

Predictors associated with incident hypertension in healthy women after menopause with normal glucose metabolism and renal function

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Introduction. The purpose of this study was to elucidate the frequency of arterial hypertension and to discover potential risk parameters in healthy, recently postmenopausal Greek women with normal glucose metabolism and renal function.

Patients and Methods. In this retrospective cohort study, 141 recently postmenopausal women were examined at baseline and on a yearly basis (follow-up time: 1 to 8 years).

Blood samples were collected at baseline and ultrasound examinations were also performed and evaluated. For every patient, a detailed medical history was recorded, as well as anthropometric parameters, blood pressure and cardiovascular risk factors.

The first occurrence of systolic or diastolic hypertension measured at 2 different visits within 2 months, or a recent beginning of antihypertensive medication, were defined as incident hypertension.

Results

Predictors	Incident Hypertension		p-value*
	Yes	no	
Age (years)	54.9±4.8	54.3±5.5	0.570
YSM (years)	6.2±3.3	5.9±3.9	0.661
Smoking	26.7%	34.2%	0.514
Education			
✓ Primary	23.3%	14.4%	
✓ Secondary	50.0%	42.3%	0.212
✓ University	26.7%	43.3%	
Having children	100.0%	84.7%	0.013
Waist (cm)	87.0±10.0	82.3±10.1	0.026
WHR	0.83±0.06	0.82±0.06	0.268
BMI (kg/m ²)	26.5±3.7	24.6±3.3	0.007
Cholesterol (mg/dL)	238.3±39.2	220.0±38.9	0.024
Triglycerides (mg/dL)	116.7±59.5	83.1±33.3	<0.001
HDL-cholesterol (mg/dL)	60.5±19.4	61.9±14.01	0.631
LDL-cholesterol (mg/dL)	140.7±36.0	134.9±38.0	0.456
Apolipoprotein A (mg/dL)	163.1±33.2	164.1±29.7	0.870
Apolipoprotein B (mg/dL)	101.7±24.8	91.6±25.5	0.058
FBG (mg/dL)	93.3±11.7	91.8±8.8	0.439
Insulin (μU/mL)	8.5±4.7	6.4±3.6	0.010
HOMA-IR	1.98±1.07	1.48±0.92	0.014
Homocysteine (μmol/L)	10.6±2.2	11.1±2.9	0.432
HbA1c (%)	5.29±0.52	5.23±0.69	0.663
GFR	90.4±11.8	89.7±11.7	0.783

*Comparisons were performed using ANOVA or Fisher's exact test
Statistical significance was set at the level of p-value<0.05
YSM=years since menopause; WHR=waist-to-hip ratio; BMI=body mass index; HDL-cholesterol=high density lipoprotein cholesterol; LDL=low density lipoprotein cholesterol; FBG=fasting blood glucose; HOMA-IR=homeostasis model assessment of insulin resistance; HbA1c=glycated hemoglobin; GFR=Glomerular filtration rate; NGAL=neutrophil gelatinase-associated lipocalcin;

- ◆ 30 out of 141 women (21.3%) were diagnosed with incident hypertension.
- ◆ Median time to incident hypertension was 3.5 years after menopause.
- ◆ Risk factors such as obesity, elevated cholesterol and triglyceride levels, insulin resistance and parity were associated with incident hypertension.

	Exp(B)	p-value
MODEL 1		
Age (years)	0.914	0.089
BMI (kg/m ²)	1.161	0.141
Waist (cm)	0.953	0.160
Cholesterol (mg/dL)	1.010	0.148
Triglycerides (mg/dL)	0.993	0.231
HOMA-IR	1.988	0.043
MODEL 2		
Age (years)	0.183	0.669
Obesity ¹	3.746	0.019
Waist (cm)	0.651	0.420
Cholesterol (mg/dL)	0.071	0.791
Triglycerides (mg/dL)	0.108	0.742
HOMA-IR	1.823	0.177

BMI=body mass index; HOMA-IR=homeostasis model assessment of insulin resistance
¹Obesity was defined as BMI ≥30kg/m²
Bold indicates statistical significance, defined as p-value<0.050

◆ Multivariate analysis, though, indicated that obesity and insulin resistance were the only statistically significant variables linked to more than 3fold and 2fold respectively increased risk of incident hypertension (obesity: OR=3.746, p=0.019, HOMA-IR: OR=1.988, p=0.043).

Conclusions.

- ◆ A notable proportion of early postmenopausal women present incident hypertension.
- ◆ Obesity and insulin resistance are the major contributory factors to this phenomenon.