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METABOLIC SYNDROME AS A GROWING PROBLEM OF POPULATION IN CLINICAL AND EPIDEMIOLOGICAL PERSPECTIVES

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Metabolic syndrome is a conglomeration of factors that contribute to the development of atherosclerotic plaque. As of obesity, which is one of the diagnostic criteria of metabolic syndrome by hypertension and atherogenic dyslipidemia - all these elements contribute to the development of atherosclerosis. It is commonly believed that the development of metabolic syndrome are responsible genetic predisposition and environmental factors, which consist of such calories and atherogenic diet and low physical activity. The prevalence of metabolic syndrome in populations is diverse in terms of ethnicity, age and gender. It is characterized by obesity, hypertension, type 2 diabetes, insulin resistance and lipid disorders. Effects and risks of particular types of diseases and disorders are mutually enhancing and adding up, which increases risk of adverse complications. According to World Health Organization (WHO) data in the 6 billion people in the world, 175 million have diabetes, and expects that over the next 25 years this number will increase to 250 million. Despite therapeutic advances, diabetes is not to cure disease that causes disability and shortens the average duration of life of patients by 20-30%. It is estimated that the treatment of diabetes and its complications consumes about 7% of all material expenditures on health care in Poland. In the United States of America, over 65% of people suffer from obesity, in Europe, this problem affects more than 67% of the population. It is estimated that in Poland about 20% or more of adults are obese. European Group for the Study of Insulin resistance (EGIR), based on WHO criteria, in several populations of different European countries assessed the occurrence of this syndrome in persons aged 40 - 55 years 7 - 36% in men and 5 - 22% in women. Data on the prevalence of metabolic syndrome in Poland was obtained from the study and obtained in corresponding WOBASZ study. In both studies the prevalence of metabolic syndrome was assessed NCEP - ATP III in 2001 and the most recent version of 2005. Based on these data, it appears that metabolic syndrome occurs on average every fifth of an adult, almost 6 million Polish citizens.

Key words : Metabolic syndrome, Type 2 diabetes, Insulin resistance, Lipid disorders, Atherosclerosis, Obesity, Hypertension

The development of civilization has brought tremendous progress in science and substantial improvement of living conditions of people, but also became the cause of the emergence of many previously unknown threats. One is the metabolic syndrome, which contribute to the creation of primarily low physical activity, poor nutrition and pollution of water, air, food, as well as the increasing pace of life and the associated stress. Metabolic syndrome is a growing problem of clinical and epidemiological population of industrialized countries. It is characterized by obesity, hypertension, type 2 diabetes, insulin resistance and lipid disorders. Effects and risks of particular types of diseases and disorders are mutually enhancing and adding up, which increases risk of

adverse complications. Available epidemiological data on the prevalence of the metabolic syndrome are not optimistic. Observations carried out by scientists and clinicians around the world confirm that we are dealing with the growing epidemic of metabolic syndrome. The prevalence of metabolic syndrome in populations is diverse in terms of ethnicity, age and gender. The pathogenesis of the metabolic syndrome is still under investigation. It is believed that the main role played by the occurrence of obesity, especially abdominal obesity. Adipose tissue, is currently regarded as the endocrine gland produces several substances that obese people are excreted in abnormal amounts and have an impact on the development of metabolic disorders. The prevalence of obesity and excessive duration of the disease and causing her a lot of diseases of very secondary importance for a sick person and to society, make the costs involved are very large. The only way to reduce these costs is intense primary and secondary prevention and health education, which not only affects an adjunct to treatment, but alone it is by teaching patients how to care for their own health. Patient's knowledge about his illness affects his awareness and involvement in the healing process. Lack of knowledge may lead to the adoption of passive attitude towards the treatment and its low efficiency. Nieradzenie the disease can lead to deterioration of the patient's life and, consequently, to withdraw from professional and social life. Metabolic syndrome is one of the major causes of cardiovascular diseases and type 2 diabetes It is estimated that the presence of metabolic syndrome doubles the risk of cardiovascular disease and five times higher risk of developing type 2 diabetes [1]. Diabetes is the most promoted in metabolic disease in the world. It occurs in people of all races in every continent and appears in each age group. The World Health Organization (WHO) in the 6 billion people in the world 175 million have diabetes, and expects that over the next 25 years this number will increase to 250 million. The presence of diabetes, takes the form of a pandemic. In Poland, suffering from diabetes 1.5 million people [2]. From this it was estimated that the population of all children in the world (0-14 years) in 2007 had 1.8 billion, of which 0.02% have diabetes. This means that the world of children with diabetes is nearly 440 000, and each year are diagnosed with 70 000 new cases. Despite therapeutic advances, diabetes is not to cure disease that causes disability and shortens the average duration of life of patients by 20-30%. It is estimated that the treatment of diabetes and its complications consumes about 7% of all material expenditures on health care in Poland [3]. Epidemiological studies indicate a significant prevalence of the metabolic syndrome in both the U.S. and Europe, including Poland. It is estimated that among adults in developed countries 20 - 25% of people in middle age meet the diagnostic criteria for metabolic syndrome [4]. The coexistence of different definitions and criteria for diagnosis of metabolic syndrome makes it difficult to study the epidemiology and comparison of incidence in different countries. Studies conducted in the U.S. by Ford et al, who the incidence of metabolic syndrome evaluated based on the definition of WHO and NCEP - ATP III indicates that the assessment of the prevalence of the metabolic syndrome depends on the accepted diagnostic criteria. Although the prevalence of metabolic syndrome recognized on the basis of two different definitions are similar, different results were obtained in the assessment rate, especially among men over 40 years of age, and among different ethnic groups, where the differences increase with age. A year earlier, the same research group published the results of the prevalence of the metabolic syndrome in the U.S., which was assessed based on the definition of NCEP - ATP III. The authors analyzed data NHANES III study conducted in the years 1988 - 1994 in the group of 8814 men and women aged over 20 years. It was estimated that metabolic syndrome occurs in about 24% of adults in the United States. We evaluated the impact of age and gender on the occurrence of metabolic syndrome. It was shown that the prevalence of metabolic syndrome increases with age. In the age group 20 - 29 years metabolic syndrome was found in less than

7% of the people, while in the group over 60 years, the frequency is increased above 40%. The prevalence of metabolic syndrome was similar in both sexes. Epidemiological studies have revealed the racial and ethnic differences in the prevalence of the metabolic syndrome and its risk factors [5]. Prevalence of metabolic syndrome was estimated in other studies of U.S.: FOS and SAHS, which covered nearly 6000 whites aged 30 - 79 years. In these studies using the diagnostic criteria of WHO and NCEP - ATP III had the following prevalence of metabolic syndrome: FOS - 24% according to both definitions; SASH - 23 and 21% among Caucasians, respectively according to the WHO and NCEP - ATP III, and 31 and 30% among Mexican Americans, respectively by the WHO and NCEP - ATP III. Of gender differences were observed only in the population of Americans of Mexican descent who have metabolic syndrome was more frequent in women than in men [6]. Also a very high incidence of metabolic syndrome observed in some European countries. European Group for the Study of Insulin resistance (EGIR), based on WHO criteria, in several populations of different European countries assessed the occurrence of this syndrome in persons aged 40 - 55 years 7 - 36% in men and 5 - 22% in women [7] . Data on the prevalence of metabolic syndrome in Poland was obtained from the study and obtained in corresponding WOBASZ. In both studies the prevalence of metabolic syndrome was assessed NCEP - ATP III in 2001 and the most recent version of 2005. Survey a representative sample of Polish population in 6114 included WOBASZ men and 6894 women aged 20 - 74 years. Based on these data, it appears that metabolic syndrome occurs on average every fifth of an adult, almost 6 million Polish citizens. Metabolic syndrome according to criteria NCEP - ATP III was diagnosed in 19.5% of males and 18.6% women, while the lower limit of fasting to a value e" 100 mg / dl and taking account of those receiving medication for hypertension, dyslipidemia, and hyperglycemia , met the criteria for the metabolic syndrome 23% of men and 20% of women [8]. Similar results were observed in the study NATPOL PLUS, in which the prevalence of metabolic syndrome was assessed in a group of 2329 men and women aged e" 18 years, based on criteria of NCEP - ATP III [9]. Study conducted in Poland NATPOL PLUS showed that the metabolic syndrome are affected by approximately 20% of the adult Polish population [10]. Metabolic syndrome occurs more frequently in men than in women, respectively 49% vs 35%. Characteristically, however, abdominal obesity (which is the basis authorizing the diagnosis of metabolic syndrome) related to more than 50% of women and only 30% of men [11]. Observing changes in the prevalence of metabolic syndrome in a Polish population can be seen a marked increase in the incidence of metabolic syndrome in the past few years. The authors of numerous research works have shown a clear effect of age on the prevalence of metabolic syndrome. In Poland, also observed that the prevalence of the metabolic syndrome significantly increases with age, and this trend is more pronounced in women. In the study reported WOBASZ almost 12 - fold increase in the prevalence of the metabolic syndrome with age among women. Analysis of occurrence of individual symptoms showed the highest prevalence of hypertension [12]. The prevalence of metabolic syndrome is increasing. An analysis of NHANES III conducted in the period 1999 - 2000 shows that metabolic syndrome is affected 27% of adults in the United States. Based on the results of this study, it is estimated that the number of people with the metabolic syndrome in the U.S. is 64 million and still increasing, which has been shown associated with an increase in obesity [13]. Also on the basis of long-term observation of the population covered by the Polish international survey Pol - MONICA can say that the prevalence of metabolic syndrome increases. In 2001, the metabolic syndrome was found in about 20% of the population of Warsaw, this percentage increased significantly compared to 1988, on which there was two - fold lower incidence of metabolic syndrome in men and 3-fold lower in women [14].

Metabolic syndrome is a conglomeration of factors that contribute to the development of atherosclerotic plaque. As of obesity, which is one of the diagnostic criteria of metabolic syndrome by hypertension and atherogenic dyslipidemia - all these elements contribute to the development of atherosclerosis. In the U.S over 65% of people suffer from obesity, in Europe, this problem affects more than 67% of the population. It is estimated that in Poland about 20% of adults are obese [14]. Causes of metabolic syndrome are not yet sufficiently understood. Scientists attempt to explain the reason for the common occurrence of metabolic syndrome components, looking for answers to the question whether its development leads to one or more pathogenic agents. The current state of knowledge shows that the most important etiological factors of the metabolic syndrome are closely related - abdominal obesity and insulin resistance [15]. There are three groups of etiological factors: abdominal obesity and fat metabolism, insulin resistance and compensatory hyperinsulinemia, and a collection of independent risk factors, such as physical inactivity, aging, or hormonal disorders [16]. It is commonly believed that the development of metabolic syndrome are responsible genetic predisposition and environmental factors, which consist of such calories and atherogenic diet and low physical activity. It emphasizes the great diversity within the population due to both genetic and due to the different gene expression in response to various environmental factors [17]. Genetic factors for the development of metabolic syndrome include genes whose mutations are responsible for its individual components, and especially such as polymorphic genes whose expression may lead to obesity, insulin resistance and glucose intolerance, and hypertension [18]. There is convincing data that indicate a genetic basis for this disease, as evidenced by a family history of metabolic syndrome such as obesity, insulin resistance, dyslipidemia and hypertension [18, 19].

References

1. Grundy S. M., Does a diagnosis of metabolic syndrome have in clinical practice?. Am. J. Clin. Nutr. 2006, 83, 1248–1251;
2. WyzgaB J, Senatorski G, Cukrzyca, Choroby wewn'trzne - podr'cznik dla studentyw piel'gniarstwa i poBo|nictwa, In: Pczek L, Mucha K, Froncewicz B. (red), W: Lekarskie PZWL, Warszawa 2009; 501-503;
3. Craig M., Hattersley A., Donaghue K., Definition, epidemiology and classification of diabetes in children and adolescents. Pediatric Diabetes, 2009; 10 (suppl. 12), 3-12;
4. Stern M. P., Williams K., Gonzales – Villalpando C., Does the metabolic syndrome improve identification of individuals at risk of type 2 diabetes and\or cardiovascular disease?. Diabetes Care, 2004, 27, 2676–2681;
5. Ford E. S., Giles W. H., Dietz W. H., Prevalence of the metabolic syndrome among US adults. Findings from the Third National Health and Nutrition Examination survey. JAMA 2002, 287, 356–357;
6. Meigs J. B., Wilson P. W., Nathan D. M., Prevalence and characteristics of the metabolic syndrome in the San Antonio Heart and Framingham Offspring Studies Diabetes. 2003, 52, 2160– 2163;
7. Balkau B., Charles M. A., Drivsholm T., The Europe and Group for the Study of Insulin Resistance (EGIR): Frequency of the WHO metabolic syndrome in European cohorts, and an alternative definition of an insulin resistance syndrome. Diabetes Metab. 2002, 28, 364–368;
8. Wyrzykowski T., Zdrojewski T., Synowska E., Biela U., Drygas W., Tykarski A., Tendera M., Broda G. Epidemiologia ZespoBu Metabolicznego w Polsce. Wyniki programu WOBASZ. Kardiologia Polska 2005 (supl. 4); 63, 641-643;
9. Zdrojewski T., Bandosz P., Szpakowski P., Rozpowszechnienie gBywnych czynnikyw ryzyka choryb ukBadu sercowo – naczyniowego w Polsce. Wyniki badania NATPOL PLUS. Kardiol. Pol. 2004,

61(Supl.IV);

10. Zdrojewski T. Ocena wybranych problemyw dotyczcych rozpowszechnienia i terapii nadci[nienia t'tniczego w Polsce na podstawie badania NATPOL PLUS: Wi'cek A., Kokot F. (red.) Post'py w nefrologii i nadci[nieniu t'tniczym. Tom II, Medycyna Praktyczna, Krakyw 2002,10;
11. Lakowska A., Chrostowska M., Szyndler A., SmiaBek K., Szcz'ch R., Zdrojewski T., Narkiewicz K: Rozpowszechnienie zespoBu metabolicznego u chorych z nadci[nieniem t'tniczym w zale|no[ci od pBci. Nadci[nienie T'tnicze, 2005, tom 9(6): 458–461;
12. Bryl W. MBody chory z nadci[nieniem t'tniczym i czynnikami ryzyka. Interwencja: jaka, kiedy i dla kogo? - Przew. Lek., 2007 nr 5-6 (97-98): 48-53;
13. Ford E. S., Giles W. H., Mokdad A. H., Increasing prevalence of the metabolic syndrome among U.S. adults. Diabetes Care., 2004, 27, 2444–2447;
14. Broda G., Szcze[niewska D., Rybik S., Cz'sto[wyst'powania zespoBu metabolicznego w populacji osyb dorosBych Warszawy. Med. Metab., 2003, 7, 225–228;
15. Carry D. B., Utzschneider K. M., Hull R. L., Intra-abdominal fat a major determinant of the National Cholesterol Education Program Adult Treatment Panel III criteria for the metabolic syndrome. Diabetes, 2004,53, 2087–2090;
16. Grundy S. M., Brewer B., Cleeman J. I., Definition of metabolic syndrome. Report of the National Heart Lung, and Blood Institute/American Diabetes Association conference on scientific issues related to definition. Circulation, 2004, 109, 433–436;
17. Gale E. A., The myth of the metabolic syndrome. Diabetologia, 2005, 48,1679;
18. Stein C. M., Song Y., Elston R. C., Structural equation model based gnome scan for the metabolic syndrome. BMC Genet., 2003, 4, 99;
19. Tang W., Miller N. B., Rich S. S., Linkage analysis of a composite factor for the multiple metabolic syndrome: the National Heart, Lung, and Blood Institute Family Heart Study. Diabetes, 2003, 52, 2840–2844.

Резюме

МЕТАБОЛИЧЕСКИЙ СИНДРОМ — РАСТУЩАЯ ПРОБЛЕМА В КЛИНИКО-ЭПИДЕМИОЛОГИЧЕСКИХ ПЕРСПЕКТИВАХ В ПОПУЛЯЦИИ

Rutowski J.A.

Метаболический синдром представляет собой ряд факторов, которые способствуют развитию атеросклеротических бляшек. Ожирение, которое является одним из диагностических критериев метаболического синдрома, артериальная гипертензия и атерогенные дислипидемии способствуют развитию атеросклероза. Считается, что за развитие метаболического синдрома отвечают генетическая предрасположенность и факторы окружающей среды: высокалорийная и атерогенная диета на фоне низкой физической активности. Распространенность метаболического синдрома в популяции зависит от этнической принадлежности, возраста и пола. Он характеризуется ожирением, артериальной гипертензией, сахарным диабетом 2 типа, инсулинорезистентностью и нарушением липидного обмена. Суммация и потенцирование эффектов и рисков отдельных видов заболеваний и расстройств увеличивают риск побочных осложнений. По данным Всемирной организации здравоохранения (ВОЗ) из 6 миллиардов человек в мире, 175 миллионов человек больны диабетом, и ожидается, что в течение последующих 25 лет их число увеличится до 250 миллионов. Несмотря на терапевтические достижения в терапии диабета, он вызывает инвалидность и сокращает среднюю продолжительность жизни пациентов на 20-30%. Считается, что на лечение сахарного диабета и его осложнений расходуется около 7% всех материальных затрат на здравоохранение в Польше. В Соединенных Штатах Америки более 65% людей страдают от ожирения, в Европе эта проблема затрагивает более 67% населения.

Считается, что в Польше более 20% взрослых страдают ожирением. Европейская группа по изучению инсулинорезистентности (Egir), по критериям ВОЗ, в популяциях различных европейских стран оценивает возникновение этого синдрома у лиц в возрасте 40 - 55 лет 7 – 36 % у мужчин и 5 - 22% у женщин. Данные о распространенности метаболического синдрома в Польше были получены в собственных исследованиях и соответствующем исследовании WOBASZ. В обоих исследованиях распространенность метаболического синдрома оценивали по версии NCEP - ATP III в 2001 и 2005 годах. Из этих данных следует, что метаболический синдром возникает в среднем у каждого пятого взрослого, т.е. почти у 6 миллионов польских граждан.

Ключевые слова: метаболический синдром, диабет 2 типа, инсулинорезистентность, нарушения липидного обмена, атеросклероз, ожирение, гипертония

Резюме

МЕТАБОЛІЧНИЙ СИНДРОМ - ЗРОСТАЮЧА ПРОБЛЕМА У КЛІНІКО-ЕПІДЕМІОЛОГІЧНИХ ПЕРСПЕКТИВАХ В ПОПУЛЯЦІЇ

Rutowski J.A.

Метаболічний синдром являє собою ряд факторів, які сприяють розвитку атеросклеротичних бляшок. Ожиріння, яке є одним з діагностичних критеріїв метаболічного синдрому, артеріальна гіпертензія і атерогенна дисліпідемія сприяють розвитку атеросклерозу. Вважається, що за розвиток метаболічного синдрому відповідають генетична схильність і фактори навколишнього середовища: високалорійная і атерогенная дієта на тлі низької фізичної активності. Поширеність метаболічного синдрому у популяції залежить від етнічної приналежності, віку і статі. Він характеризується ожирінням, артеріальною гіпертензією, цукровим діабетом 2 типу, інсулінорезистентністю та порушенням ліпідного обміну. Сумація і потенціювання ефектів і ризиків окремих видів захворювань і розладів збільшують ризик побічних ускладнень. За даними Всесвітньої організації охорони здоров'я (ВООЗ) з 6 мільярдів чоловік у світі, 175 мільйонів чоловік хворі на діабет, і очікується, що протягом наступних 25 років їх число збільшиться до 250 мільйонів. Незважаючи на терапевтичні досягнення в терапії діабету, він викликає інвалідність і скорочує середню тривалість життя пацієнтів на 20-30%. Вважається, що на лікування цукрового діабету та його ускладнень витрачається близько 7% всіх матеріальних витрат на охорону здоров'я в Польщі. У Сполучених Штатах Америки більше 65% людей страждають ожирінням, в Європі ця проблема зачіпає більше 67% населення. Вважається, що в Польщі більше 20% дорослих страждають ожирінням. Європейська група з вивчення інсулінорезистентності (Egir) за критеріями ВООЗ, в популяціях різних європейських країн оцінює виникнення цього синдрому у осіб віком 40 - 55 років 7 - 36% у чоловіків і 5 - 22% у жінок. Дані про поширеність метаболічного синдрому у Польщі були отримані у власних дослідах та дослідженні WOBASZ. В обох дослідженнях поширеність метаболічного синдрому оцінювали за версією NCEP - ATP III в 2001 і 2005 роках. З цих даних випливає, що метаболічний синдром виникає в середньому у кожного п'ятого дорослого, тобто майже у 6 мільйонів польських громадян.

Ключові слова: метаболічний синдром, діабет 2 типу, інсулінорезистентність, порушення ліпідного обміну, атеросклероз, ожиріння, гіпертонія

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