

PREVALENCE AND SEVERITY OF DEPRESSION IN DIFFERENT GROUPS OF PATIENTS WITH THE CONSEQUENCES OF ISCHEMIC STROKES

¹Babirad, A. M.; ¹Trufanov, Y. O.; ¹Svyrydova, N. K.; ²Badiuk, N. S.*

¹Shupyk National Healthcare University of Ukraine, Kyiv, Ukraine

²Odessa International Medical University, Odessa, Ukraine

*corresponding author *badiuk_ns@ukr.net

Abstract

Post-stroke depression is a common complication, affecting approximately one-third of patients who have had a stroke. Patients with post-stroke depression are at higher risk of recurrent vascular events, poor quality of life, and mortality. Despite the prevalence of post-stroke depression, uncertainty remains about predisposing risk factors and optimal prevention and treatment strategies.

The aim of our study was to investigate the prevalence and severity of depression in patients with the consequences of ischemic strokes depending on age, gender differences, education, interhemispheric asymmetry, presence of concomitant diseases (arterial hypertension), number of ischemic strokes (primary, recurrent) and their localization, degree of disability, severity of motor and cognitive neurological deficit, and laboratory parameters.

Material and methods. We examined 100 patients with consequences of ischemic strokes. To estimate the presence and degree of depression, the Hamilton Depression Rating Scale was used.

Conclusions. Depression was much more frequent in patients with the consequences of a suffered hemispheric ischemic stroke (IS), in patients with moderate and severe disability according to the Rankin Scale, in the group of patients with moderate and severe paresis, and in patients with dementia. The proportion of patients with moderate, severe and extremely severe depression significantly predominated among patients of young working age, in patients with the consequences of a transmitted hemispheric IS, in patients with moderate and severe disability according to the Rankin scale, in patients with moderate and severe paresis, and in patients with arterial hypertension and hypercholesterolemia. Our results show that the prevalence and severity of depression depend on the severity of the ischemic stroke, but at the same time, patients with the consequences of non-severe ischemic strokes with mild neurological symptoms can often develop moderate or severe depression, which will significantly impair their quality of life and require appropriate medical treatment.

All human studies were conducted in compliance with the rules of the Helsinki Declaration of the World Medical Association "Ethical principles of medical research with human participation as an object of study". Informed consent was obtained from all participants.

Keywords: *ischemic stroke, depression, Hamilton Depression Rating Scale.*

Introduction

Post-stroke depression is a common complication, affecting approximately one-third of patients who have had a stroke. Patients with post-stroke depression are at higher risk of recurrent vascular events, poor quality of life, and mortality. Despite the prevalence of post-stroke depression, uncertainty remains about predisposing risk factors and optimal prevention and treatment strategies [3, 6].

The aim of our study was to investigate the prevalence and severity of depression in patients with the consequences of ischemic strokes depending on age, gender differences, education, interhemispheric asymmetry, presence of concomitant diseases (arterial hypertension), number of ischemic strokes (primary, recurrent) and their localization, degree of disability, severity of motor and cognitive neurological deficit, and laboratory parameters.

Materials and methods

We examined 100 patients with consequences of ischemic strokes (66 men and 34 women). The mean age of the patients was 55.1 ± 1.1 years old.

The examination was carried out in the late rehabilitation period after the suffered ischemic stroke (>6 months after the beginning of the development of ischemic stroke) at the neurological and rehabilitation department of the Kyiv Regional Clinical Hospital No. 1, during the period of 2016–2019.

To assess the presence and the degree of severity of depression, we used the Hamilton Depression Rating Scale, which was developed to evaluate the state of patients with depressive disorders before, during, and after treatment, in order to observe clinical dynamics. It is by far the best, most reliable and sensitive clinical index for diagnosing the presence and severity of depression. In addition to its widespread use in clinical practice, it is also used in clinical trials, in which it is the “gold standard” for determining the effectiveness of medications in treating depressive disorders. The scale is used all over the world and has been translated into almost all European languages [1, 2, 4, 5]. The success of this scale is due to its comprehensive coverage of depressive symptoms and related psychopathology,

as well as its strong psychometric properties [7].

Statistical analysis of the data was performed using the standard statistical software package Microsoft Excel 2016 and Statistica 6.0. Non-parametric Mann-Whitney U-criterion for two independent samples and Fisher's F-test were used for statistical processing of the obtained results.

Results

We studied the prevalence and severity of depression in different groups of patients with consequences of ischemic strokes depending on age, gender differences, education, interhemispheric asymmetry, presence of concomitant diseases (arterial hypertension), number of ischemic strokes (primary, recurrent) and their localization, degree of disability, severity of motor and cognitive neurological deficit, and laboratory parameters.

When performing statistical calculations, we divided patients into three groups:

- patients without depression;
- patients with mild depression (such patients often did not require antidepressants to be prescribed);
- patients with moderate, severe and extremely severe depression (such patients required antidepressants to be prescribed).

When analyzing the frequency and severity of depression in different age groups of patients with consequences of IS, it was found that moderate, severe and extremely severe depression occurred more frequently in patients aged 29-55 years compared to the group of patients aged 56-83 years (Table 1). The greater proportion of patients with moderate and severe depression in the group of patients aged 29-55 was most likely due to the partial or full disability of patients of working age and, as a consequence, all the adverse consequences that follow (patients understood that if they lost their job because of their disability, their financial situation would significantly worsen). At the same time there were no reliable differences between the groups.

There were no significant statistical differences in the frequency and severity of depression as a function of gender differences in patients with the after-effects of IS (Table 2).

When discussing the results obtained, we can note that moderate and severe depression was more often observed in patients with higher education, and the proportion of patients without depression was higher in the group of patients with primary and secondary education, but there were no reliable differences between the groups (Table 3).

There were no statistically significant differences in the prevalence and severity of depression in right- and left-handed patients with the consequences of IS (Table 4).

The prevalence of depression was also independent of the number of ischemic strokes suffered. At the same time, mild depression was more frequently observed in patients with the consequences of several strokes, and moderate and severe depression in patients with the consequences of a single stroke ($p > 0.05$) (Table 5).

Depression was significantly more frequent in patients with hemispheric stroke consequences compared to patients with brain stem stroke (82.6% vs 59.1%, $p < 0.02$). The same tendency was observed in assessing the severity of depression: the proportion of patients with moderate and severe depression was higher in the group of patients with consequences of hemispheric stroke compared to the group of patients with stem stroke (37.7% vs 27.3%, $p > 0.05$).

Apparently, in patients with the after-effects of a stroke, cerebral hemispheric lesions may be associated with a higher incidence and severity of depression compared to patients who had a brain stem stroke (Table 6).

According to the results of our studies, the frequency and severity of depression were closely correlated with the results of disability according to the modified Rankin Scale. In patients with moderate and severe disability, depression was significantly more frequent and more severe compared to the group of patients without disability and with mild disability (Table 7).

When assessing the prevalence and severity of depression depending on the severity of paresis, we obtained predictable results (Table 8). Depression was significantly more common in the group of patients with moderate and severe paresis compared to the group of patients with normal

muscle strength and non-severe paresis ($p < 0.004$). The proportion of patients with moderate and severe depression was significantly greater in the group of patients with moderate and severe paresis, compared with the group of patients with normal muscle strength and indistinct paresis ($p = 0.05$).

We made an interesting observation that, unlike muscle strength, the degree of severity of ataxia did not reliably affect the prevalence and severity of depression in patients with the consequences of suffered IS (Table 9).

As it can be seen from Table 10, the proportion of patients without depression prevailed among patients with normal cognitive functions and patients with mild cognitive impairment, while patients with moderate and severe depression were more common among patients with dementia. There appears to be a relationship between the development of one of the most disabling non-motor symptoms, dementia and depression, in patients with the consequences of IS.

The proportion of patients with moderate and severe depression was twice as high in patients with the presence of arterial hypertension compared with the group of patients without arterial hypertension, but there were no significant differences between the groups (Table 11).

The proportion of patients with moderate to severe depression was significantly higher in patients with hypercholesterolemia compared with patients with normal cholesterol levels, but there were no significant differences between the groups (Table 12).

Obviously, the presence of hyperglycemia does not appear to affect the prevalence and severity of depression in patients with the aftermath of MI (Table 13).

Aspects of treatment

If there were no contraindications, we recommended prescription of antidepressants to all our patients with the consequences of ischemic stroke who had moderate to severe depression.

We used low doses of escitalopram (10 mg in the morning), trazadone (100 mg in the evening before bedtime), fluoxetine (20 mg in the morning), and amitriptyline (12.5 mg twice a day or 25 mg twice a day) to treat moderate to severe depression.

The choice of the antidepressant depended on

many factors, including its mechanism of action, efficacy, tolerance, side effects, additional therapeutic effects for treating anxiety (amitriptyline, trazadone), insomnia (amitriptyline, trazadone), neuropathic pain (amitriptyline), excessive daytime sleepiness (fluoxetine, much less escitalopram).

Out of the 32 patients with moderate to severe depression, 23 patients took antidepressants (one had a contraindication of Q-T interval prolongation, and 8 patients abstained from their use for one reason or another).

As early as the second week of treatment, subjectively, 16 patients (69.6%) noted a decrease in depression, and 4 patients (17.4%) noted the disappearance of depressive symptoms.

One patient who took amitriptyline had moderately pronounced excessive daytime sleepiness. In all our other patients, who took different antidepressants, side effects were not observed or were insignificant and did not interfere with further administration of the medications.

Conclusions

1. Depression was much more frequent in patients with the consequences of a suffered hemispheric IS, in patients with moderate and severe disability according to the Rankin scale, in the group of patients with moderate and severe paresis, and in patients with dementia.

2. The prevalence of depression was lower in the group of patients with the effects of stem stroke, in patients without disability or with the presence of mild disability on the Rankin scale, in patients with normal muscle strength or non-severe paresis, and in patients with normal cognitive function or non-severe cognitive impairment.

3. The proportion of patients with moderate, severe, and extremely severe depression was significantly prevalent among patients of young working age, in patients with consequences of hemispheric IS, in patients with moderate and severe Rankin Scale disability, in patients with moderate and severe paresis, and in patients with arterial hypertension and hypercholesterolemia.

4. Factors such as gender, education, right- or left-handedness, number of strokes, severity of ataxia, and presence or absence of hyperglycemia do not appear to significantly affect the prevalence and

severity of depression in patients with consequences of IS.

5. The results that we obtained show that the prevalence and severity of depression depend on the severity of the ischemic stroke, but at the same time, patients with consequences of not severe ischemic strokes with non-severe neurological symptoms may often develop moderate or severe depression, which will significantly impair their quality of life and require appropriate medical treatment.

Acknowledgments

The authors declare that there are no conflicts of interest.

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Table 1. Prevalence and severity of depression in different age groups of patients with the after-effects of IS

No.	Severity of depression	29-55 y.o.		56-83 y.o.		P
		Abs.	%	Abs.	%	
1.	No depression	11	20.4	11	23.9	> 0.05
2.	Mild	22	40.7	22	47.8	> 0.05
3.	Moderate, severe and extremely severe	21	38.9	13	28.3	> 0.05
	Total	54	100.0	46	100.0	

Table 2. Prevalence and severity of depression as a function of gender differences in patients with after-effects of IS

No.	Severity of depression	Men		Women		P
		Abs.	%	Abs.	%	
1.	No depression	15	22.7	7	20.6	> 0.05
2.	Mild	30	45.5	14	41.2	> 0.05
3.	Moderate, severe and extremely severe	21	31.8	13	38.2	> 0.05
	Total	66	100.0	34	100.0	

Table 3. Prevalence and severity of depression depending on education in patients with the after-effects of IS

No.	Severity of depression	Primary / Secondary		Higher		P
		Abs.	%	Abs.	%	
1.	No depression	18	23.1	4	18.2	> 0.05
2.	Mild	35	44.9	9	40.9	> 0.05
3.	Moderate, severe and extremely severe	25	32.1	9	40.9	> 0.05
	Total	78	100.0	22	100.0	

Table 4. Prevalence and severity of depression in right- and left-handed patients with consequences of IS

No.	Severity of depression	Right-handed		Left-handed		P
		Abs.	%	Abs.	%	
1.	No depression	19	23.2	3	16.7	> 0.05
2.	Mild	35	42.7	9	50.0	> 0.05
3.	Moderate, severe and extremely severe	28	34.1	6	3.3	> 0.05
	Total	82	100.0	18	100.0	

Table 5. Prevalence and severity of depression according to the number of strokes

No.	Severity of depression	Single stroke		Several strokes		P
		Abs.	%	Abs.	%	
1.	No depression	18	22.5	4	20.0	> 0.05
2.	Mild	33	41.2	11	55.0	> 0.05
3.	Moderate, severe and extremely severe	29	36.2	5	25.0	> 0.05
	Total	80	100.0	20	100.0	

Table 6. Prevalence and severity of depression depending on the localization of the lesion focus (dominant, subdominant hemisphere, brain stem)

No.	Severity of depression	Dominant hemisphere		Subdominant hemisphere		Brain stem	
		Abs.	%	Abs.	%	Abs.	%
1.	No depression	6	21.4	6	14.6*	9	40.9*
2.	Mild	11	39.3	20	48.8	7	31.8
3.	Moderate, severe and extremely severe	11	39.3	15	36.6	6	27.3
	Total	28	100.0	41	100.0	22	100.0

Note:

* - statistically significant differences between the group of patients with subdominant hemisphere lesions and the group of patients with brain stem lesions ($p < 0.05$).

Table 7. Prevalence and severity of depression depending on the degree of disability according to the modified Rankin Scale (0 – no symptoms, 1-2 points – mild disability, 3 points – moderate disability, 4-5 points – severe disability)

No.	Severity of depression	0-2 points		3-5 points		P
		Abs.	%	Abs.	%	
1.	No depression	9	36.0	13	17.3	< 0.04
2.	Mild	12	48.0	32	42.7	> 0.05
3.	Moderate, severe and extremely severe	4	16.0	30	40.0	< 0.002
	Total	25	100.0	75	100.0	

Table 8. Prevalence and severity of depression as a function of paresis severity (group I – patients with normal muscle strength and patients with non-severe paresis, group II – patients with moderate paresis, group III – patients with severe paresis and plegia)

No.	Severity of depression	Group I Muscle Strength 4-5 points		Group II Muscle Strength 3 points		Group III Muscle Strength 0-2 points	
		Abs.	%	Abs.	%	Abs.	%
		1.	No depression	19	29.7*#	2	8.3*
2.	Mild	27	42.2	11	45.8	6	50.0
3.	Moderate, severe and extremely severe	18	28.1	11	45.8	5	41.7
	Total	64	100.0	24	100.0	12	100.0

Note:

* - statistically significant differences between the group of patients with muscle strength of 4-5 points and the group of patients with muscle strength of 3 points ($p < 0.009$).

- statistically significant differences between the group of patients with muscle strength of 4-5 points and the group of patients with muscle strength of 0-2 points ($p < 0.04$).

Table 9. Prevalence and severity of depression depending on the severity of ataxia

No.	Severity of depression	Patients without ataxia and with non-severe ataxia		Patients with moderate and severe ataxia		P
		Abs.	%	Abs.	%	
1.	No depression	12	20.0	10	25.0	> 0.05
2.	Mild	28	46.7	16	40.0	> 0.05
3.	Moderate, severe and extremely severe	20	33.3	14	35.0	> 0.05
	Total	60	100.0	40	100.0	

Table 10. Prevalence and severity of depression in the group of patients with normal cognitive functions and mild cognitive impairment in comparison with patients with dementia

No.	Severity of depression	Patients without dementia *		Patients with dementia		P
		Abs.	%	Abs.	%	
1.	No depression	15	37.5	7	11.7	< 0.002
2.	Mild	14	35.0	30	50.0	> 0.05
3.	Moderate, severe and extremely severe	11	27.5	23	38.3	> 0.05
	Total	40	100.0	60	100.0	

Note:

* The group of patients without dementia included those with normal cognitive functions and patients with mild cognitive impairment.

Table 11. Prevalence and severity of depression in the groups of patients with and without arterial hypertension

No.	Severity of depression	Without arterial hypertension		With arterial hypertension		P
		Abs.	%	Abs.	%	
1.	No depression	3	27.3	19	21.3	> 0.05
2.	Mild	6	54.5	38	42.7	> 0.05
3.	Moderate, severe and extremely severe	2	18.2	32	36.0	> 0.05
	Total	11	100.0	89	100.0	

Table 12. Prevalence and severity of depression in the groups of patients with and without hypercholesterolemia

No.	Severity of depression	Level of cholesterol lower than 4.5 mmol/L		Level of cholesterol higher than 4.5 mmol/L		P
		Abs.	%	Abs.	%	
1.	No depression	1	12.5	10	24.4	> 0.05
2.	Mild	6	75.0	17	41.5	< 0.04
3.	Moderate, severe and extremely severe	1	12.5	14	34.1	> 0.05
	Total	8	100.0	41	100.0	

Note:

* Normal cholesterol levels in patients at high risk for cerebrovascular and cardiovascular disease were defined as levels less than 4.5 mmol/L.

Table 13. Prevalence and severity of depression in the groups of patients with and without hyperglycemia

No.	Severity of depression	Fasting level of glucose 6.0 mmol/L and lower		Fasting level of glucose 6.0 mmol/L and higher		P
		Abs.	%	Abs.	%	
1.	No depression	11	17.5	3	15.8	> 0.05
2.	Mild	30	47.6	8	42.1	> 0.05
3.	Moderate, severe and extremely severe	22	34.9	8	42.1	> 0.05
	Total	63	100.0	19	100.0	