

Chair and Department of Cardiology, Medical University of Lublin

ELŻBIETA MAZUR-STĄŻKA, MAGDALENA MAJEWSKA,
JUSTYNA ZIĘBA, RADOSŁAW KRAWCZYKIEWICZ,
MARIUSZ MIAZEK, BOŻENA SZEPIENIEC

*Metabolic syndrome among Cardiological Clinic patients.
Epidemiological and clinical aspects*

The metabolic syndrome (MS) is a cluster of the most dangerous heart attack risk factors: diabetes and prediabetes, abdominal obesity, high cholesterol and high blood pressure. It is one of the most exciting medical challenges of the 21st century (9). The prevalence of the MS is dependent to a great extent on the definition of the syndrome and its components (2).

According to the new definition of the International Diabetes Federation (IDF), the metabolic syndrome can be diagnosed when the following factors are present: central obesity (defined as waist circumference ≥ 94 cm for European men and ≥ 80 cm for European women, with specific values for other ethnic groups); plus any two of the following four factors: • raised TG Level: ≥ 150 mg% (1.7 mmol/L) or specific treatment for this lipid abnormality • reduced HDL cholesterol: < 40 mg% (1.03 mmol/L) in males and < 50 mg% (1.29 mmol/L) in females or specific treatment for this lipid abnormality • raised blood pressure: systolic BP ≥ 130 or diastolic BP ≥ 85 mmHg or treatment of previously diagnosed hypertension • raised fasting plasma glucose (FPG) ≥ 100 mg% (5.6 mmol/L) or previously diagnosed type 2 diabetes (5).

Central obesity (as estimated by waist circumference) is a prerequisite risk factor for the diagnosis of the MS according to this definition (8). People with the metabolic syndrome are at increased risk, being twice as likely to die from and three times as likely to have a heart attack or stroke compared to people without the syndrome (5).

The aim of the study was to determine the prevalence of the MS among patients visiting the Cardiological Clinic. The presence of the selected diseases was also determined in two groups: among people with the MS compared with people without the syndrome.

MATERIAL AND METHODS

The study was carried out among patients visiting the Cardiological Clinic working during the 9th Social-Scientific Camp in Wola Uhruska (July 2005), which was organized by the Medical University of Lublin. The study embraced 118 people (82 women and 36 men) aged: 20–87 (mean age 61.6 ± 14.6).

The metabolic syndrome was diagnosed with the use of the new definition by the International Diabetes Federation (IDF). In each person: waistline, blood pressure, fasting plasma glucose and components of lipidogram were measured. Blood pressure was assessed as the average of two measurements taken after subjects had been seated for ≥ 10 min. Laboratory tests consisted of fasting

plasma glucose, plasma levels of high density lipoprotein (HDL) cholesterol and triglyceride (TG) and were evaluated in the Laboratory working during the Camp. In each case an exact medical interview was carried out including questions about the history of hypertension, diabetes mellitus, dyslipidemia, ischemic heart disease (IHD), cerebrovascular events and arrhythmias. Patients who did not meet the IDF criteria for high blood pressure, high fasting glucose, abnormal level of lipids, but had specific treatment for these abnormalities were also considered to fulfil the criteria. The prevalence of the MS was evaluated in the whole study group as well as in groups of various sex and age. The presence of the particular diseases was assessed in two groups: with and without MS. Patients were considered as having coronary arterial disease (CAD) due to history of angina pectoris or myocardial infarction, ECG findings, the diagnosis of previous heart attack or documented positive treadmill test, or coronary angiography results. The statistical analysis was carried out by using Chi-square method. Two-sided values of $p < 0.05$ were considered statistically significant.

RESULTS

The frequency of the MS in the study group was 52.54%, slightly different in male and female patients. Among women the rate of the MS was 53.7% whereas among men 50% ($p=0.71$) (Fig. 1). The MS prevalence was higher in older age groups. The lowest frequency was in the 20-40 age group (16.7%) and the highest in the 61-70 (65.22%) (Fig. 2). The prevalence of the particular components of MS among patients with MS and without MS is given in Table 1. The most common disorder among patients with MS as well as in the group of patients without MS, was high blood pressure ($SBP \geq 130$ mmHg or $DBP \geq 85$ mmHg). The percentage of patients who had central obesity plus two from four MS disorders was 68.2% in women and 50% in men. Central obesity plus three factors was observed in 22.7% of women and 44.5% of men. 9.1% of women and 5.5% of men fulfilled all criteria of the MS. Hypertension, diabetes mellitus, IHD were more frequent in patients with MS compared with people without the syndrome and differed significantly between the two groups. The rate of arrhythmias and the number of patients who passed through myocardial infarction as well as had a stroke episode in the past was also greater in the group of patients with MS but not statistically significant (Fig. 3).

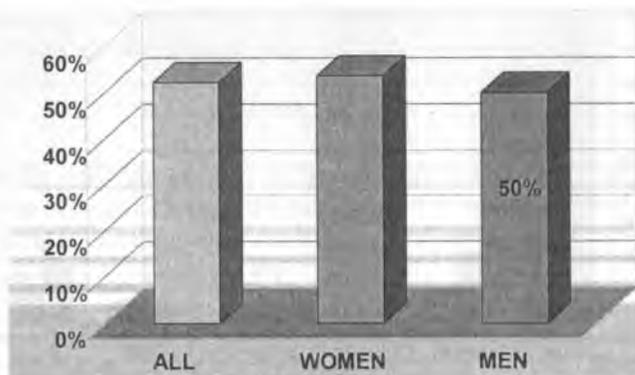


Fig. 1. Frequency of the metabolic syndrome in the study group

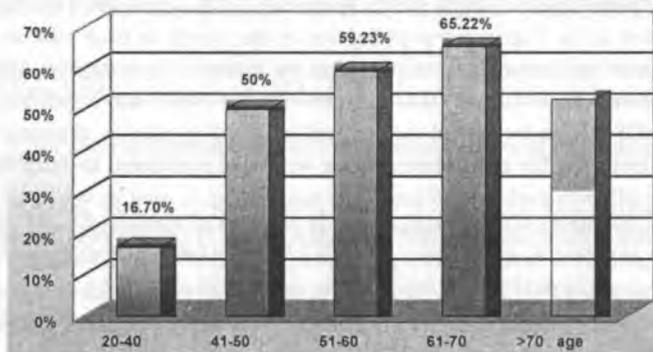


Fig. 2. Age-specific prevalence of the metabolic syndrome in the study group

Table 1. Frequency of MS anomalies in patients with and without MS according to the IDF definition

IDF definition		MS	NON-MS
Raised arterial BP	SBP ≥ 130 mmHg	91.9%	81.8%
	DBP ≥ 85 mmHg	90.3%	70.1%
Hyperglycemia	FPG ≥ 5.6 mmol/l	72.6%	12.7%
Dyslipidemia	TG ≥ 1.7 mmol/l	48.4%	3.6%
	HDL ≤ 1.03 (M) ≤ 1.29 (W) mmol/l	24.2%	1.8%

FPG-fasting plasma glucose, M-men, W-women, BP-blood pressure, TG-triglycerides, HDL-high-density lipoprotein cholesterol

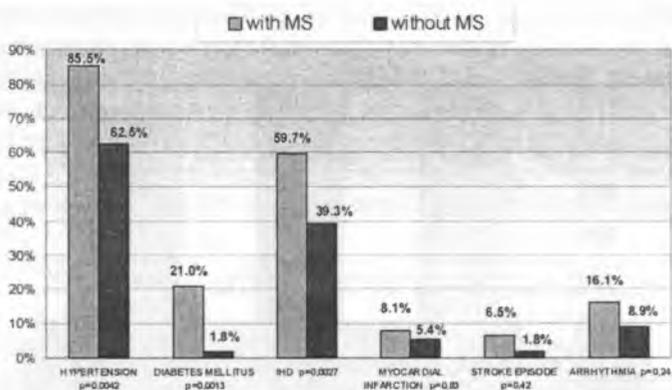


Fig. 3. Frequency of the particular diseases in two groups patients: with and without MS

DISCUSSION

The main finding in the study is high prevalence of the metabolic syndrome in the Cardiological Clinic patients. Numerous epidemiologic studies confirmed that the metabolic syndrome has become one of the major public-health challenges worldwide (3). The prevalence of the MS is increasing because of the 'obesity epidemic' (8).

The recent epidemiologic study – NATPOL III Plus has estimated the metabolic syndrome occurrence in over 20% of Polish adult population (7). Compared with the US population, with 24% prevalence (4, 11), and the Mexican population with a 27% prevalence (1, 11) of the metabolic syndrome when using the ATP III criteria, as well as compared with NATPOL III Plus study, the 52.4% prevalence for the Cardiological Clinic patients is markedly higher. Previous estimates of the rate of the MS differed because of differences in diagnostic criteria and in study populations.

According to our findings, the MS rate was not significantly different in females and in males (53.7% vs. 50%). The similar result was observed in the study in US adults, in which the prevalence of the MS (NCEP criteria) differed little among men and women in the general population (24% vs. 23%) (4). The MS prevalence in a group of Turkish elderly was significantly higher in females than in males (2).

According to the data from NHANES III, the prevalence of the metabolic syndrome in the US population increases with age, from 7% among young adults (20–29 years) to about 42% at later ages (60–70 years) (10). A similar tendency was observed in our study group.

Many studies have shown that patients diagnosed with the metabolic syndrome have more prevalent CAD or are at a greater risk of developing it (6). The rate of hypertension, IHD, arrhythmias and diabetes mellitus, as well as the number of patients who passed through myocardial infarction were more frequent in the group with MS compared with patients without MS. But only in case of hypertension, IHD and diabetes the differences were statistically significant. We also determined the prevalence of cerebrovascular event history in MS and non-MS syndrome patients. We consider that our analysis could underestimate the prevalence of cerebrovascular disease since very often patients admitted with non-neurological problems may have an incomplete CNS history and examination recorded. Similarly, cerebrovascular events can be asymptomatic in elderly people, so unless CT head scans are performed, the absolute prevalence of cerebrovascular endpoints will be underestimated.

It is interesting that the frequency of raised blood pressure was very high in two groups: among patients with the MS and without the syndrome.

CONCLUSIONS

The metabolic syndrome presents an increasing clinical and epidemiological problem. Early recognition of the syndrome components as well as prophylaxis and treatment should be one of the most important parts of the doctor's conduct.

REFERENCES

1. Aguilar-Salinas C. A. et al.: High prevalence of metabolic syndrome in Mexico. *Arch. Med. Res.*, 35, 76, 2004.
2. Cankurtaran M. et al.: Prevalence and correlates of metabolic syndrome (MS) in older adults. *Archs of Gerontology and Geriatrics*, 42, 35, 2006 (available online 25 July 2005).
3. Eckel R. H. et al.: The metabolic syndrome. *Lancet*, 365, 1415, 2005.

4. Ford E. S. et al.: Prevalence of metabolic syndrome among US adults: finding from the Third National Health and Nutrition Examination Survey. *J. Am. Med. Assoc.* 287, 365, 2002.
5. International Diabetes Federation: The IDF consensus worldwide definition of the metabolic syndrome (article online), 2005. Available from www.idf.org/webdata/docs/metabolic_syndrome_definition.pdf. Accessed 16 July 2005.
6. Khan R. et al.: The metabolic syndrome: Time for a critical appraisal. *Diabetes Care*, 28, 2289, 2005.
7. Kos M., Kowalski J.: Zespół metaboliczny – epidemiologia i patofizjologia. *Kwart. Ortop.*, 1, 18, 2005.
8. Liberopoulos E. N. et al.: Diagnosis and management of the metabolic syndrome in obesity. *Obes. Res.*, 6, 283, 2005.
9. Mamcarz A., Chmielewski M.: Zespół metaboliczny – epidemia XXI wieku. Wybrane interwencje terapeutyczne. *Pol. Przegl. Kardiol.*, 7, Supl. 1, 53, 2005.
10. Meydani M.: A Mediterranean-style diet and metabolic syndrome. *Nutrition Reviews*, 63, 9, 312, 2005.
11. Schutte A. E. et al.: The metabolic syndrome and changing relationship between blood pressure and insulin with age, as observed in Aboriginal and Torres Strait Islander peoples. *Diabet. Med.*, 22, 1589, 2005.

SUMMARY

The metabolic syndrome is a cluster of the most dangerous heart attack risk factors: diabetes and prediabetes, abdominal obesity, high cholesterol and high blood pressure. According to the new definition by the International Diabetes Federation (IDF) the metabolic syndrome can be recognized when central obesity plus any two of other four criteria (raised triglycerides, reduced high-density lipoprotein cholesterol (HDL), raised blood pressure and elevated fasting plasma glucose) are present. The aim of this study was to estimate the frequency of metabolic syndrome among patients who visited the Cardiological Clinic organized during the 9th Social-Scientific Camp in Wola Uhruska (July 2005). The presence of the particular diseases was also compared in two groups: among people with the metabolic syndrome and without the syndrome. The study embraced a group of 118 people (82 women and 36 men) aged 20–87 (mean age: 61.6 ± 14.6). In each person waistline, blood pressure and fasting glucose as well as components of lipidogram were measured. In each case a medical interview concerning the past and present diseases was carried out. The study revealed that 52.4% of patients fulfill the metabolic syndrome criteria (women: 53.7% men: 50%). The lowest frequency of metabolic syndrome was proved in the age group of 20–40 (16.7%) and the highest in the one of 61–70 (65.2%). The higher frequency of hypertension, ischemic heart disease, diabetes mellitus and arrhythmias as well as the greater number of patients after myocardial infarction and a stroke episode was proved in the group of patients with the metabolic syndrome. The metabolic syndrome presents an increasing clinical and epidemiological problem. Early recognition of the syndrome components as well as prophylaxis and treatment should be one of more important parts of the doctor's conduct.

Zespół metaboliczny wśród pacjentów gabinetu kardiologicznego.
Aspekty kliniczne i epidemiologiczne

Zespół metaboliczny stanowi grupę zaburzeń prowadzących do zwiększonego ryzyka wystąpienia choroby niedokrwiennej serca. Wśród tych zaburzeń główną rolę odgrywają: nadciśnienie tętnicze,

zaburzenia lipidowe, nietolerancja glukozy i otyłość trzewna. Zgodnie z najnowszą definicją International Diabetes Federation (IDF) do rozpoznania zespołu metabolicznego niezbędne jest występowanie otyłości centralnej oraz dwóch spośród czterech następujących czynników: zwiększone stężenie triglicerydów, zmniejszone stężenie cholesterolu HDL, podwyższone ciśnienie tętnicze krwi, zwiększone stężenia glukozy na czczo (FPG) lub wcześniej rozpoznana cukrzyca typu 2. Celem pracy była ocena częstości występowania zespołu metabolicznego u pacjentów zgłaszających się do gabinetu kardiologicznego, działającego w ramach IX Obozu Społeczno-Naukowego (Wola Uhruska, lipiec 2005). Porównano także występowanie wybranych chorób w grupie pacjentów z zespołem metabolicznym i wśród pacjentów niespełniających kryteriów zespołu metabolicznego. Badaniem objęto grupę 118 osób (82 kobiety i 36 mężczyzn) w wieku od 20 do 87 lat (śr. $61,6 \pm 14,6$). U każdego pacjenta zmierzono obwód talii, oznaczono poszczególne składniki lipidogramu i poziom glukozy na czczo oraz dokonano pomiaru ciśnienia tętniczego krwi. Przeprowadzono dokładny wywiad lekarski dotyczący przebytych i obecnie występujących chorób. Na podstawie przeprowadzonych badań stwierdzono, że częstość występowania zespołu metabolicznego w badanej populacji wynosi 52,4% (w grupie kobiet 53,7%, w grupie mężczyzn 50%). Wykazano najniższą częstość występowania w przedziale wieku 20–40 lat (16,7%), zaś najwyższą w przedziale lat 61–70 (65,2%). Stwierdzono większą częstość występowania nadciśnienia tętniczego, choroby niedokrwiennej serca, cukrzycy i zaburzeń rytmu serca oraz większą liczbę przypadków z przebyłym zawałem serca i udarem mózgu w grupie pacjentów z zespołem metabolicznym. Zespół metaboliczny stanowi coraz większy problem kliniczny i epidemiologiczny. Wczesne rozpoznanie składowych zespołu, jego profilaktyka i leczenie powinny stanowić jeden z ważniejszych kierunków postępowania lekarskiego.