70 mm), our case coincided with their criteria for benign cyst, so the decision was made to observe carefully every 3 months.

REFERENCES