

**In younger people waist circumference below IDF abdominal obesity threshold is associated with other components of metabolic syndrome.**

**Study of families of patients with premature coronary heart disease.**

*M.V.Konnov\*, L.M.Dobordzhginidze, A.D.Deev, N.A.Gratsiansky\*\**

Center for Atherosclerosis,  
Institute Of Physico-chemical Medicine,  
Moscow, Russian Federation

# Background

Large waist circumference ( $\geq 94$  cm in men,  $\geq 80$  cm in women) is often associated with metabolic cardiovascular risk factors and has been designated by the International Diabetes Federation (IDF) an essential component of metabolic syndrome.

Whether smaller but nevertheless enlarged waist circumference (WC) is also associated with unfavorable profile of other risk factors has not yet been well documented.

# Purpose

to elucidate whether intermediate waist circumference (IWC) 72-79 cm in women, and 84-93 cm in men – the range just below IDF abdominal obesity threshold - is associated with worse risk factor profile than smaller WC.

# Material

In the framework of the study of risk factors in families of patients with premature coronary heart disease we examined 251 persons (74 spouses and 177 children of patients with premature CHD) aged  $\geq 16$  years without overt vascular disease with WC  $\leq 79$  cm (women),  $\leq 93$  cm (men), and body mass index (BMI)  $\geq 18.5$  kg/m<sup>2</sup>.

**101 subjects (40.2%) had IWC.**

- The subjects were divided in 2 age groups:
  - (1) 16-26 years (n=128, 25% with IWC)
  - (2) 27-62 years (n=123, 56.1% with IWC).

# Parameters registered

- tobacco smoking;
- diabetes mellitus (WHO criteria);
- body mass index (BMI);
- systolic and diastolic blood pressure (BP);
- total cholesterol;
- high density lipoprotein cholesterol (HDL-cholesterol);
- triglycerides;
- basal blood glucose;
- Framingham risk score\* (for persons aged  $\geq 30$  years,  $n=99$ ).

\*Sex-specific variables for CVD-risk prediction algorithm  
in persons aged  $\geq 30$  years (the Framingham Heart Study, 2008)

*Age; total cholesterol; tobacco smoking; HDL-cholesterol;  
systolic BP; systolic BP treated or not treated;  
tobacco smoking; diabetes mellitus.*

# Definitions of components of unfavorable risk factor profile

- **high BP** defined as prehypertension or hypertension:
  - in persons aged 16-17 years mean levels of systolic/diastolic BP  $\geq 90$  percentile (adjusted for age, sex and 3 height categories [ $\leq 25$ ,  $> 25$  and  $< 75$ ,  $\geq 75$  percentiles] or  $\geq 120/80$  mm Hg)\*;
  - in persons aged  $\geq 18$  years mean levels of BP  $\geq 120/80$  mm Hg or constant use of antihypertensive drugs<sup>†</sup>;
- **high triglycerides** -  $\geq 1.7$  mmol/l [150 mg/dl]<sup>°</sup>;
- **low HDL-cholesterol** -  $< 1.03$  mmol/l [40 mg/dl], men;  $< 1.29$  mmol/l [50 mg/dl], women;<sup>°</sup>
- **high basal blood glucose** -  $\geq 5.6$  mmol/l [100 mg/dl]<sup>°</sup>.

\* 4-th Report of Working Group on High BP in children and adolescents.

† 7-th Report of Joint National Committee, USA. <sup>°</sup>[http://www.idf.org/metabolic\\_syndrome](http://www.idf.org/metabolic_syndrome)

## Statistical methods

- Before analysis for reduction of variability of continuous coronary risk factors and to suppress possible outliers the symmetric censoring of 1% of their values was carried out.
- Predictors were selected by logistical 'univariate' regression analysis and Spearman's rank order correlation coefficient with adjustment for age and sex.

## Results of univariate analysis and Spearman's correlations

Risk factors	OR	95% CI	P	R <sub>spearman</sub>	P <sub>spearman</sub>
	<b>16-26 years (IWC, n=32/128)</b>				
High BP	<b>2.457</b>	1.307 - 4.621	<b>0.0053</b>	0.21506	<b>0.0156</b>
High triglycerides	<b>5.361</b>	1.326 - 21.676	<b>0.0185</b>	0.20938	<b>0.0186</b>
Low HDL-C	<b>2.707</b>	1.113 - 6.585	<b>0.0282</b>	0.19991	<b>0.0248</b>
High glucose	3.049	0.611 - 15.216	0.1740	0.11902	0.1844
	<b>27-62 years (IWC, n=69/123)</b>				
High glucose	0.450	0.098 - 2.059	0.3036	-0.0994	0.2781
Low HDL-C	0.734	0.290 - 1.854	0.5125	0.00439	0.9622
High triglycerides	1.695	0.182 - 15.761	0.6426	0.12735	0.1639
High BP	1.122	0.594 - 2.120	0.7226	0.04938	0.5907
	<b>30-62 years (IWC, n=58/99)</b>				
≥5% vs <5% CVD-risk	2.136	0.686 - 6.653	0.1905	0.12783	0.2146

OR, CI, P and R<sub>Spearman</sub> – odds ratio, confidence interval, P-level and Spearman's rank correlation coefficient, respectively

# Results

In younger age group persons with IWC had significantly higher risk to have high BP (OR 2.46,  $p=0.005$ ), high triglycerides (OR 5.4,  $p=0.018$ ), and low HDLCH (OR 2.71,  $p=0.028$ ) than those with smaller (“normal”) WC.

In older subjects IWC and studied risk factors were not significantly related.

## Conclusion

In younger people (age 16-26 years) waist circumference below IDF thresholds but above 72 cm (women) or 84 cm (men) can be associated with factors known as components of metabolic syndrome

# Abstract

**OBJECTIVE.** To elucidate whether intermediate (I) waist circumference (WC) 72-79 cm, women, 84-93 cm, men - a range just below IDF abdominal obesity threshold - is associated with worse risk factor profile than smaller WC.

**METHODS.** In a study of risk factors in families of patients with premature coronary heart disease we selected 251 persons (74 spouses, 177 children of patients) aged  $\geq 16$  years without vascular disease with WC  $\leq 79$  (women),  $\leq 93$  (men) cm, body mass index (BMI)  $\geq 18.5$  kg/m<sup>2</sup>. Factors analyzed included BMI, systolic/diastolic BP, serum low density and high density lipoprotein (LDL, HDL) cholesterol (CH), triglycerides (TG), glucose (GL). High BP was defined as prehypertension or hypertension (NHLBI report on high BP in children/adolescents or JNC 7 depending on age). TG  $\geq 1.7$ , GL  $\geq 5.6$  mmol/l were defined as high, HDLCH  $< 1.03$  (men),  $< 1.29$  mmol/l (women) – as low. Framingham risk score was calculated for persons aged  $\geq 30$  years. Factors associated with IWC were selected by logistical regression ‘univariate’ analysis with age, sex adjustment . Subjects were divided in 2 age groups: 16-26 years (n=128, 25% with IWC) and 27-62 years (n=123, 56.1% with IWC).

**RESULTS.** In the whole group IWC was significantly related to high BP and TG. In younger age group persons with IWC had significantly higher risk to have high BP and low HDLCH than those with "normal" WC (table). In older subjects IWC and studied risk factors were not significantly related.

**CONCLUSION.** In younger people WC smaller than IDF thresholds can be associated with factors known as components of metabolic syndrome.