Adrenal incidentalomas - analysis of 23 cases discovered by ultrasound

E. Goncalvesová,1 P. Hnilica,1 Z. Motovská,1 *F. Goncalves,1 A. Kovác2

1Department of Medicine, I. Dérer’s Memorial Hospital, 833 05 Bratislava, Slovakia; 2Department of Urology, Dérer’s Hospital, Bratislava, Slovakia

Received September 5, 1996

Frequent use of abdominal ultrasonography (USG) increases discovery of incidental adrenal tumors. Our experience and concise review of recent opinions on management of adrenal incidentalomas is presented. In four out of 23 patients with adrenal incidentalomas false positivity of USG was found (all on the left side), 4 cases were identified as pseudoadrenal masses. Hormonal activity was proved in 4 out of 15 true adrenal masses (2 pheochromocytomas, 2 aldosteronomas). Five out of 11 hormonally inactive tumors were benign adenomas, 2 myelolipomas, 2 simple cysts, 1 metastasis of bronchogenic carcinoma and 1 tuberculotic involvement. The smallest tumor was aldosteronoma (2 cm in diameter), the largest was myelolipoma (more than 10 cm). Size of benign adenomas ranged between 2.5–4.8 cm. Three main ultrasonic patterns of adrenal tumors were recognized: (1) anechogenic cysts, (2) complex but predominantly hyperechogenic myelolipomas, (3) hypoechogenic all other masses.

Key words: Adrenal incidentaloma, management, ultrasound.

Incidentaloma is defined as a surprising, unexpected mass discovered by chance at the examination performed for any reason. There are at least two possibilities why tumor appears as an incidentaloma. The first is a “mute” tumor. That means that the mass has no clinical manifestation. The second is a “blind” physician who does not consider adrenal tumor as a cause of symptoms.

Previously, these masses were relatively frequent incidental discoveries at autopsy. Prevalence of the adrenal masses in autopsy studies varies between 1–15% depending on selection of patients and criteria of tumor size [9].

Widespread use of high resolution imaging techniques (ultrasonography, computerised tomography, nuclear magnetic resonance) in the last decades have led to significant increase in number of incidentalomas. Frequency of adrenal masses identified by CT in patients unsuspected for adrenal pathology ranges between 1–10% [4, 9]. The optimal approach for management of incidentalomas is a great challenge of contemporary medicine and attracts the interest of many authors [1, 6, 11, 17].

This article describes our experience on 23 patients with consecutive adrenal incidentalomas discovered by ultrasound. Concise review of recent opinions on management of adrenal incidentalomas is presented.

Patients and methods

23 consecutive inpatients, 10 males and 13 females, aged 32–80 years, with adrenal masses incidentally discovered by ultrasound, were studied retrospectively. Ultrasonography (USG) was performed by the same examiner within the period of 28 months (May 1993 – August 1995). Toshi-ba Sonolayer SSA 270 A with 3.75 MHz anular probe was used. All USG findings were verified by computerised to-mography (CT) and in 16 cases with confirmed adrenal tumor endocrinological evaluation was performed (one of them was later shown to be pseudoadrenal at surgery). It always included clinical examination, measurement of urine catecholamines (epinefrin, norepinefrin, dopamin) and oral overnight (short) dexamethason suppression test. In hypertensive patients upright plasma renin activity and serum aldosteron concentration were evaluated. The adrenalec-tomy was performed in 8 patients. Two patients died and were autopsied. In the rest of the cases diagnostic conclusions were based on imaging studies, endocrinological evaluation and at least one year follow-up if the lesion had not changed.
In fifteen out of 23 patients, suspicious adrenal masses were confirmed by CT. False positivity of USG was found in 4 patients (9.2%). False positive USG findings were seen in the left adrenal only. Remaining 4 cases (9.2%) were identified as pseudoadrenal masses - tumor and pseudocyst of pancreatic cauda, and accessory spleen. In one patient diagnosis of sympathetic ganglioneuroma was confirmed surgically.

Two out of 15 true adrenal masses were simple cysts. Remaining 13 tumors were solid. Hormonal activity was proved in 4 of 9 hormonally inactive cases were benign adenomas, 1 metastasis of bronchogenic carcinoma, 2 myelolipomas and one tubercular involvement with calcification. The smallest tumor detected by ultrasound was aldosteronoma, measured 2 cm in diameter. The size of benign cortical adenomas varied between 2.5 and 4.8 cm. No adrenocortical carcinoma has been discovered. Two myelolipomas with diameter 7.8 and 10.3 cm were the largest tumors seen in our series. Three main ultrasonic patterns of tumors were recognized. Typical anechogenic of two cysts. Complex, but predominantly hypeerechogenic of myelolipomas. All remaining tumors, i.e. adenomas and metastasis, were homogenous and hypeerechogenic, spheric or oval and well margined.

Discussion

Frequent use of abdominal ultrasonography increases the chance to discover incidental tumors. In our study 4 out of 23 ultrasonically detected adrenal masses were later found to be false positive and 4 were so-called pseudoadrenal masses. Relatively high frequency of false positive findings on the left side can be explained by problems of proper imaging of the left suprarenal region in some cases. Contrary to the right side, where the liver gives advantageous acoustic window, the imaging of the left suprarenal region is more difficult. Local accumulation of fibrotic tissue and vessels in splenic hilus absorbs ultrasonic waves resulting in uncertain irregular shadow in the left suprarenal region. This picture could be interpreted as a hypeerechogenic tumor, particularly if the examination is performed by a less experienced examiner. Frequency of pseudoadrenal masses ranges between 0–10%. Tumors of pancreas, kidney and liver, neurinomas, accessory spleen and lymph nodes simulate the adrenal masses commonly [9, 19]. Other possibilities, e.g. rudimentary second stomach or bronchogenic cysts, are also reported [2, 18].

We were able to prove hormone hypersecretion in 4 cases of incidentalomas (2 aldosteronomas and 2 pheochromocytomas). No glucocorticoid hypersecretion was detected. Literature data on the frequency of pheochromocytomas vary between 0–11% and tumors with mineralocorticoid or glucocorticoid hypersecretion 0–7% and 0–12%, respectively [9, 13]. Precise endocrinological evaluation of all adrenal incidentalomas in nonmalignant patients is needed. The aim of this evaluation was first of all to identify eventual pheochromocytoma because there are few reports on mortality (up to 80%) in patients with unsuspected pheochromocytoma who underwent surgery [9].

Proof of glucocorticoid hyperproduction is important because of prevention of the postoperative Addison crisis by corticoid substitution. Therefore the oral overnight dexamethasone suppression test is performed in all patients. Patients who failed to suppress serum cortisol below 140 nmol/l, needed more extensive studies (prolonged dexamethasone suppression test, CRH stimulation test and/or examination of the diurnal rhythm of cortisol secretion). In our group, no overt or subclinical cortisol hypersecretion (according to the results of short dexamethasone suppression test) was proved.
However, many authors have already reported high prevalence of subtle cortisol overproduction (up to 50%) in patients with incidentally discovered adrenal masses [5, 14, 15]. Recommended biochemical screening test for adrenal incidentalomas are presented in Table 1.

After decision on hormonal activity of the tumor another problem has to be solved: benign or malignant lesion? Different approach is applied in patients with and without known extraadrenal malignancy. In patients with malignancy, adrenal masses are usually found at primary tumor staging. In case of advanced metastatic disease further studies are not substantial. On the other hand, to distinguish metastatic involvement from other causes of adrenal mass, it is crucial for the decision in patients with no other evidence of metastatic disease. For those patients management of the incidental adrenal mass is similar to other ones.

Differential diagnosis of carcinoma and benign conditions is stressed. Incidental primary adrenocortical carcinoma is relatively rare (0–10%) and benign adenoma is discovered in 38–90% [9]. Many studies proved that probability of carcinoma increased with the tumor size. Cortical carcinomas smaller than 3 cm account for 3.8% and smaller than 6 cm 6.6% of a total of 101 cases of cortical carcinoma, cortical adenoma, ganglioneuroma and hemangioma [20]. In other study [6] malignancy was discovered in five out of 55 patients and the smallest malignant tumor measured 5 cm in diameter. Aso et al. [1] reported 210 cases of incidentalomas, where 6.7% of malignant tumors were found. All were larger than 6.5 cm in diameter and occurred in patients younger than 59 years. In several series, our including, no cortical carcinoma was detected [7, 17]. Twenty six out of 630 incidentalomas in the literature, were found to be adrenocortical carcinomas and 85% of them were larger than 6 cm in diameter [9]. Based on these data, the majority of the authors recommended surgical exploration of adrenal masses larger than 3–5 cm [6, 11, 17].
accumulation of a radiotracer (commonly $^{131}$I-6iodo-methyl 19 norcholesterol) in functioning cortical tissue. Concordant uptake pattern (increased accumulation of radiocho-


---

**Book review**

World Health Statistics

Annual 1995

1996, pp.852

This annual publication presents detailed country-specific statistical data on mortality rates, causes of death, and other indicators of health trends at national and global levels. Health statistics, which are submitted to WHO by national health and statistical offices, are compiled each year in order to help policy makers interpret changes over time and compare key indicators of health status in different countries. Reflecting the introduction of a more rigorous procedure for data collection, the 1995 volume already contains official statistics from an expanded number of countries. The volume also continues a new format resulting in more concentrated coverage of mortality and causes of death.

Statistics are presented in two parts. Part A, which contains two tables, summarizes worldwide health and demographic data. The first table shows assessed 1995 population size and composition by major age group, and gives estimates of the population growth rate, crude birth rate, and crude death rate, in 1995, for all countries having a population of at least 150,000, according to United Nations estimates. Country-specific data are followed by summary values for major geographic areas and WHO regions. The second table presents statistics on poverty, housing conditions, food availability, and child mortality as health-related background information for the United Nations’ 1996 themes: Year for the Eradication of Poverty, the World Food Summit, and the Human Settlements Conference.

The second and most extensive part contains over 800 pages of vital statistics and life tables based on data submitted by more than 60 of the 190 member states of WHO, and validated by WHO. Country statistics are presented in three tables. The first gives the number of deaths by underlying cause, according to age and sex. The second table shows the number and age distribution of infant deaths, and the infant mortality rate per 100,000 live births. The final table indicates life expectancy at birth and at selected ages for each country, together with the number of survivors out of a synthetic cohort of 100,000 persons for the latest available year. The probability of dying from selected causes, by age group is also indicated.

New in this edition are recent historical series for all newly independent states of the former USSR, including a review of life expectancy and causes of death from 1981 through 1994, differences between the sexes, and comparison with other regions of the world. Countries represented for the first time include Azerbaijan, Georgia, the Republic of Moldava, South Africa, Turkmenistan, and Zimbabwe.