

# Are adrenal incidentalomas components of metabolic syndrome?



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## INTRODUCTION

- Easy access to imaging has led to an increase in the number of patients with coincidentally discovered adrenal tumours, also called as adrenal incidentalomas (AI).
- Nowadays AI is diagnosed in 0,4% and 2-4% patients by USG and CT respectively.
- Metabolic syndrome (MS) is a group of interrelated factors with increased risk of atherosclerosis, obesity and DM2.
- Insulin resistance (IR) has a confirmed correlation with development of neoplasms.
- Concomitance of MS and IR in patients with AI was initially associated with adrenal adenomas that were hormonally active, but later more attention was paid to a high cardiovascular risk in this group of patients.

## AIMS OF THE STUDY

An assessment of the frequency of the components of metabolic syndrome according to the criteria of the International Diabetes Federation (IDF) in patients with adrenal incidentaloma without hormonal activity.

## MATERIALS AND METHODS

The study comprised of patients with AI without hormonal activity, confirmed in CT. The adrenal function was determined: circadian rhythm of cortisol and/or dexametasone suppression test, aldosterone, plasma renin activity (PRA), DHEAS, androstenedione, metanephrines in urine.

In some cases, ACTH and 17 hydroxy progesterone was determined. In patients with AI without hormonal activity physical examination was conducted with BMI included, the waist circumference and blood pressure. The biochemical assays included: OGTT according to WHO, fasting insulin and

lipids (total cholesterol, HDL, LDL, triglycerides). HOMA IR was calculated. IR was estimated by HOMA-IR  $\lambda$  2. MS was diagnosed according to the IDF criteria established in 2009.

## RESULTS

### Characteristics of patients with AI with normal hormonal activity

PARAMETERS	WOMEN 72(57,6%)	MEN 53(42,4%)	TOTAL 125(100%)	P
AGE(years)	61,04 ± 8,5	61,7 ± 9,1	61,3 ± 8,8	ns
SMOKING	29(23,2%)	30(24%)	59(47,2%)	ns
WAIST CIRCUMFERENCE (cm)	92,3 ± 13,7	97,9 ± 10,7	95,1 ± 12,7	ns
BMI (kg/m <sup>2</sup> )	27,4 ± 5,5	27,1 ± 4,3	27,3 ± 5,2	ns
BLOOD PRESSURE (mmHg) systolic	131,6 ± 14,5	130,7 ± 16,7	131,15 ± 15,6	ns
diastolic	80,8 ± 9,4	80,0 ± 9,4	80,4 ± 9,4	ns
DIAMETER OF AI (mm)	23,15 ± 9,34	32,6 ± 19,31	27,6 ± 15,1	p<0,005

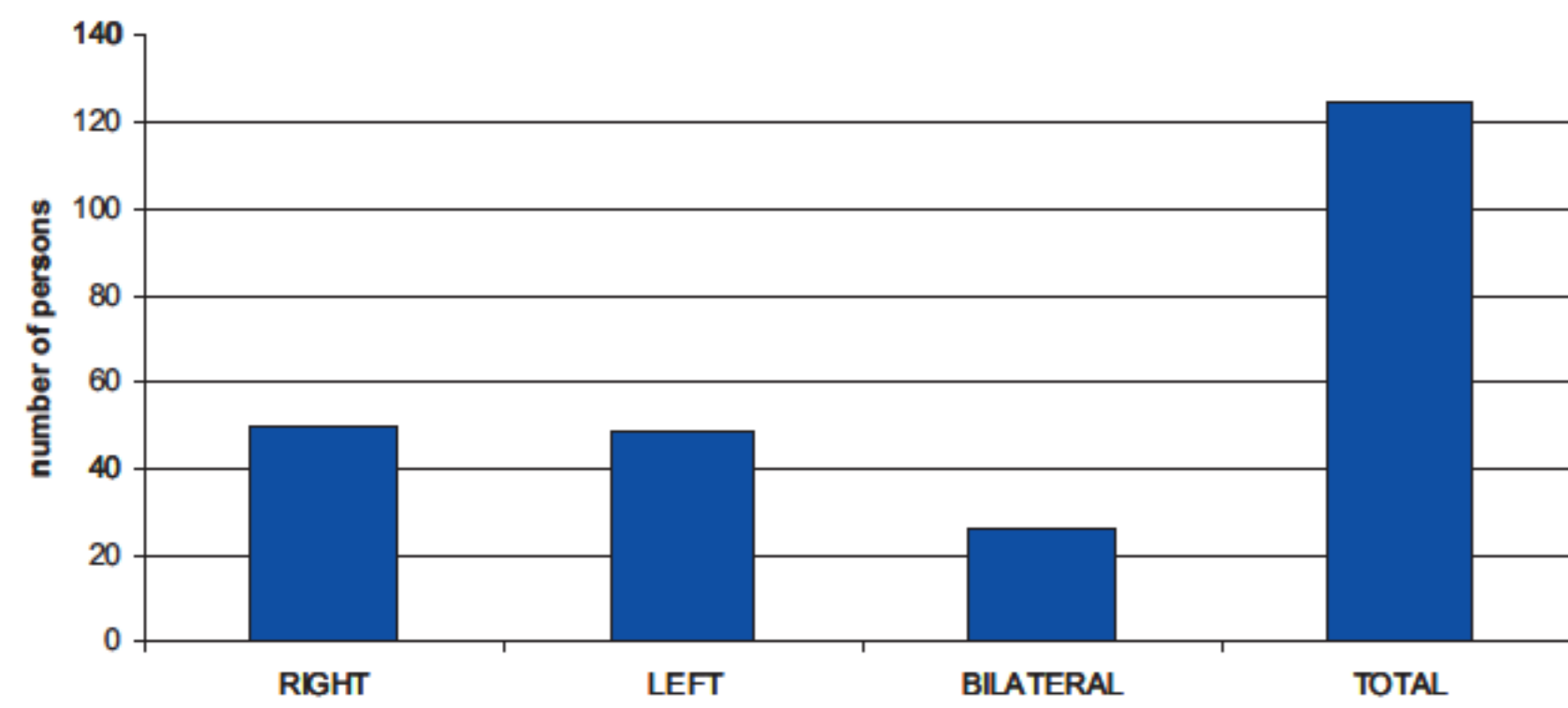
### Laboratory results of patients with AI with normal hormonal activity

PARAMETERS	WOMEN 72(57,6%)	MEN 53(42,4%)	TOTAL 125(100%)	P
GLUCOSE CONCENTRATION FASTING	92,8 ± 15,01	102,8 ± 15,65	97,8 ± 5,5	ns
2hrs OGTT(mg/dl)	119,1 ± 42,9	125,5 ± 41,5	122,3 ± 42,8	ns
FASTING INSULINE (uU/ml)	8,71 ± 4,70	9,16 ± 5,65	8,9 ± 5,5	ns
HOMA-IR mmol/L * (uU/ml)	2,06 ± 1,38	2,53 ± 2,54	2,3 ± 2,0	ns
T. cholesterol (mg/dl)	227,96 ± 51,89	204,98 ± 43,89	218 ± 49,7	p=0,01
HDL-cholesterol (mg/dl)	66,46 ± 21,79	49,98 ± 15,92	59 ± 21,1	p<0,005
LDL-cholesterol (mg/dl)	136,14 ± 46,61	132,02 ± 40,73	116 ± 60	ns
Triglycerides (mg/dl)	112,06 ± 43,98	122,72 ± 78,73	134 ± 44,1	ns

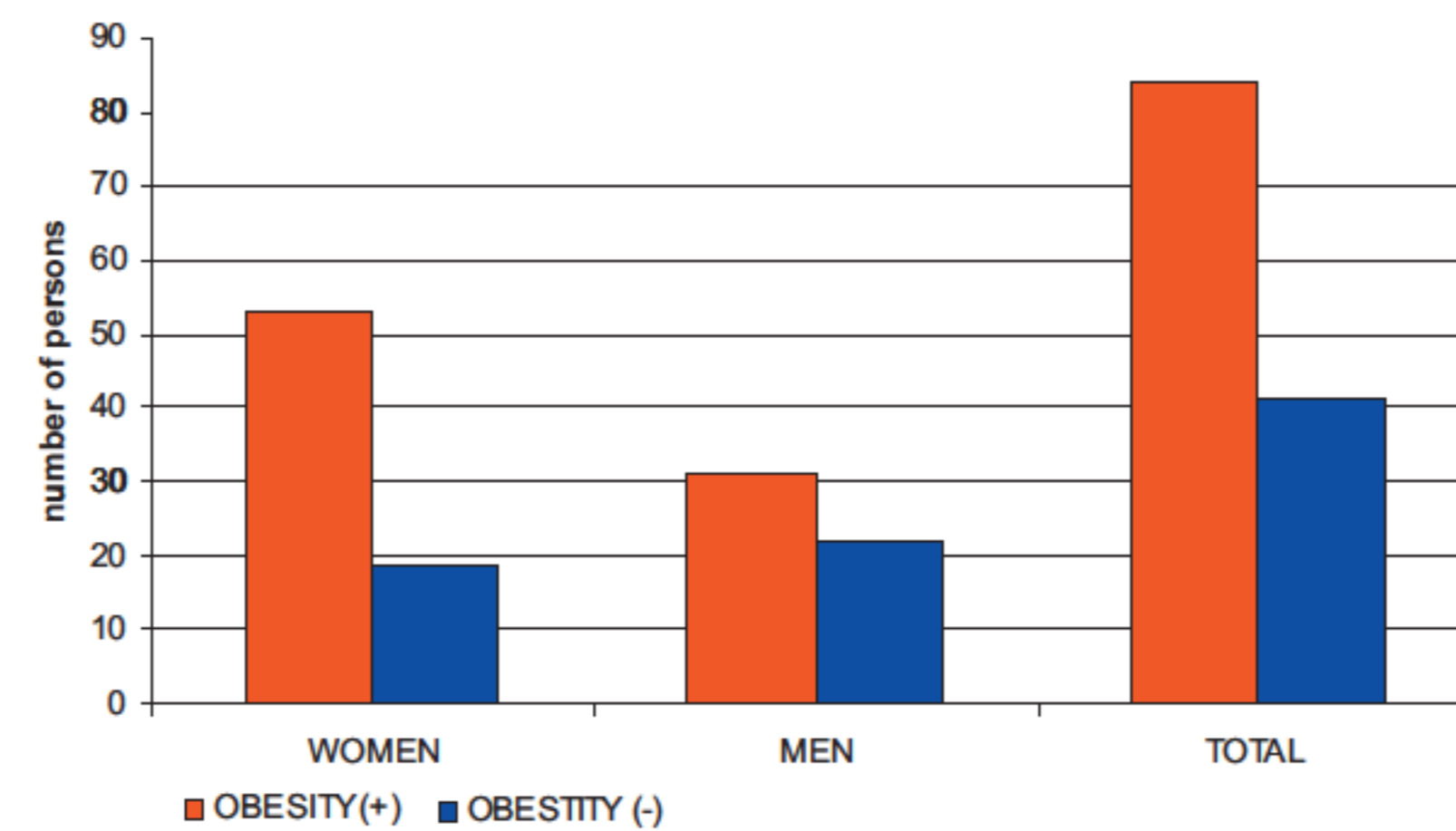
### HOMA IR and fasting insuline concentration in patients with AI with normal hormonal activity

PARAMETERS	OBESITY(+) 84(67,2%)	OBESITY(-) 41(32,8%)	P
FASTING INSULINE LEVEL (uU/ml)	9,74 ± 5,21	6,99 ± 4,08	p=0,003
HOMA-IR mmol/L * (uU/ml)	2,58 ± 2,22	1,53 ± 0,81	p=0,002

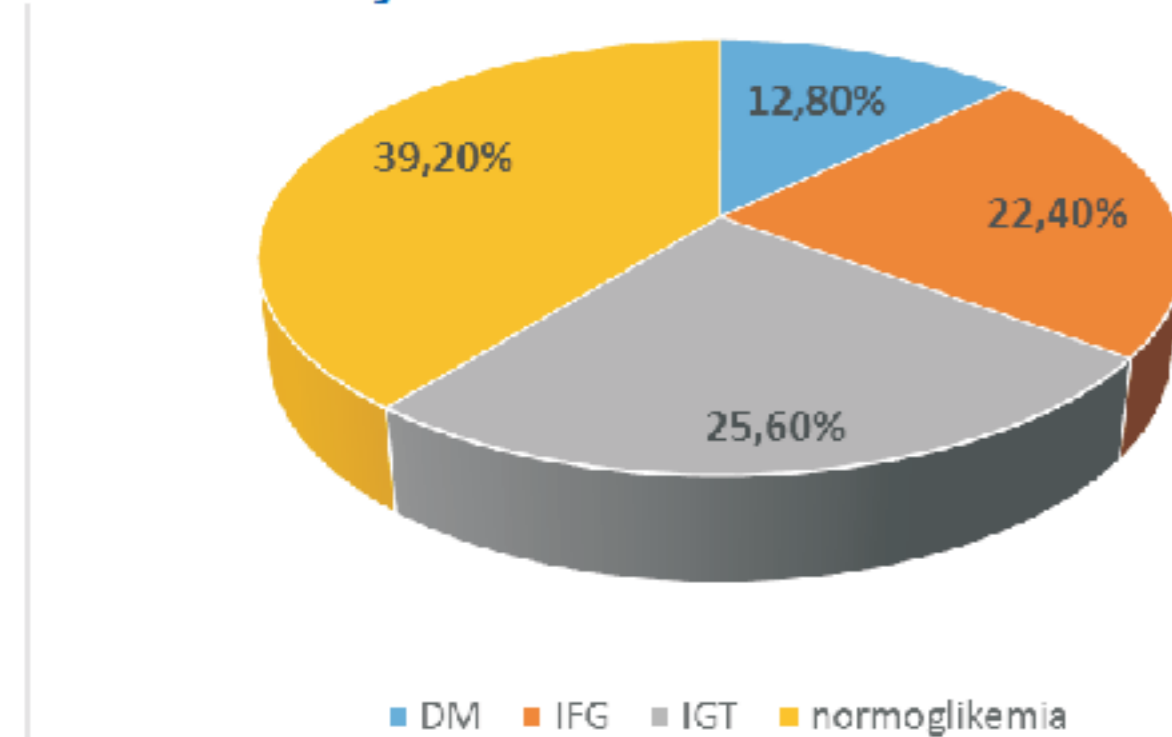
### AI location in patients with normal hormonal activity



### Obesity in patients with AI with normal hormonal activity



### Glucose metabolism disturbances in patients with AI with normal hormonal activity



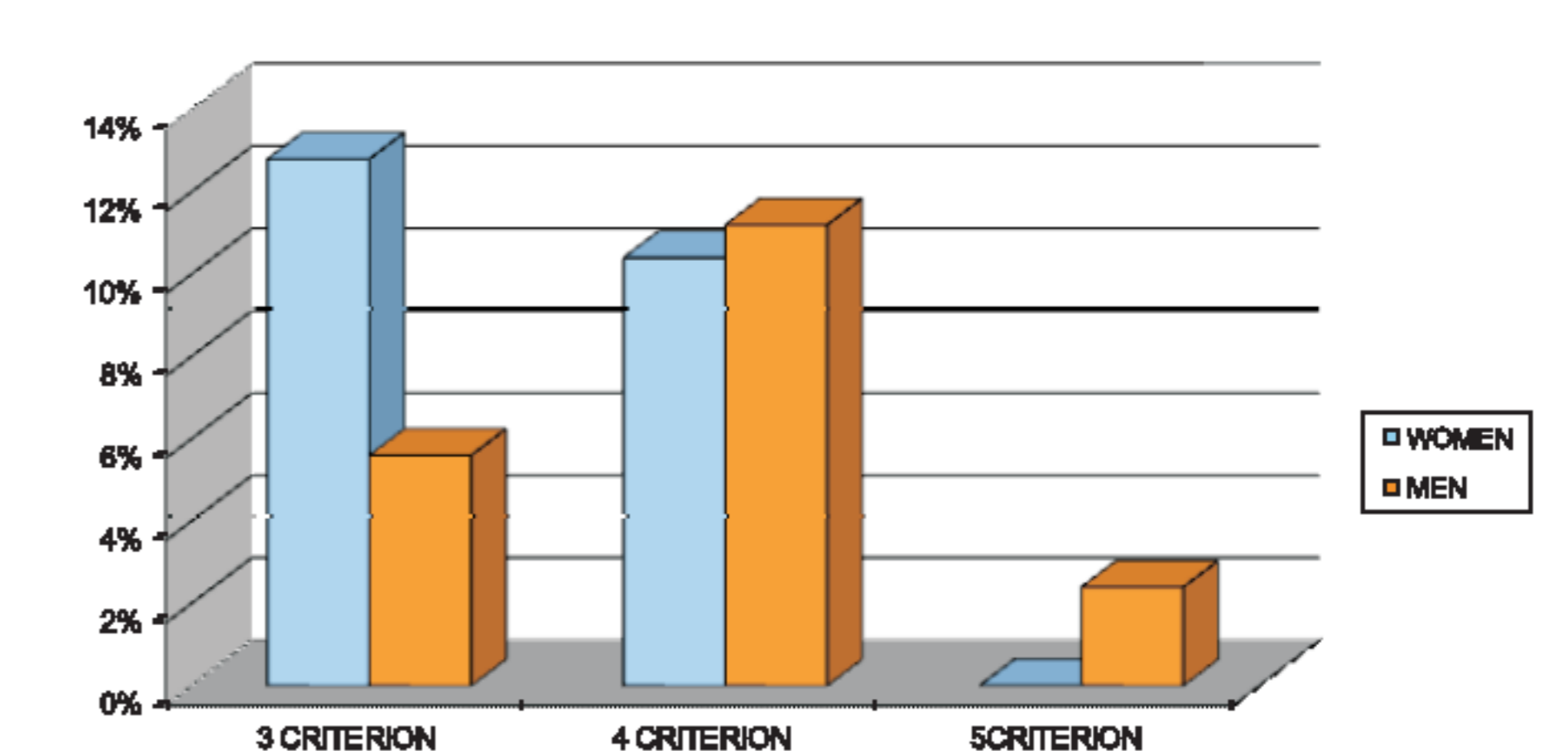
### HOMA IR in patients with AI with normal hormonal activity

SEX	HOMA IR ≤ 2	IR>2 HOMA	TOTAL
WOMEN	46(36,8%)	26(20,8%)	72(57,6%)
MEN	30(24%)	23(18,4%)	53(42,4%)
TOTAL	76(60,8%)	49(39,2%)	125(100%)

### MS diagnosis in patients with AI with normal hormonal activity

Metabolic syndrome components	MS PRESENT(n%) 53(42,4%)	MS ABSENT(n%) 72(57,6%)
Obesity ( elevated waist circumference)	84 (67,2%)	41(32,8%)
Elevated triglycerides or drug treatment for elevated triglycerides	54(43,2%)	71(56,8%)
Reduced HDL-C or drug treatment for reduced HDL-C	27(21,6%)	98(78,4%)
Arterial hypertension or antihypertensive drug treatment	99 (79,2%)	26(20,8%)
Impaired fasting glucose or previously diagnosed type 2 diabetes	76 (60,8%) 28 (22,4%) 16(12,8%)	49(39,2%)

### MS diagnosis in patients with AI with normal hormonal activity



## CONCLUSIONS

- Metabolic syndrome was more often diagnosed in patients with adrenal incidentaloma without hormonal activity as compared to the general population.
- Insulin resistance did not correlate with the size of the adrenal incidentaloma
- Age and sex were the factors affecting the frequency of the metabolic syndrome.
- Patients with adrenal incidentaloma without hormonal activity are the risk group of prediabetes and diabetes.

