DOI: 10.25121/PNM.2018.31.6.358 Post N Med 2018; XXXI(6): 358-360

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Ischemic heart disease – definition, epidemiology, pathogenesis, risk factors and treatment

Choroba niedokrwienna serca – definicja, epidemiologia, patogeneza, czynniki ryzyka i postępowanie

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Keywords
ischemic heart disease, definition, classification, epidemiology, treatment

Słowa kluczowe
niedokrwienna choroba serca, definicja, klasyfikacja, epidemiologia, postępowanie

Summary

Ischemic heart disease (IHD) is the result of a limited blood supply to the heart muscle. In more than 95% of cases, the cause of IHD is coronary blood flow reduction caused by coronary artery atherosclerosis, therefore the term "coronary heart disease" is often used to describe this syndrome. Ischemic heart disease in assessment of the World Health Organization is still the most common causes of death in Poland and in the world. Due to chronic ischemic heart disease in Poland, 2.5% of the population suffers, i.e. about 1 million people, of whom 100,000. She has a heart attack every year. Over the last two decades in Poland, mortality from ischemic heart disease has increased in people under 65 years of age. In spite of wide prevention, there is a problem between the current guidelines and the patient's continuing of recommendations. Good communication between medical staff and patient with ischemic heart disease and increasing the pressure on education is a guarantee of therapeutic success, which will be reflected in the health, social and economic sphere. The aim of the article is to summarize the issues of definition, epidemiology, pathogenesis, risk factors and treatment of ischemic heart disease.

Streszczenie

Choroba niedokrwienna serca (ChNS) jest rezultatem ograniczonego dopływu krwi do mięśnia sercowego. W ponad 95% przypadków przyczyną ChNS jest zmniejszenie przepływu wieńcowego spowodowanego miażdzycą tętnic wieńcowych, dlatego celem opisu tego zespołu chorobowego często zamiennie stosuje się termin „choroba wieńcowa". Choroba niedokrwienna serca w ocenie Światowej Organizacji Zdrowia jest nadal najczęstszą przyczyną śmierci tak w Polsce, jak i na świecie. Z powodu przewlekłej choroby niedokrwiennej serca cierpi w Polsce 2,5% populacji, tj. ok. 1 miliona osób, spośród których 100 tys. rocznie zapada na zawał serca. Na przestrzeni ostatnich dwóch dekad w Polsce wzrosła umieralność z powodu choroby niedokrwiennej serca u osób poniżej 65. roku życia. Pomimo szerokiej polityki istnieje problem pomiędzy obecnymi wytycznymi postępowania a kontynuowaniem zaleceń przez pacjenta. Dobra komunikacja między personelem medycznym a pacjentem z chorobą niedokrwienną serca oraz zwiększenie nacisku na edukację stanowią gwarancję sukcesu terapeutycznego, co przełoży się na sferę zdrowia zarówno w kwestii społecznej, jak i ekonomicznej. Celem artykułu było podsumowanie zagadnień dotyczących definicji, epidemiologii, patogenezy, czynników ryzyka i leczenia choroby niedokrwiennej serca.

Conflict of interest
Konflikt interesów
None
Brak konfliktu interesów

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INTRODUCTION

One of the most serious problems of modern times are cardiovascular diseases. Ischemic heart disease is still the most common cause of death in Poland and in the world. Number of deaths due to this disease will increase from 7 200 000 in 2002 to 11 000 000 in 2020 (1, 2).

The aim of this study is to draw attention to still present problems of patients with ischemic heart disease by presenting current definition, epidemiology of disease, pathogenesis, risk factors and treatment methods.

DESCRIPTION OF KNOWLEDGE

In the available literature can be found various definitions and descriptions of the ischemic disease form. It should be emphasized here that the contemporary definition includes stable coronary disease and acute coronary syndromes (3). According to the European Society of Cardiology (ESC) coronary artery disease (CAD) is defined as an episode of a reversible incommensurability between the nutrient needs of the cardiac muscle and its demand that is associated with ischemia or hypoxia. Stable CAD also includes a stable, often asymptomatic phase of the disease after having an acute coronary syndrome (ACS) (4). Acute coronary syndromes are a group of diseases characterized by changes in coronary circulation, according to ESC, it includes acute myocardial infarction (MI). The unstable angina is defined by the European Cardiac Society as ischemia of the myocardium at rest or with minimal effort, in which there is no necrosis of cardiomyocytes (4).

EPIDEMIOLOGY

Due to the high occurrence frequency of risk factors as well as the aging of the population, ischemic heart disease is still the most frequent cause of deaths in Poland and in the world. According to the World Health Organization (WHO), the number of deaths due to ischemic heart disease will increase from 7 200 000 in 2002 to 11 000 000 in 2020 (2). The incidence of angina pectoris in men between 45 and 54 increases from 2% up to 5% and in 56-, 74-year-olds grow from 11 to 20%. In women, they are at the level of 0.5-1% and 10-14%, respectively. After the age of 75, the frequency of diagnosing ischemic heart disease is comparable in both genders (2, 5). Epidemiological studies show that the elimination of harmful risk factors such as smoking, alcohol abuse, lack of physical activity, unhealthy and irregular nutrition, stress, lack of sleep, influences the behavior of health to a greater extent than genetic factors, quality of medical care or environmental conditions (6).

PATHOGENESIS

Ischemic heart disease is a pathophysiological condition caused by the disproportion between the myocardial oxygen demand and its supply. Nutrition of the myocardium depends on the oxygen capacity of the blood and the amount of coronary flow (7). Ischemia is caused by an myocardial oxygen demand at the time of the provision of coronary artery spasm or intravascular blood clotting at the site of ruptured atherosclerotic plaque. This results in limiting the coronary flow. It is possible to combine all of those mechanisms at one time. In general, the pathology relates to large coronary arteries in which stenosis reduces the coronary reserve in proportion to the degree of vasoconstriction. Stenosis may be accompanied by spasm amplifying the size of it. Ruptured atherosclerotic plaque often becomes a substrate for intravascular clotting leading to acute coronary events (2). During acute ischemia oxygen deficiency impairs oxidation of glucose and free fatty acids (FFA), so the main source of energy becomes enzymatic cytoplasmic glycolysis. Secreted catecholamines (epinephrine and norepinephrine) intensify the hydrolysis of fats, which reach to the heart. As a result of the reduced supply of glucose promotes the oxidation of free fatty acids while becoming the only source of energy during which the oxygen consumption is increased, and the reserve decreases rapidly, thereby forcing the cell to move to the anaerobic glycolysis. This causes accumulation of lactates and hydrogen ions. Several seconds of ischemia impairs contractility and relaxation of the myocardium. Lack of return of the myocardium reperfusion for 45-60 minutes' leads to necrosis of the heart cells, i.e. a heart attack (5).

RISK FACTORS

The first of these are non-modifiable factors which includes individual factors: male gender, age (risk of disease increases with age), family history incidents and co-morbidities (kidney disease, thyroid disease, hormonal therapy, hypercholestreolemia, type I and II diabetes and chronic conditions inflammatory) (8, 9). The second group is modifiable factors which accumulate the most common factors that can be eliminated or minimized by changing the lifestyle. These include stress, alcohol, smoking and so-called metabolic syndrome including: elevated glucose, hypertension, inflammation of various origins, visceral obesity, lipid disorders and thrombotic conditions (10).

PHARMACOLOGICAL TREATMENT

The main goals of pharmacological treatment of ischemic heart disease are reducing the number of nagging symptoms and preventing cardiovascular events (11). The main groups of drugs used are: short and long-acting nitrates, β-blockers, calcium channel antagonists, lipid-lowering drugs, anticoagulants, angiotensin-converting-enzyme inhibitors (ACE inhibitors). General conservative treatment includes the inclusion of at least one antianginal/anti-ischemic drug and drugs used to prevent cardiovascular events. At this stage of treatment, it is important to educate patients about the disease entity, risk factors and treatment (12). In fighting with angina, short-acting nitrates are recommended. First-line therapy includes β-blockers and/or calcium channel antagonists. Depending on the heart rate and arterial pressure, long-acting nitrates are added (12). The prevention of cardiovascular events is based on all patients on low-dose acetylsalicylic acid (ASA). In the event of intolerance of ASA, clopidogrel is recommended. In addition, statins are recommended for all of patients. In the case of heart failure, hypertension or diabetes, ACE inhibitors are used. This general strategy can be modified depending on comorbidities, patient preferences and costs of treatment (12-14).

NON-PHARMACOLOGICAL TREATMENT

The main goals of non-pharmacological treatment of ischemic heart disease include reduction of clinical symptoms and improved prognosis. This therapy includes lifestyle modification, risk factor control and patient education. Smoking is one of the most strongly affecting risk factors for ischemic heart disease. All patients should avoid tobacco smoke, both as active and passive smokers. Smoking cessation is potentially the most effective preventive measure (15). To broadly defined healthy lifestyle should be added adequate, balanced diet. A Mediterranean diet is recommended. Balanced nutrition should lead to a reduction in weight so that body mass index (BMI) should be < 25 kg/m^2. Reduction of body weight and its regular control positively effects on blood pressure, glucose metabolism and lipid disorders. Diet conducive to patients with ischemic heart disease contains of 200 grams of fruit and 200 grams of vegetables per day. Dietary recommendations suggest avoiding of unsaturated fatty acids. 30-45 grams of fiber derived from whole grains, fruits and vegetables. In addition, patients should consume fatty fish twice a week. Alcohol consumption should be limited to 2 units (20 grams) in men and 1 unit (10 grams) in women (16). Salt intake should be limited to < 5 grams per day (flat teaspoon). It is worth paying attention to the purchase of low sodium water instead of sweet high calorie drinks (10). Regular physical activity should be part of everyday life. Patients should be instructed to do aerobic exercise. Exercises reduce unnecessary kilograms, act against blood clotting, reduce blood glucose levels and improve well-being. Training sessions at least 3 times a week for 30 minutes is the minimum recommended by the European Society of Cardiology (3, 10). In patients with ischemic heart disease, a comprehensive risk reduction including influenza vaccination is recommended (17). To achieve maximum control over the disease should be paid attention on the occurrence of stress, depression and anxiety in patients. This directly affects the acceptance of the disease and adjust to treatment recommendations (8, 18).

CONCLUSIONS

In spite of wide prevention, there is a problem between the current guidelines and the patient's continuing of recommendations. Good communication between medical staff and patient with ischemic heart disease and increasing the pressure on education is a guarantee of therapeutic success, which will be reflected in the health, social and economic sphere. Doctors and nurses are the right group of people to use prevention. The use of questionnaires in conjunction with measurements of body weight and blood pressure at nurse's work should enable the identification of the majority of people with an increased risk of ischemic heart disease.

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received/otrzymano: 12.11.2018
accepted/zaakceptowano: 03.12.2018