Stroke as a civilization disease

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Abstract

Background: Stroke is one of the three leading causes of death in the world. Young people are also more and more affected. The reasons for this phenomenon are divided into two categories, modifiable and non-modifiable. The former include: hypertension, dyslipidemia, diabetes or cardiovascular disease. Factors that can not be modified include age, gender, race, as well as genetic predispositions and previous impacts. Behind the main principles of primary prevention means: regular monitoring of blood pressure, treatment of metabolic disorders, carotid angioplasty, and most important lifestyle change. The secondary principles of prophylaxis include antiplatelet therapy, anticoagulant therapy as well as surgical treatment. The aim of the study was to present stroke as a disease of civilization, with particular regard to its possible pathogenesis and prevention.

Materials and methods: The literature was reviewed from the medical databases PubMed, Google Scholar and EBSCO. We adopted as key words: stroke, prevention, cerebral infarction, civilization disease.

Results: Stroke has become a civilization disease. It is more and more often the cause of deaths in Poland and in the world. Epidemiology of this phenomenon has been thoroughly known. Risk factors

for the incidence of stroke have been grouped, as well as methods for preventing and treating this phenomenon.

Conclusions: The stroke affects more and more people. Its causes have been known. These include risk factors that can be modified by, for example, changing lifestyle.

Key words: stroke, prevention, cerebral infarction, civilization disease.

Introduction

The nervous system is a physiologically very complex system of connections that integrates different types of reactions at its levels, from simple ones like reflexes that condition the basic needs of the body, to complex activities such as thinking, mental functions [1]. Each incident occuring in the brain may permanently or temporarily disturb the proper functioning of nervous system structures, which in turn may lead to deficits, depending on the location and extent of damage [2].

Definition of stroke

In order to understand the nature of the disease, which is a stroke, it is necessary to become familiar with its definition. Substantively, however, the concept of stroke defined in different literature boils down to the same thing. According to the World Health Organization (WHO, 1983), this is: "a clinical syndrome characterized by the sudden appearance of focal or global cerebral dysfunctions, which if they do not lead to death, last longer than 24 hours and have no other cause than vascular" [3]. Another term for this deficit was presented in 1990 by the american National Institute for Nervous System Diseases and Stroke, describing it as: "a set of symptoms resulting from a temporary or permanent impairment of central nervous system function through ischemic or hemorrhagic processes in which there was primary damage to one or more brain vessels through pathological process occurred" [4]. More generally, stroke is defined as acute and irreversible neurological symptoms resulting from a brain vessel disease that leads to cerebral circulatory disorders. It can occur without losing consciousness or with losing it, and its cause is one of two different mechanisms: hemorrhage or embolism either clot. The above descriptions, however, do not include vascular incidents such as transient circulatory disorders in the brain, i.e. TIA (transient ischemic attack). From the above-mentioned incidents it is differentiated by the fact that they last less than an hour and have no other features of cerebral infarction [5, 6, 7, 8].

Purpose of work

Considering the high incidence of stroke in clinical practice, the decision was made to consolidate the most important and up-to-date information on the subject matter. This will allow for faster assimilation of knowledge necessary for healthcare professionals, patients and their families.

Materials and methods

The literature was reviewed from the medical databases PubMed, Google Scholar and EBSCO. We adopted as key words: stroke, prevention, cerebral infarction, civilization disease.

Results
Epidemiology

Vascular stroke is defined as a civilization disease, because it has become not only a medical problem but also a social problem. Analyzing epidemiological data there is no doubt as to the validity of this statement, because this type of vascular incidents are right after cardiovascular diseases and cancer, the third most common cause of death in developed countries and the most leading cause of permanent physical and mental disability. According to the estimates each year about 15 million people in the world occur the stroke, and up to 5 million of them die. The risk of falling ill increases with age, therefore the largest proportion of patients affected by this disease are adults over 40 years of age and elderly, however, also cases of falling ill are registered in young people and children. In Poland, there are reported about 60 000 new cases of stroke annually. Incidence rate of stroke in our country remains at the average European level and is 175/100 000 for men and 125/100 000 for the female part of society. Unfortunately, data on the frequency of deaths are slightly worse, as they are 106/ 100 000 in the male group and 79/100 000 in women and have not shown a declining trend over the past few years. Among patients who have suffered a stroke, about 60% suffer from motor disability expressed to a different degree, half of them require care or are practically dependent, which causes serious socio-economic problems [4, 9, 10, 11, 12].

Types of strokes and their symptoms

According to the traditional division, haemorrhagic strokes and ischemic strokes are distinguished. The latter may be due to embolism or thrombosis. The essence of ischemic, i.e. ischemic strokes, is a cerebral infarction, and the cause of hemorrhagic strokes may be a weakening of the vessel wall, for example, by the formation of an aneurysm or a developed atherosclerosis. The hemorrhagic strokes include intracerebral and subarachnoid haemorrhages. In addition to these types of stroke, there are transient incidents or ischemic attacks that may be similar to stroke, but the symptoms disappear within 24 hours [13].

The clinical picture of stroke is dependent on the etiology of the disorder and the location and extent of the lesion focus. It is variable in time and dynamic. Neurological deficits may be manifested by qualitative and quantitative disturbances of awareness and consciousness. The symptoms include focal paresis or paralysis, aphasia, sensory disturbances, vision, balance, swallowing, and sphincter dysfunction often that the extensive ischemia is more common. The group of vegetative symptoms is formed by cardiac arrhythmias and blood pressure, sleep disorders, diabetes insipidus and thermoregulatory disorders. Usually, the symptoms of stroke are divided into those caused by ischemia of the anterior cerebral circulation and those caused by disorders in the area of the posterior cerebral circulation, i.e. in the vertebrobasilar system. The following picture describes the symptoms of a stroke depending on its etiology and the location of the stroke [4, 8, 14]:

The frontal area of vascularization
Internal carotid artery:
-paresis or hemiplegia on the side opposite to the damage, -aphasia, when the stroke includes the dominant hemisphere, -hypoaesthesia, -hemianopsia and disorders associated look sideways, -blindness eye on the side, where there was a blood clot, -positive spastic symptoms along with spastic increase in muscle tone.
Central cerebral artery:
-hemiplegia face and upper limb contralateral -aphasia, when the stroke includes the dominant hemisphere, -hypoaesthesia -hemianopsia and disorders associated look sideways, -intensification of self reactions and spastic symptoms, -Wernicki-Manna walking disorder.
Front artery:
-paralysis of the lower limbs and / or upper limb paresis, -possible disturbances of sensation with a distribution analogous to paresis, -less often facial-brachial paresis, -intensification of self-reactions and spastic symptoms.

The rear area of vascularization
Spinal arteries:
-dizziness, -balance disorders, -tinnitus and hearing loss, -submedullary syndrome, which consists of facial disorders, hemiparesis, anti-compromised fissure sensory disturbances and Horner syndrome (eyelid drooping, collapsing of the eyeball, narrow pupil position) -suddenly falls due to a sudden relaxation of the lower limbs. -alternating bulbous syndromes including nerves IX, X, XI and XII.
Basilar artery:
-quadriplegia, -disturbances of consciousness, -damage involving cranial nerves: III, IV, VI and VII.
Posterior cerebral artery:
Ø Cortical branches: -hemianopsia on the opposite side of the disorder, -in the case of closing the light of both arteries - cortical blindness, Ø Branches running to the thalamus and midbrain: -hemianopsia on the opposite side, hyperpathia and hypoesthesia (thalamic syndrome) -alternate paresis including nerve III, -alternating extrapyramidale tremos with hemiplegia.

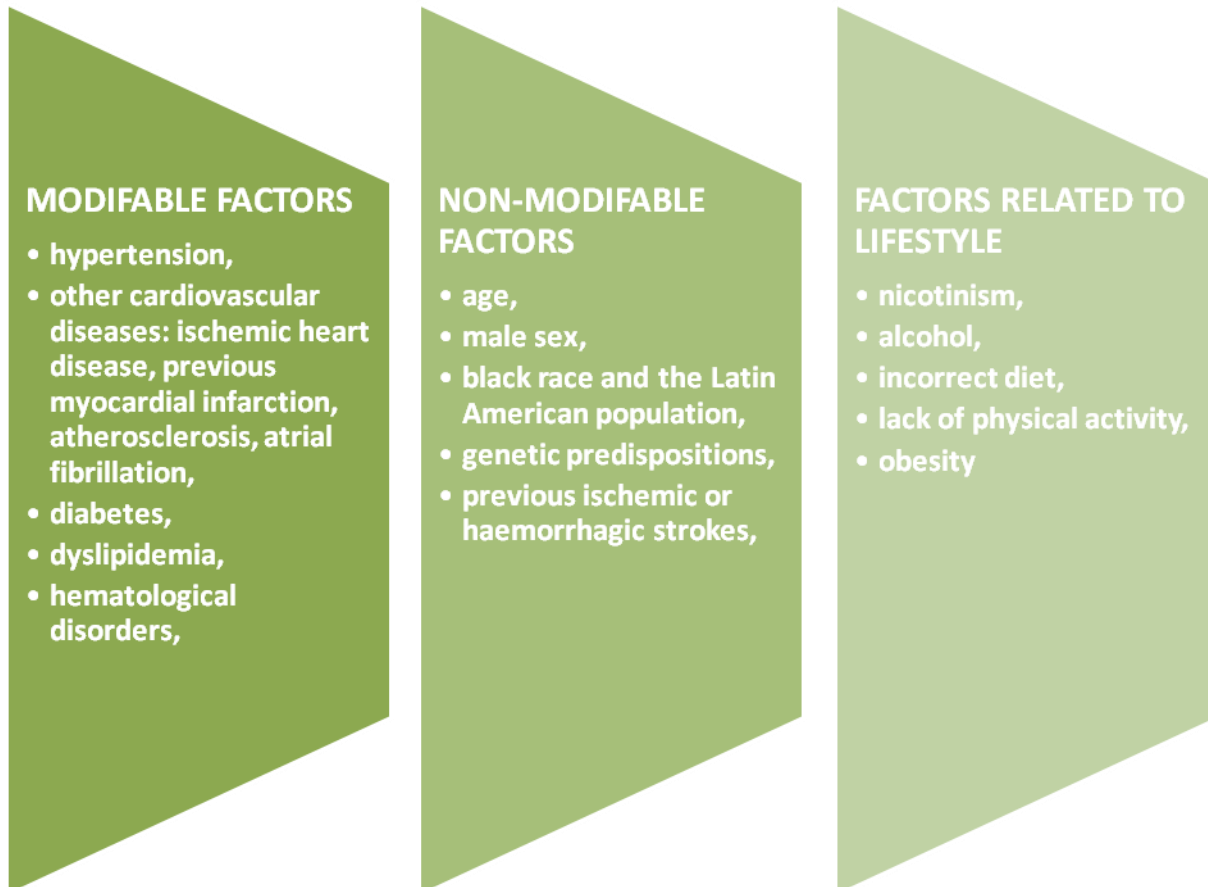| Hemorrhagic stroke - intracerebral bleeding: |
|---|
| -symptoms usually manifest themselves during physical exertion or when experiencing strong emotions and develop quickly, often within a few minutes,
-focal symptoms correlated with the location of a defect, for example hemiparesis or hemiplegia, numbness, aphasia, or setting the eyeball in the direction of the stroke fokus,
-on the paresis side, there is also a positive Babinski's sign, limb fall, pipe symptom, Baniewicz's symptom,
-severe headaches,
-vomiting, nausea,
-disturbances of awareness and consciousness, there may also be convulsions,
-sometimes is decerebration rigidity. |
| **Hemorrhagic stroke - subarachnoid haemorrhage:** |
| -suddenly a strong, throbbing headache, often most strongly felt in back of the neck and occiput,
-disturbances of awareness and consciousness, there may also be convulsions,
-meninx symptoms,
-there may be focal symptoms depending on the location of the bleeding,
-cerebral epileptic seizure,
-psychiatric disorders may join [4, 5, 8, 14]. |

Regardless of what type of stroke has occurred, it is very important to quickly recognize the symptoms and immediately start treatment, because the time that has elapsed since the first symptoms occurred may determine the future health condition of the person affected. The faster the reaction, the better predictions and prognosis can be expected, and probably less wasting in the body will be made by the emerging vascular incident. Stroke, according to the most often ischemic statistics, nowadays affects not only the elderly, but also young people, that is why the prevention and monitoring of risk factors, which will be described in the next part of the work, is so important.

Risk factors for stroke

Epidemiological data provide us with knowledge about statistics, numbers specifying the frequency and severity in the population of a disease which is a stroke, but it is also necessary to consider what factors affect this, which may be the reason for its emergence. Stroke through its prevalence and high death rate has become the subject of many studies to determine the risk factors. The most transparent division identifies risk factors that are modifiable, non-modifiable and those associated with lifestyle. The table below presents such a division model, and selected reasons will be described in more detail: [15]

MODIFABLE FACTORS

- hypertension,
- other cardiovascular diseases: ischemic heart disease, previous myocardial infarction, atherosclerosis, atrial fibrillation,
- diabetes,
- dyslipidemia,
- hematological disorders,

NON-MODIFABLE FACTORS

- age,
- male sex,
- black race and the Latin American population,
- genetic predispositions,
- previous ischemic or haemorrhagic strokes,

FACTORS RELATED TO LIFESTYLE

- nicotinism,
- alcohol,
- incorrect diet,
- lack of physical activity,
- obesity

The main factor not subject to modification, and being in the group posing a greater risk of stroke is age, because with each subsequent decade of life the risk of stroke increases twice [16].

However, one of the most frequent and the most serious factors that may affect the occurrence of vascular diseases is arterial hypertension, which belongs to the group of modifiable factors. This is the most important cause of stroke, whether hemorrhagic or ischemic. The risk of vascular stroke increases directly in proportion to the increase in blood pressure. It has been assumed that hypertension increases the risk of a cerebral incident by four times. The maximum safe blood pressure has not yet been demonstrated, however a reduction in systolic blood pressure by 10 and diastolic blood pressure by 5 mmHg may reduce the risk of disease by 30%. Unfortunately, hypertension is a very common problem, as it affects about 1/3 of the adult population and increases with age, as it covers over 60% of people over 65 years of age. Assuming that this is the most important risk factor for stroke, a very important element in the prevention of this disease should be antihypertensive therapy, which aims to lower blood pressure using pharmacotherapy [17].

Another potential cause is dyslipidemia. The possibility of falling into a stroke increases with increasing triglycerides and LDL / HDL. Studies conducted in recent years have reported that the risk in patients of both sexes rises by 6 to 25% for each increase in total cholesterol by 1mmol / L of

blood. The affinity of low HDL cholesterol and increased triglycerides for ischemic stroke were also found. However, the association of dyslipidemia with stroke is still not clearly elucidated. Lipid metabolism disorders belong to the group of modifiable factors, because it is largely influenced by our lifestyle, and above all the diet. Hypercholesterolemia may also contribute to the development of atherosclerotic disease [18].

Atherosclerotic stenosis of the intracerebral arteries, which may be caused by ischemic heart disease, peripheral atherosclerosis or hypertension, is also an important factor. Atherosclerosis causing the formation of deposits of cholesterol and other lipids, which in turn leads to the formation of atherosclerotic plaque, which reduces the lumen of the vessel and at the time of detachment can come to its complete closure. The result is the ischemia of the organs provided by the given vessel, in the case of carotid arteries - the human brain. Low risk causes carotid artery stenosis less than 50% and no clinical symptoms. On the other hand, carotid stenoses with more than 70% of its light are particularly at risk. In such cases, endarterectomy should be performed, i.e. treatments to remove atherosclerotic plaque from the vessel, or alternatively angioplasty with stenting [9, 12].

The group of factors directly dependent on our lifestyle include nicotine, alcohol consumption, poor diet and lack of physical activity. Smoking is an independent risk factor for both ischemic and haemorrhagic stroke. Studies have shown that tobacco smokers are more than twice as likely to get sick as non-smokers. In the case of physical activity, this is a clear association with stroke. Too little activity indirectly and directly increases the risk of developing cardiovascular diseases, including stroke. It is recommended to take regular, moderate physical exercise, such as walking, jogging or cycling for at least 30 minutes a day. An important relationship with the above-mentioned group of diseases is also an inadequate diet that may lead to hypercholesterolemia, hypertension or obesity, which are also independently mentioned as risk factors for stroke. In prevention of strokes, diet low in sodium and rich in potassium is recommended, because it promotes lowering of blood pressure, and consumption of less animal fats and larger portions of fruit and vegetables [4, 6, 10, 14,].

Factors that are possible causes of stroke are, as you can see, dependent: poor diet, lack of exercise, stress or nicotinism can lead to hypertension, cardiovascular disease or hypercholesterolemia, which in turn may cause atherosclerosis. It is therefore necessary to take care of all the above-mentioned aspects that may have an impact on increasing the risk of stroke, and prevention and public education in this area become a very important tool.

Prevention of stroke and patient health education

Prevention of stroke can be divided into primary and secondary. The original one refers to people who have not suffered a stroke and want to prevent it, whereas the secondary one refers to patients after a vascular incident and contains elements that prevent its subsequent appearance.

Considering the risk factors for stroke, it can be concluded that prophylaxis is currently the best tool for managing vascular diseases [14, 19].

The education of the public in the field of primary prevention plays a very important role, because, observing its assumptions, one can largely protect against severe cerebrovascular disease and long-term disability or alleviate the course of the disease if it develops. The main principles of primary prophylaxis include:

Ø control of blood pressure and effective treatment of hypertension, keeping them at 140/90 mmHg;

Ø treatment of metabolic disorders;

Ø anticoagulant prevention in people with heart defects or atrial fibrillation;

Ø carotid angioplasty (with a stenosis greater than 60%);

Ø change of lifestyle - practicing regular physical activity, change of eating habits, rejection of smoking and excessive alcohol consumption [20].

Secondary prevention, in turn, is designed to minimize the risk of recurrence, but also to treat complications resulting from prolonged lying after a stroke. In the acute phase of the stroke, the patient is exposed to such complications, most often they are respiratory or urinary tract infections, deep vein thrombosis or decubitus ulcers. Properly quick startup of the patient, correct pro-treatment and implementation of treatment of venous thromboembolism and infections play an indispensable role in improving the results of rehabilitation. The main assumptions of secondary prevention of stroke recurrences are:

Ø antiplatelet therapy - administration of anti-aggregation drugs;

Ø anticoagulant therapy - administration of anticoagulants;

Ø surgical treatment - arterial angioplasty;

Ø treatment of lipid disorders - administration of hypolipemic drugs and dietary treatment;

Ø treatment of hypertension

Ø a change in lifestyle is very important [20, 21].

Analyzing the risk factors of stroke and its epidemiology, one can notice how important the role of education in health and prevention, both primary and secondary, should play in society. Patients should be taught normal habits, encouraged to be active and change some aspects of their lives so that they would be able to avoid the very serious cerebral circulation disorder which is stroke, because, as everyone knows, prevention is better than cure.

Conclusions

The stroke affects more and more people. His cause has been known. These include risk factors that can be modified by changing lifestyle, among other things. There are also non-modifiable risk factors, including age, gender, race or previous strokes. There are many methods to prevent

stroke. Due to the time of application, we can divide them into primary and secondary prophylaxis.

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