Metabolic syndrome in families of patients with premature coronary heart disease: impact of 2009 Joint Interim Statement criteria

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Background

Modified criteria of metabolic syndrome (MS)
have been proposed recently
in the Joint Interim Statement (JIS) of several societies
rejecting large waist circumference
as obligatory component of MS.

Purpose

To assess impact of this change
relative to definition of International Diabetes Federation (IDF).
on proportion of individuals with MS
among patients with premature CHD
and members of their families.

Material

In the framework of the study of risk factors in families of patients with premature CHD (onset < 55 years, men; < 60 years, women) we examined 785 members of 361 families:

- 340 parents-probands with premature CHD
  (66.2% men, 78.5% after MI, age 36-67 years);
- 203 their consorts
  (18.7% men, 5.42% with CHD, age 28-67 years);
- 242 their children
  (59.9% men, without overt vascular disease, age 16-46 years).

Parameters registered

- body mass index (BMI);
- waist circumference;
- systolic and diastolic blood pressure (BP);
- arterial prehypertension and hypertension;
- high density lipoprotein (HDL) cholesterol;
- triglycerides;
- impaired fasting glucose;
- diabetes mellitus.

Methods

BMI - body mass (kg) / height (m^2)

High BP was defined as arterial prehypertension or hypertension according to criteria of

- 4-th Report of National High BP Education Program Working Group on High BP in children and adolescents (USA) (in persons aged 16-17 years);
- 7-th Report of Joint National Committee (USA) (in persons aged ≥18 years.

For diagnosis of *diabetes mellitus* we used ADA criteria
Oral glucose tolerance test was carried out
according to WHO recommendations.

MS definition
(criteria*of International Diabetes Federation, 2005)

1. central obesity$^{\Delta}$ or obesity (BMI > 30 kg/m^2);
2. raised triglycerides (≥ 1.70 mmol/l)
   or specific treatment for this lipid abnormality;
3. reduced HDL-cholesterol (<1.03 mmol/l [men];
   <1.29 mmol/l [women]) or specific treatment for this lipid abnormality;
4. raised BP (systolic BP ≥ 130 mm Hg and/or diastolic BP ≥ 85 mm Hg) or treatment of previously diagnosed arterial hypertension;
5. raised fasting plasma glucose (≥ 5.6 mmol/l)
   or previously diagnosed type 2 diabetes.

clinical identification of MS –* ***central obesity and/or obesity* ***+*** *any 2 of other 4 criteria*

$^{\Delta}$for Europids defined as waist circumference: ≥ 94 cm (men), ≥ 80 cm (women)

MS definition
(Joint Interim Statement 2009 criteria*)

1. elevated waist circumference (population and country specific)[Δ];
2. elevated triglycerides (≥ 1.7 mmol/l)
   or drug treatment for this lipid abnormality;
3. reduced HDL-cholesterol (< 1.0 mmol/l [men]; < 1.3 mmol/l [women]) or drug treatment for this lipid abnormality;
4. elevated BP (systolic BP ≥ 130 mm Hg
   and/or diastolic BP ≥ 85 mm Hg) or antihypertensive drug treatment of previously diagnosed arterial hypertension;
5. elevated fasting plasma glucose (≥ 5.55 mmol/l)
   or drug treatment of elevated glucose.

**clinical identification (diagnosis) of MS – any 3 of 5 criteria.*

[Δ] for people of European origin (e.g. participants of this study) IDF cut points can be used – waist: ≥ 94 cm (men), ≥ 80 cm (women)

Results

Frequency of MS according to IDF and JIS criteria

Criteria of MS	total	patients-probands	consorts	adult children
	n=785	n=340	n=203	n=242
IDF	37.6%	56.8%	36.5%	11.6%
JIS	41.3%	63.0%	36.9%	13.6%

Results

Concordance of frequencies of MS identified according to JIS and IDF criteria

	JIS criteria *without* MS	JIS criteria *with* MS	total
IDF criteria, *without* MS	461 (100%)	**29 (9%)**	490
IDF criteria *with* MS	0	295 (91%)	295
total	461 (100%)	324 (100%)	785

All 295 persons with IDF MS satisfied JIS criteria
JIS criteria identified MS in 29 more persons (24 patients with CHD).
They were predominantly men, not obese (BMI range 19.1- 29.1 kg/m2), **with 3 - 4 AHA/NHLBI (2005) criteria**, most had high triglycerides, high BP, low HDL-cholesterol; 14 persons had impaired fasting glucose, 4 - diabetes.

Characteristics of persons reclassified as MS by JIS criteria (i.e. without increased waist circumference)

with MS by JIS criteria / without MS by IDF criteria	**29/490**	**5.9%**
men	22/29	75.9%
CHD	24/29	82.8%
high triglycerides	25/29	86.2%
high BP	24/29	82.8%
low HDL-cholesterol	24/29	82.8%
impaired fasting glucose	14	48.3%
diabetes	4	13.8%
30 kg/m^2 > BMI ≥25 kg/m^2 BMI < 25 kg/m^2	18/29 11/29	62% 38%

Conclusion

In this heterogeneous population
(patients with premature CHD, their spouses and adult children)
the use of JIS criteria resulted in identification of metabolic syndrome in small additional portion
of persons with obvious high risk already requiring interventions because of CHD and/or level of individual risk factors.
Practical value of (re)labeling these persons as having MS remains unclear.

Abstract

OBJECTIVE. Modified criteria of metabolic syndrome (MS) have been proposed recently in the Joint Interim Statement (JIS) of several societies rejecting large waist circumference as obligatory component. Within study of families of patients with premature coronary heart disease (CHD) we assessed impact of this change relative to definition of International Diabetes Federation (IDF) on proportion of individuals with MS.

METHODS. We examined 785 members of 361 families: 340 parents-probands with premature CHD (66.2% men, 78.5% after MI, age 32-67 years); their 203 consorts (18.7% men, 5.42% with CHD, age 28-67 years), and 242 their children (59.9% men, age 16-46 years) without overt vascular disease. Parameters analyzed included body mass index (BMI), waist circumference, systolic/diastolic BP, serum high density lipoprotein (HDL) cholesterol (CH), triglycerides (TG), presence of impaired fasting glucose (IFG) and diabetes mellitus. High BP was defined as prehypertension or hypertension (NHBPEP 4 report on high BP in children/adolescents or JNC 7, USA). TG ≥1.7 mmol/l were defined high; HDLCH <1.0 (men), <1.3 mmol/l (women) – low. Drug treatment of these abnormalities was also considered (JIS criteria of MS, 2009). .

RESULTS. Portions of individuals with MS according to JIS compared to IDF criteria were greater in the whole population (324/785 [41.3%] vs 295/785 [37.6%]) and among probands (63 vs 56.8%), and similar among consorts (36.9 vs 36.5%) and adult children (13.6 vs 11.6%). All 295 persons with IDF MS satisfied JIS criteria but JIS criteria identified MS in 29 more persons (24 patients with CHD). They were predominantly men (22/29), not obese (BMI range 19.1 - 29.1; median 25.5 kg/m^2), with 3 - 4 AHA/NHLBI (2005) MS criteria, most had high TG (86.2%), high BP (82.8%), low HDL-CH (82.8%); 14 persons had impaired fasting glucose, 4- diabetes.).

CONCLUSION. In this heterogeneous population the use of JIS criteria resulted in diagnosis of MS in small additional number (9%) of persons with obvious high risk already requiring interventions because of CHD and/or level of individual risk factors. Practical value of relabeling these persons remains unclear.

Concordance of MS frequencies according to JIS and IDF criteria

	JIS criteria, ***with*** MS, n=324	JIS criteria, ***without*** MS, n=461
IDF criteria, ***with*** MS, n=295	295*	0
IDF criteria, ***without*** MS, n=490 (100%)	**29 (6%)****	461 (94%)

**All 295 persons with IDF MS satisfied JIS criteria*

**JIS criteria identified MS in 29 more persons (24 with CHD).
They were predominantly men, **with 3 - 4 AHA/NHLBI (2005) criteria**, most had high triglycerides, high BP, low HDL-cholesterol;
14 persons had impaired fasting glucose, 4 - diabetes.