МЕДИЧНА ОСВІТА

DOI: 10.21802/gmj.2017.3.7

O.S. Bobrykovych

Peculiarities of Teaching Problems of Metabolic Syndrome in Children to Interns

Abstract. Obesity has become one of the most urgent social problems worldwide. Continuous and rapid increase in obesity rates is considered by the World Health Organization as a global epidemic. Obesity affects children as well; the World Health Organization recognized childhood obesity as an acute public health crisis. Childhood obesity is often accompanied by arterial hypertension, hyperlipidemia and disorders of carbohydrate metabolism resulting in symptom complex – metabolic syndrome. While teaching the problems of metabolic syndrome in children to interns, a significant attention is paid to risk factors, diagnosis, treatment and prevention of syndrome. Such approach will allow future pediatricians to diagnose and prevent the development of early complications of metabolic syndrome in children timely.

Keywords: metabolic syndrome; obesity; excess weight; children.

Metabolic syndrome in children is a problem that attracts more and more attention of researchers and doctors worldwide. The number of children who are overweight or obese increases annually; childhood obesity leads to diseases being previously considered as adult diseases (arterial hypertension, hypercholesteremia, dislipoproteinemia, diabetes mellitus, osteoarthritis) [1]. In economically developed countries, one in three adults is overweight. In the USA, about 34 million people are obese [7]. Obesity affects 35% of females and 31% of males at the age of 20 years and older including 25% of children and adolescents [9]. Wolf AM and Colditz GA have estimated that obesity as a social and medical problem, costs American economy $ 49 billion annually. According to Stern JS, et al, the figures are substantially greater. In European countries, the prevalence of obesity is significant; however, it is somewhat lower as compared to the USA [4]. There is an increase in the incidence of obesity among children and adolescents as well [2]. The latter is essential since obesity in this age group is a significant predictor of adult obesity [13]. The most common variant of developing metabolic syndrome is unhealthy lifestyle (overeating with predominant animal fats and easily digested carbohydrates in the diet, sedentary lifestyle and psycho-emotional stress) when energy intake exceeds energy expenditure and, on the background of genetic predisposition, promotes excessive fat deposition predominantly found in the abdominal (or visceral) region [8].

Obesity is more common among urban residents than rural ones [5]. This dependence is supposed to be associated with labour conditions as physical activity in rural areas requires more energy expenditure than in urban ones. There are several studies which prove that people being engaged in mental activity are more likely to become overweight than those being engaged in physical activity [10].

Numerous studies have shown that the lower level of education the more likely the development of obesity is [11]. At the first glance, the dependence between the incidence of obesity and the level of education seems quite paradoxical since people with lower level of education are more often engaged in physical activity as compared to people with a high level of education. This is most likely due to the fact that educated people understand health risks of obesity as well as the physical and chemical properties of certain food products better and, accordingly, adhere to dietary restrictions which prevents excessive weight gain [12].

In children, there is a dependence between their educational achievements and the incidence of obesity. Obese children are proven to succeed in learning as compared to their thin contemporaries. Zoppi G, et al. believe that higher academic performance in obese children is associated with the fact that due to excess body weight they are less likely to participate in games and, accordingly, spend more time preparing for lessons. The authors consider higher academic performance in obese children to be the result of their desire to enhance their social status which, in their opinion, is reduced due to excess body weight.

In 2006, the World Health Organization (WHO) European Ministerial Conference on Counteracting Obesity was held in Istanbul, Turkey, where obesity was recognized as the most important health problem in the WHO European Region, especially childhood obesity which was declared as an acute public health crisis.

While teaching the problems of metabolic syndrome in children to interns, particular attention should be paid to the questionable issues on diagnostic criteria for metabolic syndrome. Currently, various international medical societies provide their own recommendations: Adult Treatment Panel (ATP III), PAS/ASPN/IPHA/LWPES (2005), the European Society for Pediatric Endocrinology (ESPE, 2007). The recommendations of the International Diabetes Federation (IDF, 2007) are most commonly used in pediatric practice. All the recommendations include key symptoms, namely obesity, hyperlipidemia, arterial hypertension and disorders of carbohydrate metabolism. According to the IDF criteria, metabolic syndrome does not develop before the age of 6 years and at the age of 6-10 years, only a group of patients being at risk for metabolic syndrome is formed; children at such a young age cannot be diagnosed with metabolic syndrome. In a child at the age of 10-16 years, metabolic syndrome may be diagnosed only in the presence of abdominal obesity accompanied by two or more additional pathological changes, namely elevated levels of triglycerides, low levels of high-density lipoprotein cholesterol, high blood pressure, hyperglycemia. When diagnosing metabolic syndrome in 16-year-old adolescents and older ones, adult criteria are used [6].

To diagnose obesity, it is important to collect the patient's anamnesis, i.e. to identify birth weight, the patterns of feeding in the first year of life, the dynamics of weight gain and the possible cause of obesity, the intensity of physical activity. In family history, it is important to assess the heredity factors predisposing to both obesity and arterial hypertension, type 2 diabetes mellitus, dyslipidemia, cholelithiasis.

To assess physical growth and body weight as well as the body mass index (BMI), percentile tables are used. Obesity is diagnosed when the BMI >97th percentile. The measurement of waist circumference (WC), hip circumference (HC) as well as the calculation of waist-to-hip ratio is mandatory as well; the parameters are assessed according to special IDF tables designed for various age and sex. Physical examination is performed to assess the distribution of body fat and pigmentation. The parameters of blood pressure measurement are assessed using percentile tables; 24-hour ambulatory blood pressure monitoring is performed, if necessary. In laboratory diagnostics, complete blood count, C-peptide test, glucose tolerance test, insulin testing, homeostasis model assessment of insulin resistance (HOMA-IR), as well as the determination of blood glucose levels, lipid profile, thyroid stimulating hormone concentration, leptin levels, sex hormone levels, if necessary, are mandatory to be performed.

In timely diagnosis and determination of risk factors for developing metabolic syndrome in children, combination treatment as well as the achievement of maximum reduction in the risk of developing complications such as diabetes mellitus and cardiovascular diseases is necessary. A moderate and gradual

calorie restriction, a change in the diet and a moderate increase in physical activity are the mandatory components of combination treatment. If necessary, pharmacological preparations which have been tested and proven safe and effective such as metformin, antihypertensive and lipid lowering drugs may be prescribed.

The prevention of obesity and metabolic syndrome in children and adolescents is worth paying the interns' attention as well. Such measures include maternal pre-pregnancy BMI normalization, moderate-intensity physical activity during pregnancy, breastfeeding till at least 6 months of age, eating meals together with a family at a certain time, the regularity of graduated exercises, active walking, the establishment drinking regimen for a child, and the limitation of the time a child spends in front of the computer and television. Pediatricians must monitor a child's growth and body weight and timely prevent the progressive increase in body weight; they must observe children being at higher risk of developing obesity (children born to obese parents, low-income parents or parents with low levels of education, chronically ill children being restricted in physical activity) and familiarize them with the expected "adult" body weight; they have to clarify that obesity is a disease that requires treatment.

Understanding of the measures for early detection, prevention and treatment of metabolic syndrome in children will allow preventing common complications such as arterial hypertension, atherosclerosis and, as a result, ischemic heart disease, type 2 diabetes mellitus, impaired reproductive function (conception, carrying a pregnancy and delivery), gastrointestinal diseases (chronic gastroduodenitis, cholecystitis, pancreatitis, possible constipation, fatty hepatosis) bronchial asthma, skeleton deformation, articular cartilage damage, platypodia, sleep disturbances (snoring, sleep apnea) [3]. Obesity in adolescence is often a cause of social exclusion of obese individuals and their depression that may lead to the problems such as drug addiction, alcohol dependence as well as eating disorders (bulimia, anorexia) [14].

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Received: 19.07.2017
Revised: 28.09.2017
Accepted: 28.09.2017