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Retrospective Analysis of Patients in the Aspect of the Prevalence of Alcohol Abuse Among Patients with Stroke Treated in the Department of Neurology

Retrospektywna analiza pacjentów w aspekcie rozpowszechniania nadużywania alkoholu wśród chorych z udarem mózgu leczonych w Oddziale Neurologii

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Abstract

Introduction. Alcohol is a drug that is harmful to many organs, especially the brain, and may contribute to worse recovery in stroke patients treated in a neurological ward. There are few works in the literature dealing with alcohol-related problems in patients with stroke.
Aim. Assessment of the prevalence of alcohol abuse in stroke and its impact on the diagnostic and therapeutic process in groups of patients diagnosed with harmful alcohol consumption or alcohol dependence syndrome.
Material and Methods. The material consisted of 2770 medical records of patients hospitalized in the Department of Neurology with the Stroke Treatment Sub-Department at the Specialist Hospital of Stanisław Staszic in Piła from January 1 to December 31, 2015, which were analysed in terms of alcohol abuse by patients. Patients with stroke (40 people) were analysed in detail. The results of laboratory tests, risk factors, gender and age of the patients were analysed. The following methods of scientific research were used in the study: analysis of medical records, statistical analysis of quantitative and qualitative data with the use of STATISTICA v. 13.3 computer program by StatSoft.
Results. There were 40 patients with ischemic and haemorrhagic stroke who abused alcohol in total (29.85%). Among patients with stroke, 70% presented harmful drinking, 30% — alcohol dependence syndrome. More than two risk factors for stroke were reported more frequently in the group of patients with stroke who abused alcohol than in those with stroke but did not abuse alcohol (38.8% vs. 30.0%; $p=0.0561$). In laboratory studies, stroke patients who abused alcohol compared to non-drinkers had a statistically significantly higher red blood cell (MCV) volume, higher levels of the liver enzymes ASPAT and ALAT; $p<0.05$.
Conclusions. The lack of real information on the amount of alcohol consumed by a patient can make the diagnostic and therapeutic process very difficult, and thus delay the full diagnosis and implementation of the appropriate therapy. The study should be extended to include a prospective assessment. In order to increase the detection of alcohol abuse in patients, an objective interview, psychological assessment focused on the problem would be necessary, and the use of questionnaires with short, simple but precise questions that would allow to quantify the alcohol problem in a patient. **(JNNN 2020;9(4):145–151)**
Key Words: alcohol abuse, risk factors, stroke

Streszczenie

Wstęp. Alkohol jest używką, która oddziałuje szkodliwie na wiele narządów, a zwłaszcza na mózg i może przyczyniać się do gorszego zdrowienia pacjentów z udarem mózgu leczonych w oddziale neurologicznym. W literaturze mało jest prac poruszających problemy alkoholowe u pacjentów z udarem mózgu.
Cel. Ocena rozpowszechnienia nadużywania alkoholu w udarach mózgu i wpływ na proces diagnostyczno-terapeutyczny w grupach pacjentów, u których zdiagnozowano picie alkoholu szkodliwe lub zespół zależności alkoholowej.

Materiał i metody. Materiał stanowiło 2770 historii chorób pacjentów hospitalizowanych w Oddziale Neurologii z Pododdziałem Leczenia Udarów Mózgu w Szpitalu Specjalistycznym im. Stanisława Staszica w Pile w okresie 01.01. –31.12.2015 r., które analizowano pod kątem nadużywania alkoholu przez pacjentów. Szczegółowej analizie poddano chorych z udarem mózgu (40 osób). Analizie poddano wyniki badań laboratoryjnych, czynniki ryzyka, płeć i wiek chorych. W pracy posłużono się następującymi metodami badań naukowych: analiza dokumentacji medycznej, analiza statystyczna danych o charakterze ilościowym i jakościowym z wykorzystaniem programu komputerowego STATISTICA v. 13.3 firmy StatSoft.

Wyniki. Pacjentów z udarem mózgu niedokrwiennym i krwotocznym nadużywających alkohol łącznie było 40 (29,85%). Spośród pacjentów z udarem mózgu 70% prezentowało picie szkodliwe, 30% — zespół zależności od alkoholu. W grupie pacjentów z udarem nadużywających alkohol w porównaniu do pacjentów z udarem ale nie nadużywających alkoholu częściej odnotowano występowanie powyżej dwóch czynników ryzyka udaru (38,8% vs 30,0%; p=0,0561). W badaniach laboratoryjnych pacjenci z udarem nadużywający alkohol w porównaniu do nie pijących mieli znamiennie statystycznie większą objętość krwinki czerwonej (MCV), wyższy poziom enzymów wątrobowych ASPAT i ALAT; p<0,05.

Wnioski. U pacjentów z udarem mózgu należy zwracać szczególną uwagę na to czy nadużywają alkohol. Brak prawdziwej informacji na temat ilości spożywanego przez pacjenta alkoholu może bardzo utrudniać proces diagnostyczno-terapeutyczny i tym samym opóźnia postawienie pełnej diagnozy i wdrożenie właściwej terapii. Badanie należałoby rozszerzyć o ocenę prospektywną. W celu zwiększenia wykrywalności nadużywania alkoholu u pacjentów konieczny byłby wywiad obiektywny, ocena psychologiczna ukierunkowana na ten problem, zastosowanie ankiet z krótkimi, prostymi, ale precyzyjnymi pytaniami, które pozwoliłyby oszacować problem alkoholowy w sposób ilościowy u pacjenta. **(PNN 2020;9(4):145–151)**

Słowa kluczowe: nadużywanie alkoholu, czynniki ryzyka, udar mózgu

Introduction

Chronic alcohol abuse causes permanent damage to the central and peripheral nervous system [1,2]. Ethyl alcohol is toxic to the brain as the main part of the central nervous system (CNS) and to the nerve trunks and roots that are part of the peripheral nervous system. The frontal lobes of the brain are damaged the earliest, followed by the temporal, parietal and occipital lobes. The type and severity of damage depends on many factors, including on the quantity and quality of alcohol consumed, the age at which the patient began to abuse alcohol, and malnutrition [3,4].

Stroke is one of the most common diseases of the nervous system, and due to its consequences, it is one of the most serious medical problems. World Health Organization (WHO) has defined a stroke as a sudden onset of focal or generalized disturbances in the functions of the central nervous system lasting more than 24 hours or leading to death. The definition was modified in 2013 and now also includes conditions in which clinical symptoms of a stroke last less than 24 hours, if the ischemic focus is clearly documented by neuroimaging and correlates with neurological symptoms [5–7]. There are two main types of stroke: ischemic stroke, where the vessel obstructs, and haemorrhagic stroke, where blood flows from a blood vessel in the brain and destroys brain tissue. Risk factors that contribute to its occurrence play an important role in the occurrence of strokes. The well-documented risk factors for stroke include non-modifiable factors such as age, sex, race, genetic factors and modifiable factors, the elimination of which may reduce the risk of stroke. Modifiable factors include: arterial hypertension, heart disease, smoking, lack of physical activity, alcohol abuse, drug addiction, and improper diet. Therefore, stroke prevention is becoming extremely important both in people who have not had a stroke (primary prevention) and in patients who have had a stroke incident (secondary prevention). Effective prevention requires the identification, treatment and elimination of risk factors for stroke [8,9].

Alcohol is a risk factor for both ischemic and haemorrhagic stroke types at any time in life. Regardless of the route of administration, ethanol causes vasoconstriction, proliferation of blood vessels and affects the thickness of the arterial wall, and often causes haemorrhagic focus [10]. Alcohol as a risk factor for stroke should be considered in terms of chronic abuse, occasional excessive consumption, and repeated incidents of excessive, regular consumption, most often at weekends.

The diagnostic process of an alcohol problem among patients is not simple. How can alcohol dependence be distinguished from risky or harmful drinking? Initial diagnosis of both hazardous and harmful drinking and addiction is possible thanks to screening questionnaire methods, laboratory tests and physical examination. It is difficult to detect abuse in clinical work because typical clinical signs may not be visible until the patient reaches an advanced stage of addiction. Hence, the assessment of the patient's behaviour, interview and physical examination play an important role in the diagnosis of alcohol abuse. The most frequently used measurement techniques used in clinical diagnosis are the Michigan Alcoholism Screening Test (MAST), test the Alcohol Use Disorder Identification Test (AUDIT), questionnaire Cut down, Annoyed, Guilty, Eyeopener (CAGE) and

the quantity/frequency test Quantity/Frequency Screen [11]. These tests are intended for use by medical/nursing staff in the initial conversation with the patient. Questionnaire methods are helpful, and laboratory tests — rather confirm the diagnosis [11,12]. A clinical diagnosis (e.g. addiction or harmful drinking) can be made without laboratory tests [13].

Clinical laboratory tests show lower sensitivity and specificity than questionnaires, but are useful for confirming the diagnosis of alcohol abuse by a patient [14–16]. The accuracy of these markers depends on various factors, including non-alcoholic liver injury, medicine or drug use, and metabolic disorders. Markers are helpful in estimating the quantitative disturbance of the studied parameters, and are also useful for tracking the dynamics of disturbances over time. The list of commonly used laboratory markers includes: blood ethanol levels, gamma-glutamyl transferase (GGT), transferrin, aspartate aminotransferase (ASPAT), alanine aminotransferase (ALAT) and mean red blood cell volume (MCV). The determination of ethanol in the blood is reliable for a short time, while an increase in GGT, MCV and CDT indicates chronic consumption of high doses of alcohol [15,16]. The results of laboratory markers can be used by general practitioners, in emergency rooms, psychiatric, neurological and internal medicine departments as a screening tool for patients. They can be very useful when we do not have the opportunity to collect an interview [16,17].

Material and Methods

The material consisted of 2770 medical records of patients hospitalized in the Department of Neurology with the Stroke Treatment Sub-Department at the Specialist Hospital of Stanisław Staszic in Piła from January 1 to December 31, 2015, which were analysed in terms of alcohol abuse by patients. Alcohol abuse was defined according to the International Statistical Classification of Diseases and Health Problems (ICD-10) as harmful alcohol drinking (F10.1.) and alcohol dependence syndrome (F10.2.). The diagnosis of alcohol abuse was based on an interview and/or on the basis of a psychologist's consultation. Out of the population of 134 alcohol abusing patients, patients with the basic diagnosis "Stroke" (40 people)were selected and their medical history was analysed and compared with the same number of patients with stroke but not abusing alcohol (control group). The control group (40 people) came from the same department and from the same period, from January 1 to December 31, 2015, what the study group and the histories of diseases were randomly selected. The results of laboratory tests, risk factors, gender and age of the patients were analysed.

Both these groups of patients were compared in terms of the following features:

1. Demographic data: age, gender.
2. Co-occurrence of several stroke risk factors in a single patient.
3. Assessment of the number of procedures performed in patients who abuse alcohol and do not abuse alcohol.
4. Assessment of laboratory test results.

The following research methods were used in the study: analysis of medical records, statistical analysis of quantitative and qualitative data with the use of the STATISTICA v. 13.3 computer program by StatSoft. Statistical inference was carried out using the following statistical methods: the compliance of the distribution of individual features with the normal distribution was examined using the Shapiro–Wilk test, the values of continuous variables were presented in the form of the arithmetic mean (X) and standard deviation (±SD), the values of the variables whose distribution differed significantly from the normal distribution were presented in the form of the median (Me) and the lower (Q_1) and upper (Q_3) quartile, minimum (Min) and maximum (Max), the values of categorized variables were presented as the number (N) and percentage values.

Results

In the analysed group of 134 alcohol abusing patients, the majority (73%) reported harmful alcohol consumption, while the remaining 27% consumed alcohol in a manner meeting the criteria of the Alcohol Dependency Syndrome (ADS). The analysis of the diagnosis groups in the respondents showed that the most common basic diagnosis in people abusing alcohol was stroke (according to ICD10: Stroke — I63, Cerebral haemorrhage — I61, which occurred in 29% of patients (n=40).

Patients with stroke and alcohol abusers were analysed in particular and compared with a matched group of patients with stroke but not abusing alcohol. Figure 1 presents the percentage distribution of stroke patients from the control group (patients who do not abuse alcohol) and the study group (patients who abuse alcohol). The control group consisted of 40 patients. In the study group, 28 patients presented Harmful Alcohol Consumption, 12 — ADS.

The age of patients with stroke and alcohol abusers ranged from 34 to 73 years with a median of 61.5 years, while in the non-abusing group these values were 45 and 72 years, respectively, with a median of 63.5 years; statistically insignificant difference (p=0.153). The age of the harmful drinking and ADS patients was similar and the median age was 60.5 years and 62.5 years,

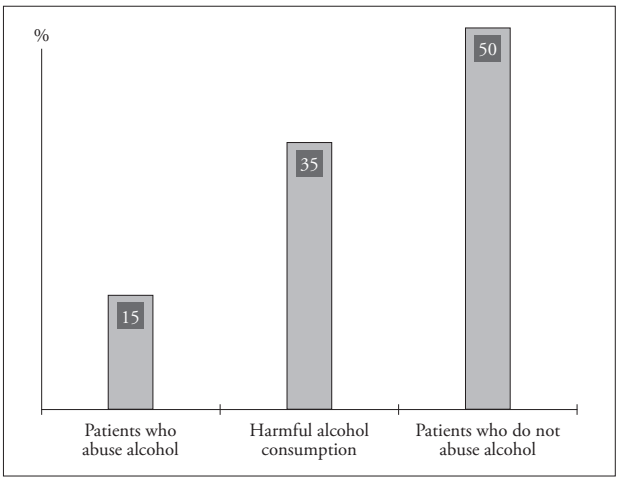

Figure 1. Patients with underlying disease — stroke abusing alcohol and patients not abusing alcohol treated at the Department of Neurology with the Stroke Treatment Sub-Unit at the Specialist Hospital in Piła from January 1 to December 31, 2015

respectively (p=0.8706). Tables 1 and 2 provide the demographics of the control and study patients with stroke.

Table 2 presents the gender distribution of the control and study groups of patients with stroke (in alcohol abusing patients divided into Harmful Alcohol Consumption and ADS). In the control group women constituted 52%, men — 48%, while among alcohol abusing patients the gender distribution was different: 88% of men and 12% of women (x^2=20.69, p<0.0001). The gender distribution was similar in the Harmful Alcohol Consumption and Alcohol Dependence Syndrome (x^2=2.44, p=0.1176).

Risk factors for stroke have been reported in patients abusing alcohol and in the control group: arterial hypertension, previous stroke, atherosclerosis, ischemic heart disease, diabetes, obesity, hypercholesterolaemia, and nicotinism.

Alcohol abusing patients with stroke did not differ significantly from one another depending on the number of risk factors for stroke. The occurrence of two or more risk factors was more frequent in people abusing alcohol (38.8%) compared to non-drinkers (30.0%), but the difference did not reach statistical significance (p=0.056) (Table 3).

Patients abusing alcohol compared to patients not abusing alcohol (control groups) had higher MCV, ASPAT and ALAT values. These were statistically significant differences, where p<0.005 (Table 4).

The Alcohol Harmful and ADS patients had similar RBC, MCV, glucose, ALAT, ASPAT and GGTP values.

Table 1. Age of patients with primary diagnosis of stroke

Group	Min	Q_1	Me	Q_3	Max	p
Does not abuse alcohol	45.00	57.50	63.50	67.50	72.00	0.153
Abusing alcohol	34.00	49.00	61.50	66.50	73.00	
Harmful Alcohol Consumption	39.00	49.00	60.50	66.50	73.00	0.8706
Alcohol Dependency Syndrome	34.00	50.00	62.50	66.50	70.00	

Table 2. Gender of patients with primary diagnosis of stroke

Group	Women		Men		Total	p
	N	%	N	%		
Does not abuse alcohol	21	52	19	48	40	
Abusing alcohol*	5	12	35	88	40	<0.0001
Harmful Alcohol Consumption	5	18	23	82	28	0.1176
Alcohol Dependence Syndrome	0	0	12	100	12	

* significant dependencies

Table 3. Occurrence of risk factors for stroke in a single patient with the underlying stroke disease

Number of risk factors for stroke	Patients abusing alcohol		Control group		chi^2	p
	N	%	N	%		
None	4	9.70	6	15.00	7.12	0.0561
1 risk factor	11	27.61	14	35.00		
2 risk factors	10	24.58	8	20.00		
>2 risk factors	15	38.81	12	30.00		

Table 4. Laboratory results of blood of alcohol-abusing patients and control group with main diagnosis of stroke

Laboratory parameter [units]	Alcohol abusing patients			Control group			p
	Me	Q_1	Q_3	Me	Q_1	Q_3	
RBC [million/ul]	4.61	4.39	4.88	4.62	4.22	4.95	0.5343
MCV [fL]*	92.25	87.20	98.85	88.05	85.00	91.00	0.0018
Glucose [mg/dl]	98.00	85.50	115.00	103.50	89.50	130.00	0.2339
ALAT [IU/L]*	26.50	19.00	37.50	18.00	14.00	22.50	0.0005
ASPAT [IU/L]*	31.00	21.50	39.00	19.50	15.00	25.50	<0.0001

* significant dependencies; RBC — red bloodcount; MCV — mean corpuscular volume; Glucose — the level of glucose in the venous blood; ALAT — alanine aminotransferase; ASPAT — aspartate aminotransferase

Discussion

Despite the preventive measures taken, the problem of ethanol abuse in the Polish population is not decreasing. Patients hospitalized at Neurology for various diseases, often struggle with the problem of alcohol abuse, which they usually try to hide. It seems that the alcohol problem has recently taken a back seat in stroke.

The conducted study shows that among patients treated in the Department of Neurology with the Department of Cerebral Stroke, there is a real problem of alcohol abuse, which is associated with numerous symptoms and neurological diseases. Similar risk factors for stroke have been reported in patients abusing alcohol and in the control group: arterial hypertension, previous stroke, atherosclerosis, ischemic heart disease, diabetes, obesity, hypercholesterolemia, and nicotinism. However, more than two risk factors were reported more frequently in the group of alcohol abusing stroke patients studied than in stroke patients who did not abuse alcohol; this difference was at the borderline of significance (38.8% vs. 30.0%; p=0.0561). To sum up: in the studied population of stroke patients, alcohol had a significant influence on the occurrence of more risk factors.

There are reports that low doses of alcohol (about 1 drink a day for women, 1–2 drinks a day for men) reduce the risk of ischemic stroke and increase the risk of consuming alcohol in larger amounts on a regular or occasional basis [18].

However, no such relationship was found for haemorrhagic stroke and each dose of alcohol is harmful, and the risk is increased by the amount of alcohol consumed (dependence type "J") [19]. The multicentre INTERSTROKE study found that moderate alcohol consumption (1–30 drinks per month) was associated with a reduced risk of ischemic stroke (0.79; 0.63–1.00), while heavy alcohol consumption and heavy drinking in a short period of time was associated with an increased risk of all strokes (1.51; 1.18–1.92), ischemic stroke (1.41; 1.09–1.82) and haemorrhagic (2.01; 1.35–2.99) compared with non-alcohol users [18]. Therefore, it is not advisable to recommend the consumption of low doses of alcohol as one of the types of prevention, especially in Poland, where the problem of alcohol abuse is a real problem [20].

The observation is that among stroke patients with multiple risk factors, they should be carefully assessed for alcohol abuse so as not to overlook this important risk factor for stroke that patients may not always want to talk about (and may not even realize that it is a risk factor for stroke).

Syta-Krzyżanowska et al. emphasize that in people with several risk factors, a wider diagnosis should be carried out in order to identify all risk factors and comorbidities, which may contribute to a better treatment of stroke [21].

In the INTERSTROKE study, which included 3,000 patients with the first stroke, it was found that the most common risk factor for stroke is arterial hypertension, followed by: smoking, dyslipidaemia, abdominal obesity, drinking alcohol in large quantities, diabetes, depression, psychosocial stress. These factors (including alcohol abuse) are responsible for 90% of strokes, and alcohol abuse increases the risk of ischemic stroke 1.41 times, and haemorrhagic — 2.01 times [22]. In addition, alcohol is a recognized risk factor for early recurrence of stroke in addition to high blood pressure, atrial fibrillation, diabetes, smoking and hypercholesterolaemia [20,23]. Alcohol abusing patients with stroke more often had a history of stroke than patients treated for a reason other than stroke, so it can be assumed that also in this case alcohol may be one of the factors that contributed to the recurrence of stroke. However, multivariate regression analysis did not confirm the finding that alcohol alone increased the risk of recurrent stroke [20,24]. It is worth noting that the abuse of alcohol and psychoactive substances increases the incidence of stroke among young adults under 55 [18,20].

In the study group of patients with stroke who abusing alcohol (both in ADS and in harmful drinkers), blood tests showed increased values of MCV, ASPAT and ALAT compared to patients who did not abuse

alcohol, and these differences turned out to be statistically significant ($p<0.005$). The obtained results are consistent with the data reported in the literature [15,25–27]. Increased MCV in alcohol abusing stroke patients in a recognized marker of alcohol abuse and may be considered if excessive alcohol consumption is suspected [15,25]. According to Savage et al., an increased MCV value is found in 65% of alcohol abusers, and only in 4% of the general population [28]. However, in other studies, MCV values in people abusing alcohol were within the normal range, although they were higher than in non-drinkers [26,27]. It should be remembered that not only alcohol contributes to an increase in MCV, but also many different diseases, such as hypothyroidism, certain medications, as well as folic acid and vitamin B12 deficiency [29].

Conclusions

Based on the obtained results and the performed statistical analysis, it was possible to draw conclusions:

1. In the studied group of patients, stroke patients abusing alcohol more often presented harmful drinking. More than two risk factors were more frequently present in stroke patients and alcohol abusers, which may lead to a worse prognosis.
2. For the diagnosis of alcohol abuse, the increased values of laboratory markers: MCV, ASPAT and ALAT turned out to be insufficient. It was necessary to assess the patient's clinical condition, an interview not only from the patient but from the patient's family/friends, examination using a dedicated questionnaire and assessment by a psychologist.
3. Lack of real information on the amount of alcohol consumed by a patient may make the diagnostic and therapeutic process very difficult, and thus delay the full diagnosis and implementation of appropriate therapy. In order to increase the detection of alcohol abuse in patients, it is necessary to have an objective interview, psychological assessment focused on the problem, and the use of questionnaires that would allow to quantify the alcohol problem in a patient.

Implications for Nursing Practice

In stroke patients, alcohol is an important risk factor for stroke. It would be advisable in the future to prospectively assess stroke patients for alcohol abuse by analysing laboratory tests using markers of alcohol abuse and using psychological assessment. This is why this is so important because alcohol abuse is a modifiable factor that can be influenced. By eliminating this risk factor, other important risk factors for stroke are affected, such as: hypertension, smoking, increased blood glucose levels, and low physical activity.

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