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Selected Risk Factors of Ischemic Stroke

Wybrane czynniki ryzyka udaru niedokrwiennego mózgu

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;
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Abstract

Background. Stroke is a major cause of mortality and disability in the world. Risk factors of stroke increase several times the risk of stroke and the associated long-term health complications. That is why it is important to identify prevalence of the risk early factors and to reduce them by appropriate treatment, education and lifestyle changes.

Objectives. The aim of the study is an analysis of occurrence of risk factors of ischemic cerebral stroke among people who had stroke and those who did not have.

Material and Methods. The study included 60 stroke patients hospitalized in 4th Military Hospital in Wrocław in the Department of Neurology and of 60 randomly selected people who did not have a stroke. A special made questionnaire was used. The material was developed using Microsoft Office Excel 2007 and Word 2007, and statistical analysis was performed using Statistica 10.

Results. Analysis of the material showed: high prevalence of risk factors in patients with stroke, such as drinking too much coffee (90%), smoking (58%), alcohol (57%), hypertension (48%); low level of physical activity among the respondents – 3/4 of respondents are not engaged in any sport, and more than 60% spend free time in a passive way; obesity as a risk factor for stroke is more common in the group who did not have stroke than in patients after stroke.

Conclusions. The prevalence of risk factors for patients with stroke is common and significantly increase the risk of recurrent stroke. The incidence of ischemic stroke is more common for women and people between 34 and 64 years old (75% of the study group) (Piel. Zdr. Publ. 2013, 3, 4, 331–335).

Key words: stroke, risk factors.

Streszczenie

Wprowadzenie. Udar mózgu jest jedną z głównych przyczyn śmiertelności oraz niepełnosprawności we współczesnym świecie. Czynniki ryzyka udarów niedokrwiennych mózgu zwiększają wielokrotnie ryzyko zachorowania oraz związanych z tym długofalowych powikłań zdrowotnych, dlatego konieczne wydaje się wczesne rozpoznawanie osób zagrożonych wystąpieniem udaru niedokrwiennego oraz ograniczenie czynników ryzyka przez odpowiednie leczenie, edukację i zmianę stylu życia.

Cel pracy. Analiza czynników ryzyka udaru niedokrwiennego mózgu występujących wśród osób po przebytym udarze mózgu oraz u tych, które nie miały udaru.

Materiał i metody. Badania przeprowadzono wśród 60 pacjentów po udarze mózgu, hospitalizowanych w 4. Wojskowym Szpitalu Klinicznym we Wrocławiu na Oddziale Neurologii oraz wśród 60 losowo wybranych osób, które nie miały udaru mózgu. Posłużono się kwestionariuszem ankiety własnego autorstwa. Materiał opracowano za pomocą pakietu Microsoft Office Excel 2007 i Word 2007, a analizę statystyczną wykonano z wykorzystaniem programu Statistica 10.

Wyniki. Analiza materiału badawczego wykazała: częste występowanie kilku czynników ryzyka u pacjentów z udarem mózgu, takich jak: picie nadmiernej ilości kawy (90%), palenie papierosów (58%), picie alkoholu (57%), nadciśnienie tętnicze (48%); niski poziom aktywności fizycznej wśród ankietowanych – trzy czwarte badanych nie uprawia żadnego sportu, a ponad 60% spędza czas wolny w sposób bierny; otyłość jako czynnik ryzyka udarów mózgu występuje częściej w grupie badanych osób, które nie przeżyły udaru, niż w grupie chorych po udarze.

Wnioski. Występowanie kilku czynników ryzyka u pacjentów z udarem mózgu jest częste i w istotny sposób zwiększa zagrożenie wystąpienia ponownego udaru. Zachorowalność na udar niedokrwienny mózgu częściej dotyczy kobiet oraz osób w wieku 34–64 lat (75% badanej grupy) (Piel. Zdr. Publ. 2013, 3, 4, 331–335).

Słowa kluczowe: udar mózgu, czynniki ryzyka.

Stroke is one of the main causes of disability and death in developed countries [1]. In Poland about 60.000 people fall ill with cerebral strokes per year which places us at an average European level and it has been invariable for a few years now. Unfortunately, stroke mortality rates are much higher in our country than in the USA and countries of Western Europe [2].

Due to introduction of general prophylaxis and treatment of circulatory system diseases as well as improvement of care for patients with stroke, a systematic decrease of mortality and disability associated with cerebral stroke is recorded in many countries around the world. Prognosis in the disease can be distinctly improved due to an appropriate preventive procedure. Professional prophylactic and therapeutic actions can significantly reduce number and intensification of complications, which are the main reason for mortality in an early period of stroke [1].

Probability of stroke occurrence increases along with co-occurrence of particular risk factors. Due to their diagnosis and limitation, it is possible to efficiently prevent from falling ill and disease recurrences. Three groups of risk factors of stroke can be distinguished [3–5]:

a) non-modifiable – age > 65 years of age, male gender, genetic factors, the black race, changes of seasons – (autumn/winter), socioeconomic factors – stroke occurs more often in people with lower socioeconomic status;

b) modifiable reliable – arterial hypertension; heart diseases, diseases of valves, vessels and dyslipidemia;

c) modifiable probable – overweight, obesity, small physical activity; alcohol overuse; hyperhomocysteinemia; hormone replacement therapy and oral contraceptives.

The aim of the study is to analyse the occurrence of risk factors of ischemic cerebral stroke among people who had stroke and those who did not have.

Material and Methods

Consent no. KB–4/2012 of Bioethics Commission of Wrocław Medical University was obtained to carry the studies.

Research for the study aims was conducted among randomly selected 60 patients after cerebral stroke hospitalized in 4th Wrocław Military Clinical Hospital at Neurology Department from

March 2012 to December 2012. Obtained results were compared to results of surveys carried out among 60 randomly selected people who did not have cerebral stroke.

An original survey questionnaire was used for conducting the studies. Questionnaires were filled in by a nurse in the presence of a patient or his family in case of patient's disability.

An analysis of collected statistical materials was made with the use of Microsoft Office Excel 2007 packet and STATISTICA PL version 10. Statistically significant results were those for which $p < 0.05$.

Results

The biggest group among patients were females (61%); males (55% of the group) prevailed among people without stroke. Statistical analysis showed that difference in the number of females in both groups was not statistically significant (62% vs. 45%, $p = 0.067$).

Straight majority of the respondents among both groups are people aged between 55 and 64 and living in a city. In both groups prevail people remaining in the state of matrimony (60% respondents from each group) who have good social conditions. Among the respondents the largest group were people with vocational education (32% people in the group of patients with stroke and 45% people in the group without stroke), those who are still professionally active (about 52% respondents) and those who perform physical work (67% people from the group of patients with stroke and 77% people without stroke).

Statistically significant differences were not found among the groups of respondents as regards: age ($p = 0.742$), place of residence ($p = 0.432$), social conditions ($p = 0.236$), marital status ($p = 0.385$), education ($p = 0.186$) and professional activity ($p = 0.095$).

Among the respondents sedentary lifestyle is led by 25% people with stroke and nearly half (45%) without stroke. Definite preference of passive way of spending free time was also revealed (68% patients and 57% people without stroke). Unfortunately, as many as 77% patients after stroke and 68% people from the group who did not suffer from it do not do any sports. Statistically significant differences among the groups of respondents were not found as regards: a kind of performed work ($p = 0.224$), lifestyle ($p = 0.068$),

a way of spending free time ($p = 0.187$) and doing sports ($p = 0.307$).

Nearly half of people without stroke and those with past stroke do not smoke cigarettes. Among people addicted to nicotine the largest group are people smoking about one pack of cigarettes a day (every 3rd respondent after stroke and every 5th without stroke). Among the respondents 57% patients suffering from stroke and 42% people without stroke drink alcohol (statistically insignificant difference ($p = 0.068$)). Unfortunately, 10% people from each group drink alcohol every day. Statistical analysis showed that the group of patients suffering from stroke consume more stimulants than the group of people without stroke ($p = 0.002$).

In the group of patients after stroke 16% suffer from hypothyroidism, 18% – blood vessel diseases, 25% – diabetes, 25% – heart diseases, 28% – ather-

omatosis and 48% – arterial hypertension. Among people who did not have stroke 10% suffer from atheromatosis, 18% – hypothyroidism, 20% – heart diseases, 20% – blood vessel diseases, 22% – diabetes and 45% – arterial hypertension. An analysis indicated that the group of patients with stroke was in a statistically significant way more exposed to risk of stroke occurrence due to atheromatosis than the group of people without stroke ($p = 0.0006$). Statistically significant differences of the groups of respondents were not revealed as regards occurrence of different diseases from risk group.

The group of people after stroke had statistically significant lower LDL level than the group without stroke (median 150 vs. 178.5, $p = 0.018$). However, a statistically significant difference was not recorded between the groups of respondents within HDL ($p = 0.449$).

Table 1. Selected risk factors of ischemic strokes in groups of respondents

Tabela 1. Wybrane czynniki ryzyka udarów niedokrwiennych a stan zdrowia badanych

Risk factors of ischemic strokes	Persons after past cerebral stroke (% studied population)	Persons without stroke (% studied population)	All the respondents (% population)	Statistical significance ($p < 0.05$)
Drinking 2 and more coffees per day	90	80	85	SI*
Not doing sports	77	68	73	SI*
Physical work	67	77	72	SI*
Not using appropriate diet	83	58	71	$p = 0.003$
Passive way of spending free time	68	57	63	SI*
Smoking cigarettes	58	52	55	$p = 0.012$
Primary and vocational education	52	53	53	SI*
Drinking alcohol	57	42	49	SI*
Arterial hypertension	48	45	47	SI*
Marital status – single or widow/widower	40	35	38	SI*
Sedentary life style	25	45	35	SI*
Overweight	43	20	32	SI*
Occurrence of stroke among family	3	33	32	SI*
Obesity	17	43	30	$p = 0.001$
Rare consumption of vegetables and fruit	25	35	30	SI*
Using oral contraceptives	22	30	25	SI*
Consumption of wheat bread	28	22	25	$p = 0.025$
Heart diseases	25	20	23	SI*
Diabetes	25	22	23	SI*
Atheromatosis	28	10	19	$p = 0.0006$
Consumption of animal fat	25	13	19	$p = 0.014$
Other vascular diseases	18	20	19	SI*
Hypothyroidism	17	18	18	SI*
Bad social conditions	12	10	11	SI*
Unemployment	13	7	10	SI*

SI* – statistically insignificant.

The analysis also showed that the group of patients after stroke was less obese in a statistically significant way than the group without stroke (17% vs. 43%, $p = 0.001$). Whereas in 1/3 respondents occurrence of strokes in family was found.

Questions concerning diet showed that only 17% people from the group of patients with stroke and 41% respondents without stroke use special diets. Among patients after stroke the largest group were people consuming mixed fats (52%), whereas in the group of people without stroke those who consume vegetable fats prevail (48%). 40% of people from both groups consume vegetables and fruit every day. Persons after stroke most often consume poultry (77%), pork (38%) and beef (12%). Persons without stroke enjoy eating poultry (50% respondents) and pork (33%), more seldom – beef (17% people). In both groups the most frequently consumed bread is mixed bread. The analysis showed that the group of patients with stroke took care of diet less than people from the group without stroke (17% vs. 42%, $p = 0.003$). Statistically significant is a difference between groups within the scope of using vegetable fats ($p = 0.014$) and consuming wheat bread ($p = 0.025$). Besides, there are no statistical differences between the responding groups.

Discussion

According to different authors, males suffer from stroke slightly more often [4–6]. However, in our own research the largest group of people after cerebral stroke were females and persons aged 35–64 (75%), which is contrary to statements of most authors that ischemic stroke is the domain of people of advanced age (> 60 years of age) [6].

Scientific studies prove that a 10-year approximate stroke risk (according to Framingham Score) is higher in people with diagnosed arterial hypertension than in people with correct values of arterial blood pressure [8]. In our own studies nearly every second respondent in both groups suffered from arterial hypertension (however this difference was not statistically significant). In studies by Bejer et al. [7] and Banecka et al. [6] that percentage was even higher – among Poles relatively 72%, among Germans 75% and 92% among those treated in Neurology Clinic in Gdańsk.

Experts [1] think that physical activity is connected with decrease of stroke risk. Studies showed that females who walk more than 2 h a week had 30% lower stroke risk than females who do not walk [9]. Unfortunately, only every 5th respondent who went through stroke and every 3rd without stroke do some sports with various frequency (that difference is not statistically significant).

According to Banecka et al. [6] as many as 85% patients with stroke are characterized by lack of physical activity.

Straight majority of the respondents (90%) use stimulants, 50% drink coffee, 60% smoke cigarettes, 55% drink alcohol. A group of experts [1] claims that alcohol overuse leads to increase of stroke risk. It is also confirmed by research conducted by Mukamal et al. [10]. Unfortunately 10% respondents in both groups drink alcohol every day. Also in the research by Banecka et al. [6] percentage of people overusing alcohol was 10%, whereas according to the studies by Bejer et al. [7] this problem concerns a marginal percentage of people after stroke.

There is a correlation between a number of smoked cigarettes and pack-years of smoking and stroke risk and other vascular diseases [11]. Smoking tobacco increases stroke risk by 1.5 to 3 times and giving up smoking decreases it significantly. Also passive exposure to tobacco smoke may cause stroke [12]. Unfortunately, in our own research over half respondents smoke cigarettes. Whereas according to other authors [6, 7], among people after stroke the percentage of smokers is definitely lower.

Moreover, persons suffering from diabetes have 1.5–3 times bigger risk of stroke occurrence compared to people with correct glucose levels in blood [13]. Among the respondents every 4th patient who went through stroke and every 5th one from the group without stroke suffers from diabetes. Similar results in the group of people after stroke were obtained by Bejer et al. [7] and Banecka et al. [6] as well.

An increased level of total cholesterol is one of important risk factors of strokes. It is proved by studies carried out by Zhang [14]. In the group of people without stroke 40% have an increased LDL level. An analysis revealed that the group of patients had statistically significant lower LDL level than the group of people who did not suffer from stroke (median 150 vs. 178.5, $p = 0.018$). The studies by Bejer et al. [7] show that every 5th Pole and every 2nd German has increased values of total cholesterol. Among people treated in Neurology Clinic in Gdańsk [6] over 50% had increased values of total cholesterol and more than 40% – LDL cholesterol.

Positive family history towards cerebrovascular diseases predisposes family members to stroke occurrence. Stroke risk in person whose father had stroke is 3 times higher than in people without positive family history. Stroke risk also increases in case of stroke burden among siblings [15]. In 22% respondents cerebral strokes occurred in families (in 6 cases among siblings).

Diet and dietary habits are factors which have influence on stroke risk. Studies conducted by Fung et al. [16] suggest that high consumption of

red and processed meat, white bread and sweets may increase stroke risk, whereas consumption of vegetables and fruit, fish and whole wheat bread prevents another stroke. Unfortunately over 80% respondents from the group of patients and 59% respondents without stroke do not use any special diet. More than 40% respondents consume mainly PORK (42%), while 30% eat fruit and vegetables only twice a week. An analysis showed that the group of patients with stroke cared of diet less than people from the group without stroke ($p = 0.003$).

Conclusions

Occurrence of a few risk factors in patients with cerebral stroke is frequent and significantly increases hazard to occurrence of another stroke.

The largest incidence of ischemic cerebral stroke applies to females and people between 34 and 64 years of age.

Most respondents lead not a very active life style and spend their time passively.

Obesity more frequently occurs in the group of respondents who did not suffer from stroke.

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