Western European Journal of Medicine and Medical Science
Volume 3, Issue 12 December 2025
https://westerneuropeanstudies.com/index.php/3
ISSN (E): 2942-1918 Open Access| Peer Reviewed

CLINICAL AND HORMONAL CHARACTERISTICS OF ADRENAL INCIDENTALOMAS

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Summary: We examined 14 patients (including 5 women and 9 men). The average age of the patients was 30.6±9.3 years. All patients had nodular adrenal hyperplasia detected on MRI. Twelve patients (85.7%) sought medical attention for arterial hypertension (AH), while two patients (14.3%) had no complaints. The patients were diagnosed with stage I obesity, with the average BMI in men Introdactionbeing 32.7±4.54 kg/m2, and in women - 31.1±3.78 kg/m2, with an abdominal distribution of subcutaneous fat. Arterial hypertension is the main symptom of adrenal masses. Arterial hypertension in men with incidentalomas is more malignant compared to women, which is confirmed by the detection of stage III hypertension in 22% of the examined men.

Introduction: Tumorous lesions of the adrenal glands were long considered relatively rare diseases. The widespread introduction of high-technology diagnostic methods into clinical practice (ultrasound, computed tomography, magnetic resonance imaging) and their further improvement (the appearance of high-resolution ultrasound probes, color Doppler mapping, spiral and multispiral CT, etc.) have significantly increased the detection rate of diseases that were previously diagnosed at late stages or detected incidentally at autopsy [2,4]. The advent and rapid development of radiation-based diagnostic methods have led to a sharp increase in the detection of tumors and cysts of various organs, including clinically “silent” adrenal tumors—the so-called incidentalomas [4,5].

The need to revise a number of basic principles in the diagnosis and treatment of adrenal masses is due to on the one hand, to the ongoing development and implementation of highly informative, noninvasive imaging methods that have significantly improved the early diagnosis of adrenal diseases. The diagnostic capabilities of ultrasound have expanded due to the introduction of color Doppler mapping [3,4,7]. At the same time, the use of ultrasound as the main imaging method is gradually being replaced by more informative, though largely comparable in capability, CT and MRI techniques [1,8]. The use of retroperitoneal pneumography as a method of topical diagnosis of adrenal lesions has been completely abandoned. Indications for angiography as a visualization method have been significantly reduced, while indications for venography with selective blood sampling have expanded, especially for the detection of small hormonally active adrenal tumors [7].

Existing diagnostic algorithms for patients with adrenal masses remain rather cumbersome and economically unjustified [2]. In most algorithms, ultrasound continues to be used as the primary imaging method. Provocative low-informative tests remain part of the diagnostic workup. Often, several instrumental studies with similar diagnostic value (for example, CT and MRI) are used within a single algorithm. Invasive studies (angiography, needle biopsy) are widely represented in diagnostic protocols. Meanwhile, the development and recent introduction of multispiral computed tomography with indirect angiography and three-dimensional image reconstruction again necessitate a revision of several diagnostic

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approaches in the evaluation of patients with adrenal diseases.

The literature widely describes the clinical and laboratory features of hormonally active tumors depending on the nature of their hormonal activity [6]. However, the problem of hormonal activity in adrenal incidentalomas remains incompletely resolved.

This study aimed to investigate the clinical and laboratory characteristics of adrenal incidentalomas.

Materials and methods

Fourteen patients were examined, including 5 women and 9 men. The mean age of the patients was 30.6±9.3 years.

Table 1

Distribution of examined patients by sex and age

Sex	Age		
	21-25 years	26-30 years	31-36 years
Men	2 (14,3%)	2 (35,7%)	5 (14,3%)
Women	-	3 (21,4%)	2 (14,3%)
Total:	2	8	4

All patients underwent MRI examination at the 3rd Clinic of the Tashkent Medical Academy using a multislice spiral computed tomography scanner (Siemens SOMATOM Sensation 64). Three-dimensional reconstruction of the obtained images was performed with a slice thickness of 2.4 mm. Height, body weight, body mass index (BMI), abdominal index (AI), blood pressure (BP), and heart rate (HR) were measured in minutes. Blood levels of cortisol, ACTH, aldosterone, angiotensin I, as well as urinary excretion of adrenaline, noradrenaline, and dopamine over 24 hours were determined.

Statistical analysis was performed using standard statistical software packages (Excel), including descriptive variation statistics. Differences were considered statistically significant at $P<0.05$. Results are presented as M±m.

MRI revealed nodular adrenal hyperplasia in all patients. Twelve patients (85.7%) presented with arterial hypertension, while 2 patients (14.3%) had no complaints. All patients were overweight or obese to varying degrees (Table 2).

Table 2

Anthropometric characteristics of patients

Parameters	Control n-5	Men n-9	Women n-6
Age	31,9±12,34	26,6±9,84	30,8±11,62
Body weight (kg)	65,1±5,43	96,7±3,71	78,6±5,98
BMI	25,7±8,39	32,7±4,54	31,1±3,78
Waist circumference, (cm)	84,2±9,2	106,2±11,7	108,3±9,9
Waist/hip ratio	0,80±0,3	0,98±0,2	0,87±0,1

As shown in the table, the mean BMI in men was 32.7±4.54 kg/m² and in women 31.1±3.78 kg/m², corresponding to grade I obesity. The abdominal index was 0.98±0.2 in men and 0.87±0.1 in women, indicating an abdominal type of obesity.

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Hemodynamic parameters are presented in Table 3.

Table 3

Hemodynamic parameters

Parameters		Control n-7	patients	
			Men n-9	Women n-5
SAD (mm. hg.)	AH-I	111.3±14.34	148±21,1* (n-2)	143±19,1* (n-1)
	AH-II		167±32,5* (n-5)	162±13,9* (n-4)
	AH-III		184±28,9* (n-2)	-
DAD (mm.hg.)	AH-I	76.8±10.4	98±12,1*(n-2)	98±1,1*(n-1)
	AH-II		102±19,2* (n-5)	102±1,2*(n-4)
	AH-III		103±17,6*(n-2)	-
Heart rate per minute		72.5±8.56	79.0±13.12	78.6±7.89

The mean blood pressure was 162/101±12.5 mmHg. In men, it averaged 166/101±18.1 mmHg, and in women 158/101±13.9 mmHg. The mean heart rate was 78.8±6.61 beats per minute. Grade I hypertension was diagnosed in 2 men (22.5%) and 1 woman (25%), grade II hypertension in 5 men (75%) and 4 women (75%), and grade III hypertension in 2 men (22.5%). Heart rate did not exceed 90 beats per minute in any patient.

All patients underwent hormonal evaluation. Hormonal study results are shown in Table 4.

Table 4

Hormonal parameters

Parameters	Control n-7	Men n-9	Women n-5
Blood cortisol, nmol/l	360,5±23,9	559,3±31,7	481,2±19,9
Blood ACTH, ng/ml	34,8±7,0	29,4±4,9	31,3±5,1
Blood aldosterone, pg/ml	89,0±11,2	162,1±25,6	159,9±22,2
Blood angiotensin I, ng/ml/hour	0,9±0,05	1,1±0,02	1,95±0,07*
Adrenaline per day urine	4,9±0,05	5,5±0,07	5,3±0,08
Norepinephrine per day urine	16,7±0,9	19,1±0,2	17,2±0,3
Dopamine per day in urine	321,8±23,05	323,5±22,02	320,8±20,0

In men, angiotensin I levels were 1.1±0.02 ng/ml/hour, which was 22% higher than in the control group. In women, this value was 1.95±0.07 ng/ml/hour, which was significantly higher than control values by 116%. These changes indicate the presence of secondary hyperaldosteronism. Although adrenal cortical hormone levels were somewhat increased compared with controls, they did not exceed normal ranges, indicating hormonally inactive

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adrenal tumors. The tendency toward elevated catecholamine levels may be associated with the body's response to venipuncture. Pheochromocytoma was excluded in these patients, as according to the literature [5,6], this diagnosis is confirmed when urinary catecholamine levels increase 20-fold or more.
MRI analysis showed unilateral adrenal hyperplasia in all patients; in 83% of cases, changes were localized in the left adrenal gland. In 9 patients, tumor size exceeded 2 cm, and in 5 patients it reached up to 3 cm.

Conclusions:
1. Adrenal incidentalomas are most frequently detected in patients aged 31–36 years (57.1%), with male predominance (64.2%).
2. Patients were diagnosed with grade I obesity: mean BMI was 32.7±4.54 kg/m² in men and 31.1±3.78 kg/m² in women, with abdominal fat distribution.
3. Arterial hypertension is the main clinical manifestation of adrenal masses. In men with incidentalomas, arterial hypertension has a more severe course compared with women, as evidenced by grade III hypertension detected in 22% of examined men.

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