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PHENOMENOLOGICAL ANALYSIS OF DEPRESSIVE AND ANXIOUS MANIFESTATIONS IN PATIENTS WHO UNDERWENT CARDIOSURGERY

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Abstract

Among the undeniable advantages of surgical tactics in the treatment of patients with various forms of cardiovascular disease, there are problematic issues, including neurological complications, especially cerebrovascular disorders and postoperative encephalopathy, and often associated psychopathological disorders based on postoperative hypoxic-ischemic lesions, which remain one of the most difficult and dangerous complications of operations under the conditions of artificial circulation (AC).

The aim was to carry out clinical and phenomenological analysis of psychopathological manifestations of depression and anxiety in patients who underwent cardiac surgery (CS) with AC in the postoperative period, both in general and in terms of individual types of vascular and neurological pathology, to determine further directions of their rehabilitation.

Material and research methods. Using the approach of a structured clinical-diagnostic interview with the help of a specially developed questionnaire, we clinically examined 700 patients who were treated at the Heart Institute of the Ministry of Health of

Ukraine and who underwent CS under the conditions of AC. Among the examined patients, there were 86 patients (12.3%) with cerebral infarction (CI), 217 patients (31.0%) with the signs of postoperative encephalopathy and 504 patients (72.0%) with manifestations of cognitive dysfunction.

Results. It has been established that patients who underwent cardiac surgery had the symptoms of depression and anxiety. The most severe depressive and anxiety manifestations are characteristic of patients with cerebral infarction in the postoperative period of cardiac surgery; they are less significant in patients with signs of postoperative encephalopathy. They are the least significant in patients with signs of cognitive dysfunction. At the same time, the severity of depressive and anxiety phenomena in patients with this pathology was significantly ($p<0.01$) higher than in patients who underwent cardiac surgery without the corresponding pathology.

Conclusion. The identified patterns should be considered when developing treatment, rehabilitation and preventive measures for patients who underwent cardiac surgery with postoperative neurological complications.

Key words: cardiac surgery under the conditions of artificial blood circulation; anxiety; depression; neurological complications

ФЕНОМЕНОЛОГИЧЕСКИЙ АНАЛИЗ ДЕПРЕССИВНЫХ И ТРЕВОЖНЫХ ПРОЯВЛЕНИЙ У ПАЦИЕНТОВ, КОТОРЫЕ ПЕРЕНЕСЛИ КАРДИОХИРУРГИЧЕСКИЕ ВМЕШАТЕЛЬСТВА

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Резюме

Среди неоспоримых преимуществ хирургической тактики лечения пациентов с различными формами сердечно-сосудистой патологии, существуют и проблемные вопросы, среди которых неврологические осложнения, и, прежде всего, нарушения мозгового кровообращения и послеоперационная энцефалопатия, и отчасти ассоциированные с ними психопатологические нарушения, в основе которых лежат – ишемические поражения, остающиеся одними из наиболее тяжелых и опасных осложнений операций в условиях искусственного кровообращения (ИК).

Цель исследования: провести клинико-феноменологический анализ психопатологических проявлений депрессии и тревоги у пациентов, перенесших кардиохирургические вмешательства (КХВ) из ИК, в послеоперационном периоде, как в целом, так и в разрезе отдельных видов сосудистой и неврологической патологии, для определения, в дальнейшем, направлений их реабилитации.

Материал и методы исследования. С использованием подходов структурированного клинико-диагностического интервью с помощью специально разработанной анкеты нами было клинически обследовано 700 пациентов, находившихся на лечении в Институте сердца Министерства здравоохранения Украины, и которым было проведено КХВ в условиях ИК. Среди обследованных пациентов было 86 больных (12,3%) с инфарктом мозга (ИМ), 217 (31,0%) пациентов с признаками послеоперационной энцефалопатии и 504 пациента (72,0%) с проявлениями когнитивной дисфункции.

В **результате** исследования установлено, что пациенты, перенесшие КХВ, показывают проявления депрессивной и тревожной симптоматики. Наиболее тяжелые депрессивные и тревожные проявления свойственны больным с инфарктом мозга в послеоперационном периоде КХВ, менее существенны – пациенты с признаками послеоперационной энцефалопатии, и наименьшие – пациенты с признаками когнитивной дисфункции. В то же время, выраженность депрессивных и тревожных феноменов у пациентов с этой патологией оказалась значительно ($p<0,01$) выше, чем у пациентов, перенесших КХВ, без соответствующей патологии.

Вывод. Выявленные закономерности следует учитывать при разработке лечебно-реабилитационных и профилактических мероприятий для пациентов с КХВ с послеоперационными неврологическими осложнениями.

Ключевые слова: кардиохирургическое вмешательство в условиях искусственного кровообращения; тревога; депрессия; неврологические осложнения

Introduction.

At present, the cardiac surgery field is one of the most progressive and dynamic, demonstrating convincing progress in introducing cardiac surgery (CS) under the conditions of artificial circulation (AC). However, along with the undeniable benefits of significantly improving surgical tactics in the treatment of patients with various forms of cardiovascular disease, there are problematic issues, including neurological complications, especially

cerebrovascular disorders and postoperative encephalopathy, and often associated psychopathic disorders, which are based on postoperative hypoxic-ischemic lesions (HIL), which remain one of the most difficult and dangerous complications of operations under the conditions of AC.

The prevalence of stroke after such surgeries is from 2% to 5%, encephalopathy is from 10% to 30%, and various manifestations of cognitive dysfunction (impairment of memory, attention, visual and spatial abilities, psychomotor disorders, etc.) are found in 50-70 % of operated patients during the early postoperative period, remaining in the form of persistent cognitive impairment in 30-50% of patients; approximately 40% of patients who underwent cardiac surgery under the conditions of AC, had the manifestations of cognitive dysfunction even five years later after a surgery [1, 2]. Recent studies emphasise that postoperative HIL cannot be ignored, as they are a significant factor in reducing the quality of life and high mortality rate of patients [3-5].

There is also no doubt nowadays that affective psychopathological symptoms have a negative effect on the course of cardiac pathology, including postoperative consequences of CS. At the same time, along with depression, which in most cases is the basis of psychopathological changes, patients have anxiety, panic and post-traumatic stress disorders [6, 7]. Significant amounts of data have been accumulated to support the common pathogenetic mechanisms of adverse neurological and cardiac effects of CS and affective disorders, and attempts to consider these phenomena as separate pathological and clinical phenomena have failed to explain current complications and risks [7-10]. In this regard, most of the negative affective manifestations and risk factors for postoperative complications of CS are considered a complex phenomenon of negative affectivity known as neuroticism, which is confirmed both at the theoretical and empirical levels [9-12].

Therefore, **the aim of this study** was to carry out a clinical and phenomenological analysis of psychopathological manifestations of depression and anxiety in the postoperative period in patients who underwent CS with AC, both in general and in terms of individual types of vascular and neurological pathology to determine further directions of their rehabilitation.

Materials and research methods. We clinically examined 700 patients who were treated at the Heart Institute of the Ministry of Health of Ukraine and who underwent CS under the conditions of AC. Among the examined patients, there were 86 patients with cerebral infarction (MI), 217 patients with signs of postoperative encephalopathy and 504 patients with manifestations of cognitive dysfunction. The comparison was performed in

pairs: the patients who had this pathology were compared to those who had not this pathology. The study included surveys using the Hamilton Depression Rating Scale (HDRS), the Beck Depression Inventory (BDI), and the Hamilton Anxiety Rating Scale (HAM-A). Statistical analysis of the differences in the quantitative values of indicators was performed using the nonparametric Mann-Whitney U test.

Findings and discussion

In general, patients who underwent CS had higher levels of depression (Table 1, Figure 1).

Table 1

Indicators of depression on the HDRS in patients who underwent CS

Indicators	I M±m / Me (Q_{25}–Q_{75}), scores
Overall indicator of depression	11,6±5,6 / 10,0 (8,0–14,0)
Non-dynamic depression	10,1±4,0 / 9,0 (7,0–13,0)
Agitated depression	5,6±2,5 / 5,0 (4,0–7,0)
Depression with fear	6,2±2,7 / 5,0 (4,0–7,0)
Undifferentiated depression	1,8±1,9 / 1,0 (0,0–3,0)

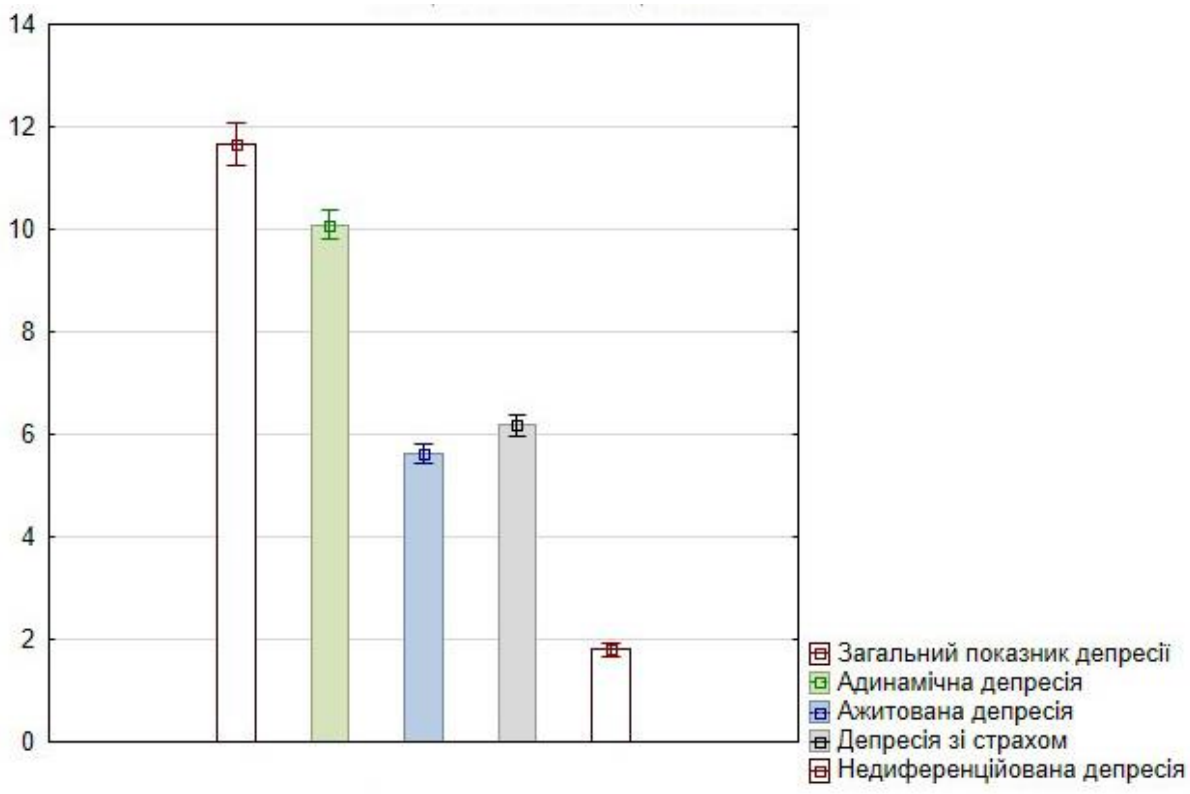


Fig. 1. Quantitative indicators of depression on the HDRS scale (scores) in patients who underwent CS (squares mark the average values of indicators, horizontal lines mark 95% of the confidence interval)

The mean value of depression on the HDRS in the examined patients was 11.6 ± 5.6 scores, which corresponded to mild depressive disorder (8 to 13 scores). At the same time, it should be noted that in the researched group, 6.0% of patients had very severe depression (over 22 scores) on the HDRS, and 8.7% of patients had the depression index which corresponded to severe depression (19-22 scores), 13.3% of patients had the indicators which corresponded to the depression of moderate severity (14-21 scores). Most of the patients (50.0%) had mild depression (8-13 scores). A significant number of examined patients (22.0%) had no signs of depression (up to 7 scores).

Patients who underwent CS had also high levels of depression due to the types of depression: non-dynamic, agitated, depression with fear, and undifferentiated depression.

Higher indicators of non-dynamic depression (10.1 ± 4.0 scores), in our opinion, show the specifics of cardiac pathology. A decrease in motor activity accompanies them; at the same time, they are associated with increased rates of depression with fear (6.2 ± 2.7 scores) and agitated depression (5.6 ± 2.5 scores), which is probably associated with the fear connected to the consequences of CS, anxiety and doubts about the future state of health and ability to work, etc. This is confirmed by the increased levels of anxiety these patients had.

The study results on the level of depression on the HDRS are consistent with the data obtained using Beck Depression Inventory, although some differences were found (Tab. 2, Fig. 2).

Table 2

Indicators of depression on the BDI in patients who underwent CS

Indicator	Indicator value, M±m / Me (Q_{25}–Q_{75}), scores
Overall depression rate on the BDI	8,8±8,9 / 7,0 (0,0–13,0)
Cognitive-affective scale	5,8±6,0 / 4,0 (0,0–10,0)
Subscale of somatic manifestations of depression	2,9±3,2 / 2,0 (0,0–5,0)

Thus, the average level of depression on the BDI in patients who underwent CS was 8.8 ± 8.9 scores, which corresponds to the average level of depression. It should be noted that, in contrast to clinical assessment, patients' self-assessment of depression was characterised by significant variability of indicators, as it is manifested through quantitative indicators obtained in the interpretation of the test. At the same time, 23.6% of the examined patients had a high level of depression; 19.7% of patients had a medium level of depression; 15.0% of patients had a level of mild depression, and 41.7% of patients had no signs of depression – as it was interpreted on the BDI. Thus, according to the self-assessment, fewer patients had signs of

depression compared with the clinical assessment. However, in those with signs of depression, its severity was subjectively assessed by patients as higher than it was according to the clinical assessment. These features should be considered when interpreting the data of psychodiagnostic examinations in patients who underwent CS.

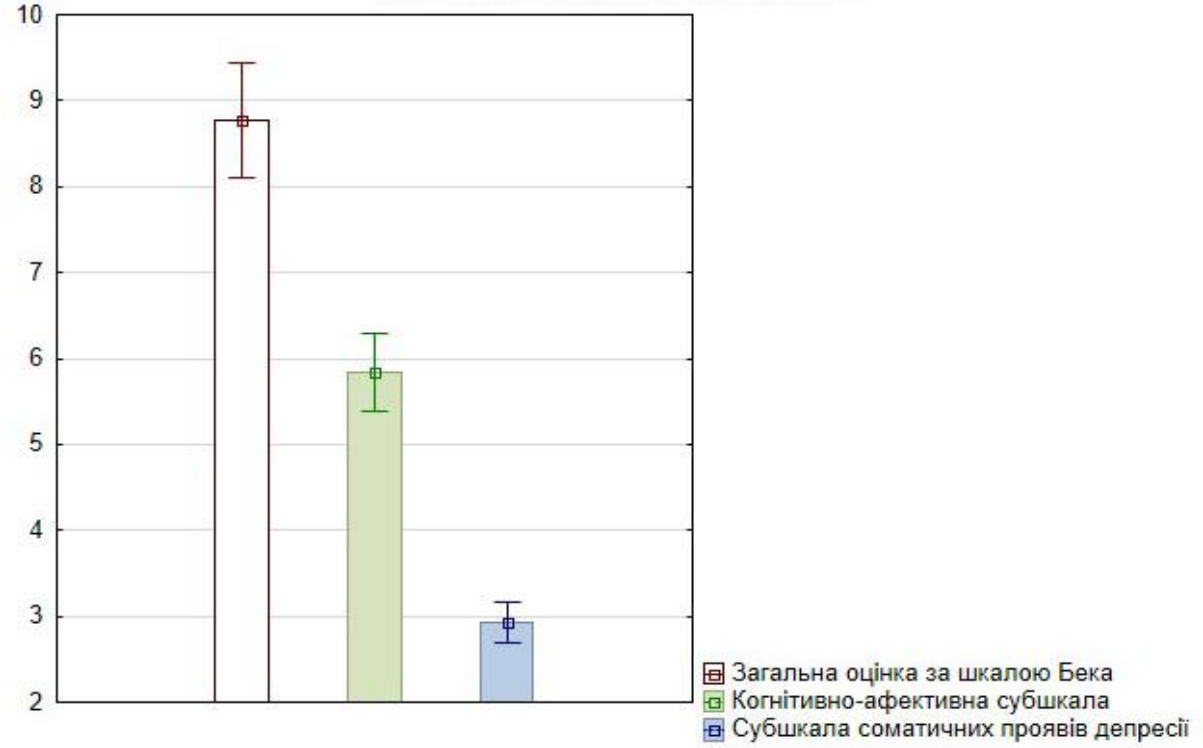


Fig. 2. Quantitative indicators of depression on the BDI (in scores) in patients who underwent CS (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

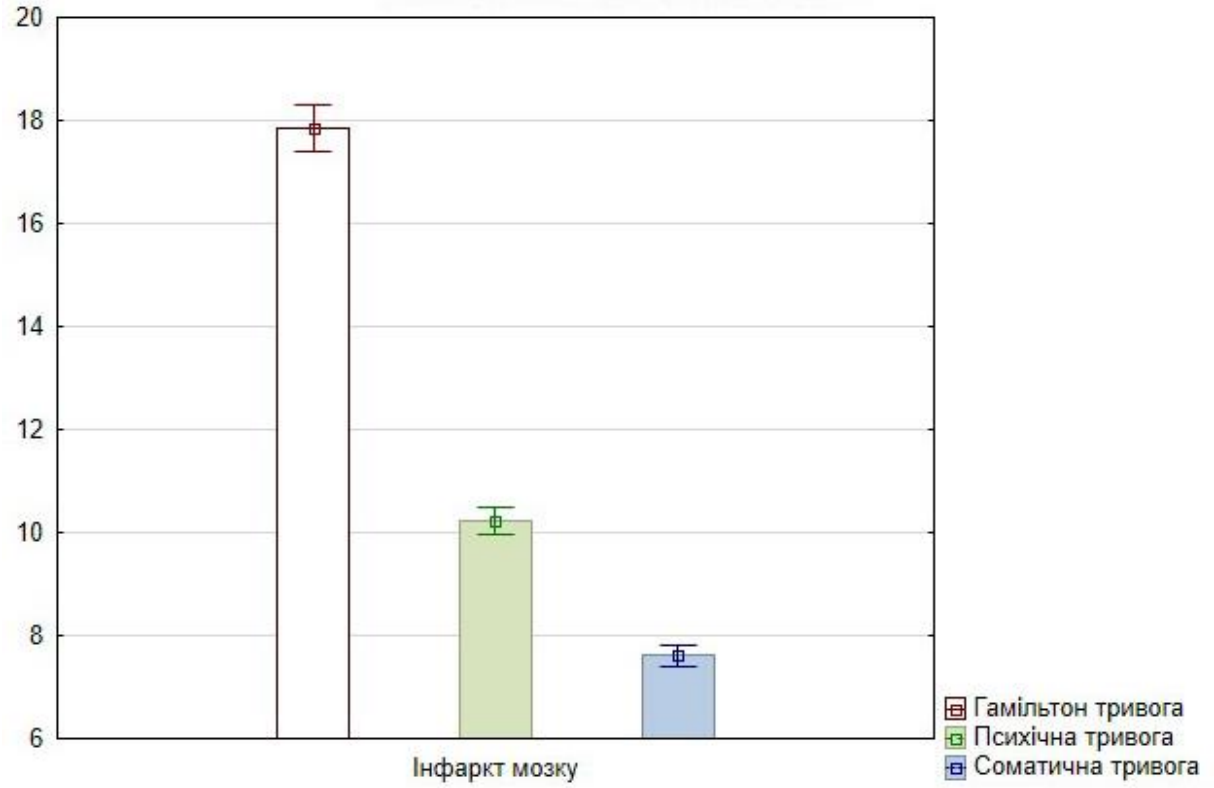
Patients who underwent CS had increased anxiety levels: the mean level of anxiety on the HAM-A was 17.8 ± 6.1 scores, which corresponds to mild or moderate severity of anxiety (14-18 scores). (Tab. 3, Fig. 3). At the same time, 15.4% of the examined patients had a high the level of anxiety (over 25 scores), 31.1% of patients had a moderate level of anxiety (from 18 to 24 scores), 33.0% of patients had a low level of anxiety (14-17 scores), and 20.5% of patients had no signs of anxiety (less than 14 scores).

Table 3

Indicators of anxiety on the HAM-A in patients who underwent CS

Indicator	Indicator value, M±m / Me (Q_{25}–Q_{75}), scores
Overall anxiety rate	17,8±6,1 / 17,0 (14,0–22,0)
Mental anxiety	10,2±3,8 / 10,0 (8,0–12,0)
Somatic anxiety	7,6±2,7 / 7,0 (6,0–9,0)

The patients who underwent CS had increased rates of both mental and physical anxiety: 10.2 ± 3.8 scores and 7.6 ± 2.7 scores, respectively; these indicators can be considered as a natural response to the psycho-traumatic situation of severe heart surgery, the associated risks, health concerns and treatment prospects, etc.



Гамільтон тривога – Hamilton anxiety

Психічна тривога – Mental anxiety

Соматична тривога – Somatic anxiety

Fig. 3. Quantitative indicators of anxiety on the HAM-A (in scores) in patients who underwent CS (squares mark the average values of indicators, horizontal dashes mark 95% of confidence interval)

The study of the peculiarities of affective symptoms in the context of certain neurological nosologies associated with CS revealed many important regularities.

Patients who underwent CS and had a cerebral infarction in the postoperative period suffered from a high level of severity of depressive and anxiety manifestations (Tab. 4, Fig. 4).

Table 4

Indicators of depression on the HDRS in patients who underwent CS with and without cerebral infarction

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without cerebral infarction	With cerebral infarction	
Overall rate of depression	10,3±4,4 / 10,0 (7,0–12,0)	21,1±3,9 / 22,0 (18,0–24,0)	<0,01
Non-dynamic depression	9,3±3,4 / 9,0 (7,0–11,0)	16,1±2,8 / 16,0 (15,0–19,0)	<0,01
Agitated depression	5,0±1,9 / 5,0 (4,0–6,0)	10,0±2,6 / 11,0 (8,0–12,0)	<0,01
Depression with fear	5,5±2,1 / 5,0 (4,0–7,0)	10,7±2,2 / 11,0 (9,0–12,0)	<0,01
Undifferentiated depression	1,4±1,6 / 1,0 (0,0–2,0)	4,7±1,3 / 5,0 (4,0–5,0)	<0,01

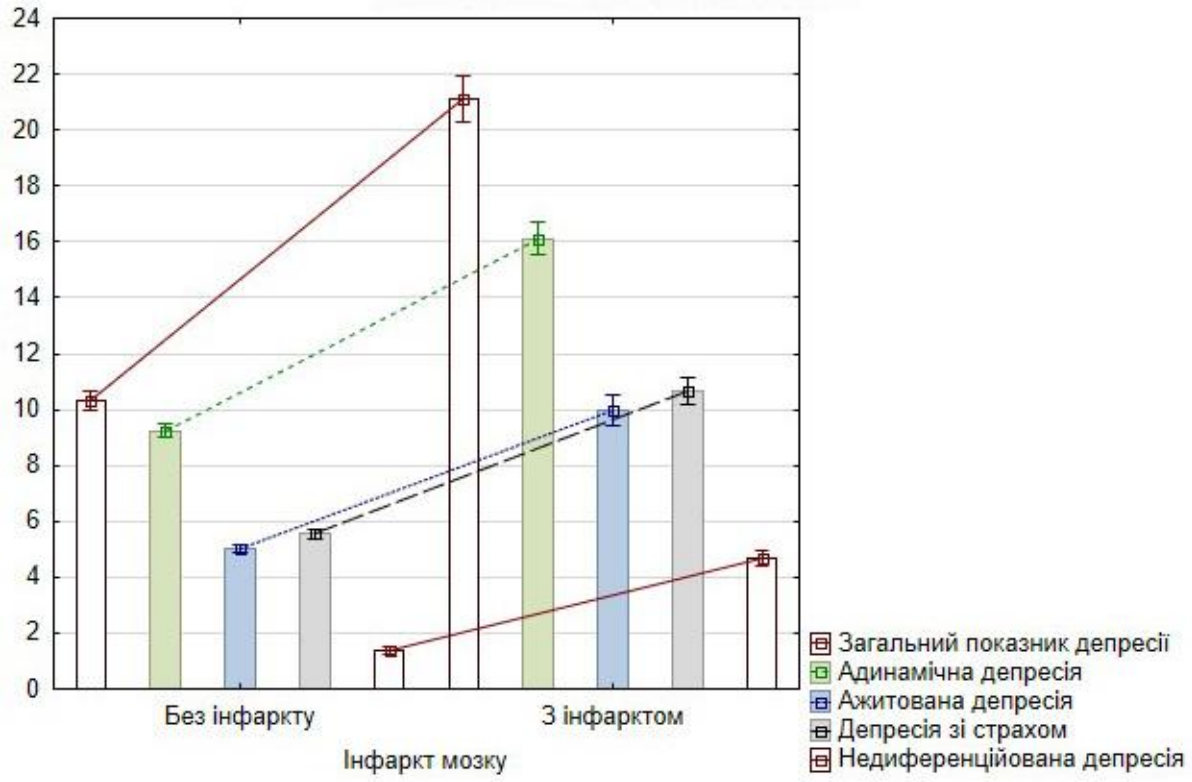


Fig. 4. Quantitative indicators of depression on the HDRS (in scores) in patients who underwent CS, with and without cerebral infarction (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Thus, the mean rate of depression on the HDRS in patients who underwent CS and had cerebral infarction was 21.1 ± 3.9 scores, which corresponds to severe depression. In contrast,

the indicator of patients, who had no signs of cerebral infarction, was close to normal and corresponded to mild situational depression: 10.3 ± 4.4 scores. Patients with cerebral infarction also had high rates for certain types of depression: dynamic: 16.1 ± 2.8 scores against 9.3 ± 3.4 scores; agitated: 10.0 ± 2.6 scores against 5.0 ± 1.9 scores; depression with fear: 10.7 ± 2.2 scores against 5.5 ± 2.1 scores; undifferentiated depression: 4.7 ± 1.3 scores against 1.4 ± 1.6 scores. Differences in all indicators of depression between groups of patients with and without cerebral infarction were statistically significant ($p < 0.01$).

In general, 20.9% of patients with cerebral infarction were diagnosed with a very severe level of depression on the HDRS, 33.7% of patients had severe depression, 29.1% of patients had moderate depression, and 16.3% of patients had mild depression.

The patients with cerebral infarction had high indicators of depression according to the BDI; the differences between the groups of patients with and without cerebral infarction according to self-assessment were more significant than according to clinical assessment (Tab. 5, Fig. 5).

Table 5

Indicators of depression on the BDI in patients who underwent CS with and without cerebral infarction

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without cerebral infarction	With cerebral infarction	
Overall depression rate on the BDI	6,7±7,4 / 5,0 (0,0–10,0)	23,4±4,2 / 24,0 (23,0–25,0)	<0,01
Cognitive-affective scale	4,5±5,1 / 4,0 (0,0–6,0)	15,4±2,6 / 16,0 (16,0–16,0)	<0,01
Subscale of somatic manifestations of depression	2,2±2,6 / 1,0 (0,0–4,0)	8,0±2,1 / 8,0 (7,0–9,0)	<0,01

Thus, the average rate of depression on the BDI in patients with cerebral infarction was 23.4 ± 4.2 scores, while patients who underwent CS without cerebral infarction had 6.7 ± 7.4 scores, which is 3, 5 times lower. The rate of depression in patients with cerebral infarction corresponds to a high level of depression; among them, 57.0% of patients were with high depression, 33.7% of patients were with moderate depression, and 9.3% of patients were with mild depression.

The patients with cerebral infarction had high scores on some sub-scales of the BDI: according to the cognitive-affective sub-scale, it was 15.4 ± 2.6 scores against 4.5 ± 5.1

scores, and on the sub-scale of somatic manifestations of depression it was 8.0 ± 2.1 scores against 2.2 ± 2.6 scores.

Differences in all indicators of BDI between groups of patients with and without cerebral infarction are statistically significant (p <0.01).

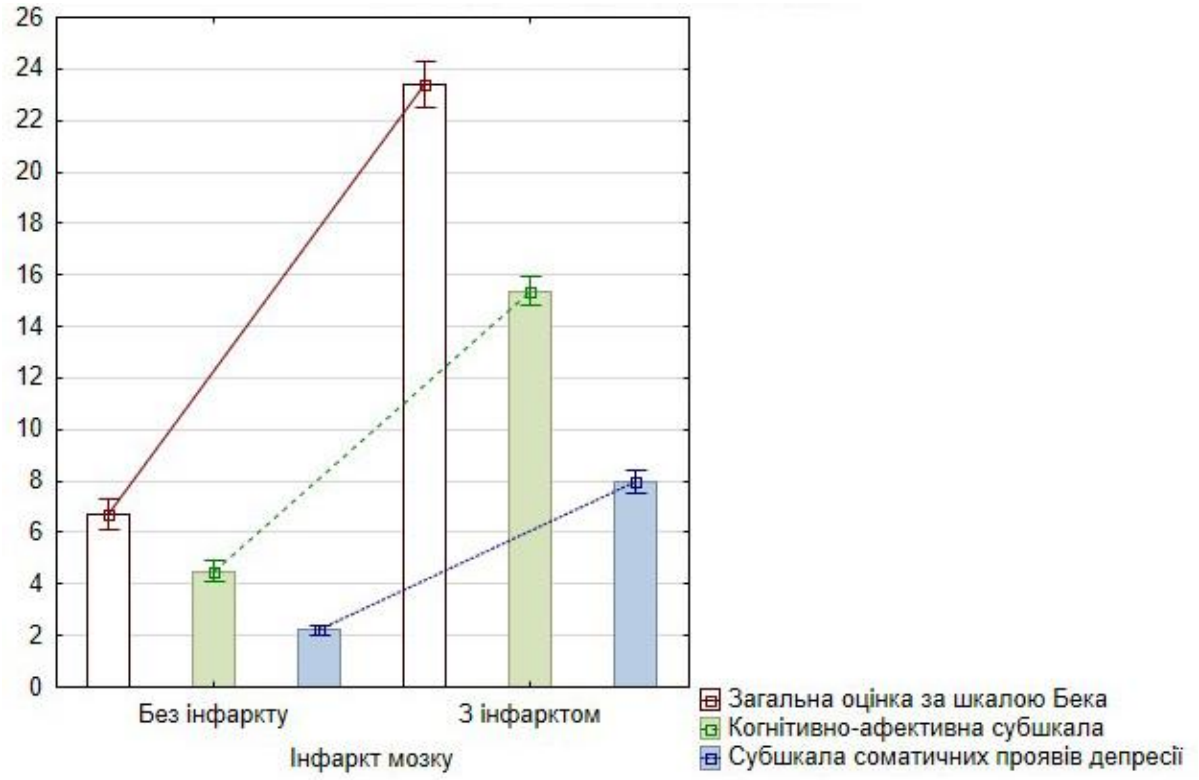


Fig. 5. Quantitative indicators of depression on the BDI (scores) in patients who underwent CS, with and without cerebral infarction (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Patients with cerebral infarction also had a high level of anxiety (Tab. 6, Fig. 6). The mean anxiety score on the HAM-A in patients with cerebral infarction was 26.9 ± 4.3 scores, which corresponds to a high level of anxiety, compared with 16.6 ± 5.1 scores in patients who underwent CS without cerebral infarction. In general, 44.1% of patients with cerebral infarction had a high level of anxiety, 46.5% of patients had a moderate level of anxiety, and 9.4% of patients had a low level of anxiety.

Patients who underwent CS with cerebral infarction had high indicators of types of anxiety: mental - respectively 16.0 ± 2.4 scores against 9.4 ± 3.1 scores, and somatic - respectively 10.8 ± 2, 8 scores and 7.2 ± 2.4 scores. Differences in all indicators are statistically significant (p <0.01).

Table 6

Indicators of anxiety on the HAM-A in patients who underwent CS with or without cerebral infarction

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without cerebral infarction	With cerebral infarction	
Overall anxiety rate	16,6±5,1 / 16,0 (14,0–20,0)	26,9±4,3 / 27,0 (23,0–30,0)	<0,01
Mental anxiety	9,4±3,1 / 9,0 (8,0–11,0)	16,0±2,4 / 17,0 (14,0–18,0)	<0,01
Somatic anxiety	7,2±2,4 / 7,0 (6,0–9,0)	10,8±2,8 / 10,0 (9,0–12,0)	<0,01

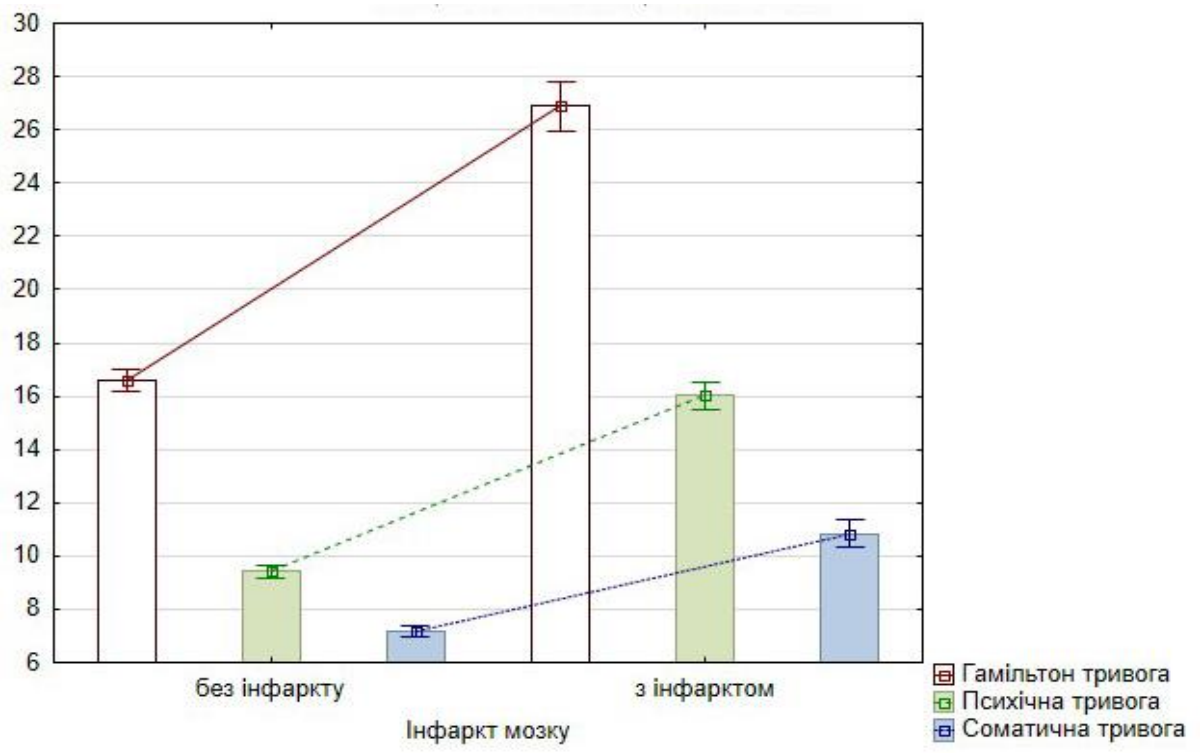


Fig. 6. Quantitative indicators of anxiety on the HAM-A (scores) in patients who underwent CS, with and without cerebral infarction (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Significant differences were also found in the analysis of the peculiarities of the manifestations of affective psychopathological symptoms in patients who underwent CS, with and without postoperative encephalopathy.

Thus, the patients with postoperative encephalopathy had the average level of depression on the HDRS scale, which was significantly lower than in patients with cerebral infarction, although it was significantly higher than in patients without signs of encephalopathy: 14.9 ± 6.1 scores (corresponding to mild depression) against 10.2 ± 4.7 scores (Tab. 7, Fig. 7).

Table 7

Indices of depression on the HDRS in patients who underwent CS with and without postoperative encephalopathy

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without postoperative encephalopathy	With postoperative encephalopathy	
Overall rate of depression	10,2±4,7 / 9,0 (8,0–11,0)	14,9±6,1 / 15,0 (10,0–20,0)	<0,01
Non-dynamic depression	9,1±3,5 / 9,0 (7,0–11,0)	12,3±4,3 / 12,0 (9,0–15,0)	<0,01
Agitated depression	5,0±2,1 / 4,0 (4,0–6,0)	7,0±2,9 / 7,0 (5,0–8,0)	<0,01
Depression with fear	5,6±2,3 / 5,0 (4,0–6,0)	7,5±3,0 / 7,0 (5,0–10,0)	<0,01
Undifferentiated depression	1,3±1,6 / 1,0 (0,0–1,0)	2,8±2,1 / 3,0 (1,0–5,0)	<0,01

In general, 11.1% of patients with postoperative encephalopathy had a very severe level of depression, 19.8% of patients had a severe level of depression, 41.5% of patients had a moderate level of depression, 30.9% of patients had a mild level of depression, and 3.3% of patients had no signs of depression.

The patients with postoperative encephalopathy had increased levels of certain types of depression: non-dynamic is 12.3 ± 4.3 scores, respectively, against 9.1 ± 3.5 scores; agitated is respectively 7.0 ± 2.9 scores against 5.0 ± 2.1 scores; depression with fear is respectively 7.5 ± 3.0 scores against 5.6 ± 2.3 scores; undifferentiated depression is respectively 2.8 ± 2.1 scores against 1.3 ± 1.6 scores. Differences between groups with and without postoperative encephalopathy of all indicators are statistically significant ($p < 0.01$).

Indicators of depression on BDI in patients with postoperative encephalopathy were also significantly higher than in patients without encephalopathy, and differences between these groups, as in cerebral infarction, were more significant than in the clinical evaluation using the HDRS (Tab. 8, Fig. 8).

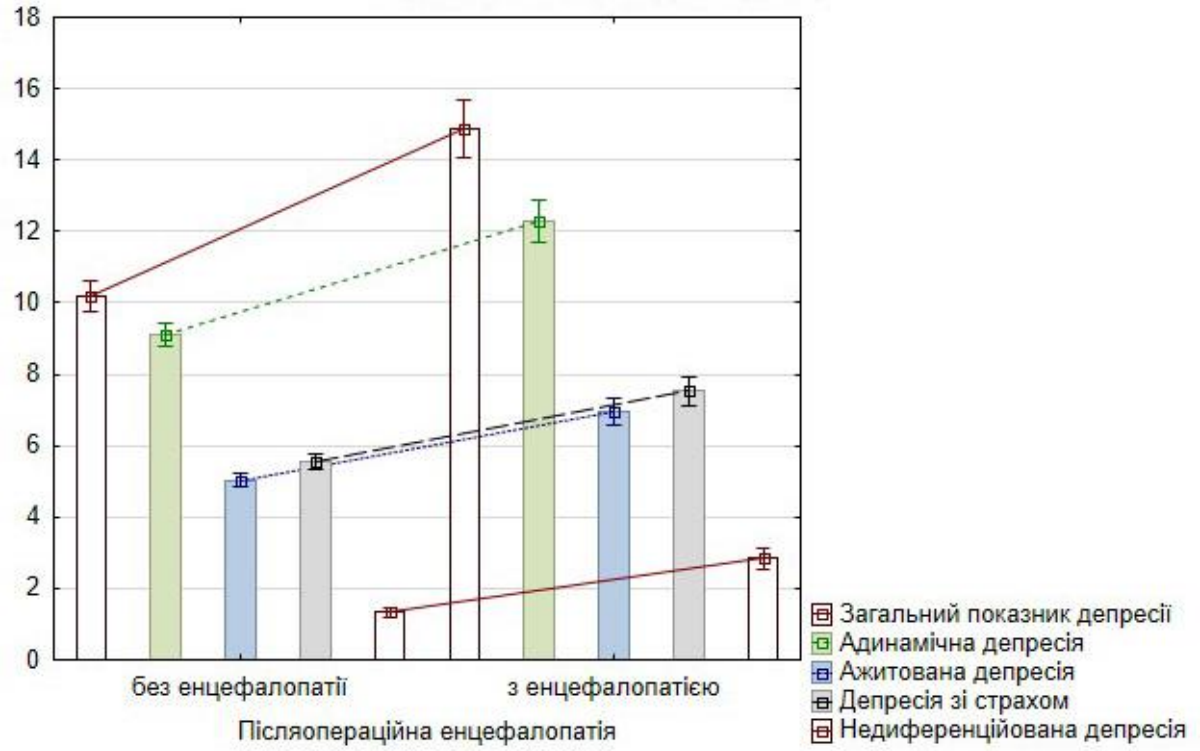


Fig. 7. Quantitative indicators of depression on the HDRS (scores) in patients who underwent CS, with and without postoperative encephalopathy (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Table 8

Indicators of depression on the BDI in patients who underwent CS with and without postoperative encephalopathy

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without postoperative encephalopathy	With postoperative encephalopathy	
Overall depression rate on the BDI	6,4±7,3 / 4,0 (0,0–10,0)	14,1±9,8 / 18,0 (5,0–24,0)	<0,01
Cognitive-affective scale	4,2±5,0 / 3,0 (0,0–6,0)	9,4±6,6 / 10,0 (4,0–16,0)	<0,01
Subscale of somatic manifestations of depression	2,1±2,7 / 1,0 (0,0–3,0)	4,7±3,5 / 6,0 (1,0–8,0)	<0,01

The mean rate of depression on the BDI in patients with postoperative encephalopathy was 14.1 ± 9.8 scores, which corresponds to the average level, while in patients who underwent CS without signs of encephalopathy, it was 6.4 ± 7.3 scores. In general, 12.4% of patients with postoperative encephalopathy had a high level of depression, 54.4% of patients

had a moderate level of depression, 14.7% of patients had a mild level of depression, and 18.5% of patients had had no signs of depression on the BDI.

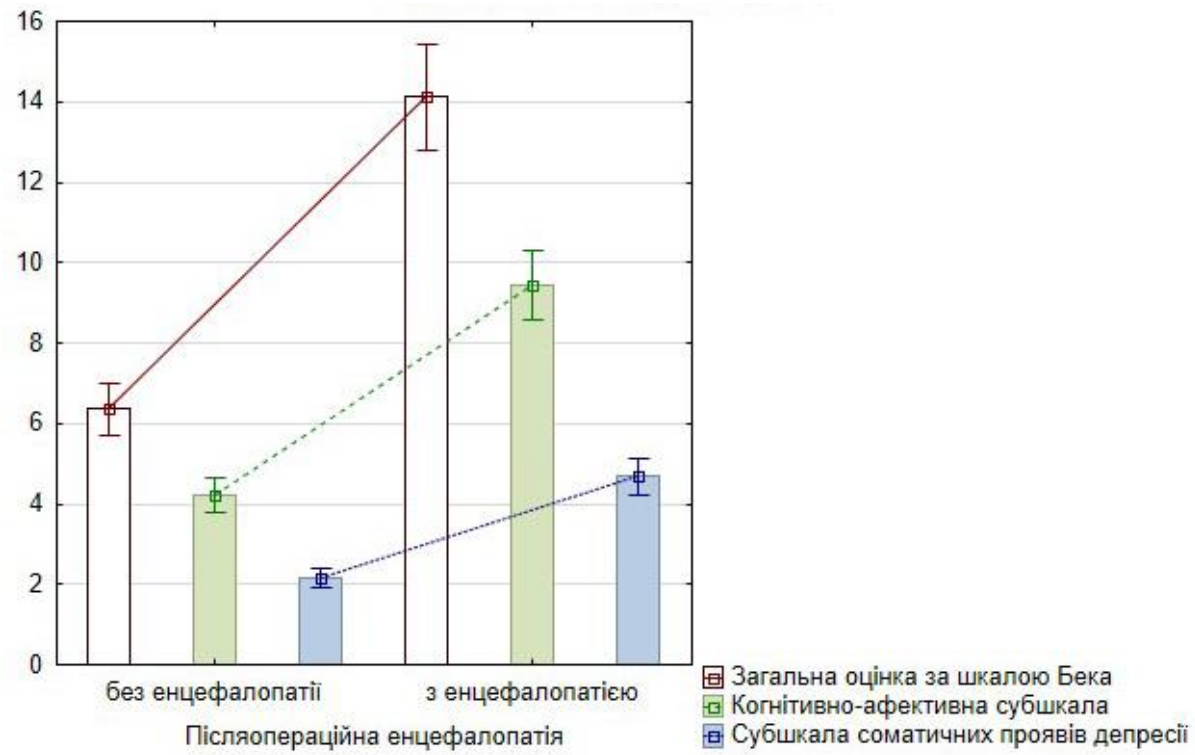


Fig. 8. Quantitative indicators of depression on the BDI (scores) in patients who underwent CS, with and without postoperative encephalopathy (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Indicators of cognitive-affective sub-scale and sub-scale of somatic manifestations of depression in patients with postoperative encephalopathy were significantly ($p < 0.01$) higher than in patients without encephalopathy: 9.4 ± 6.6 scores against 4.2 ± 5.0 scores, and 4.7 ± 3.5 scores against 2.1 ± 2.7 scores.

Patients with postoperative encephalopathy had an increased level of anxiety of both general and individual types – mental and somatic ones (Tab. 9, Fig. 9).

The mean anxiety score in patients with postoperative encephalopathy was 21.5 ± 5.7 scores, which corresponds to the average severity of anxiety disorder, while in patients without encephalopathy, it was16.2 ± 5.5 scores ($p < 0.01$). In general, 14.7% of patients with encephalopathy had a high level of anxiety, 57.1% of patients had a moderate level of anxiety, 22.1% of patients had a low level of anxiety, and 6.1% of patients had no signs of anxiety.

The indicator of mental anxiety in patients with postoperative encephalopathy was significant ($p < 0.01$): it was12.6 ± 3.5 scores against 9.1 ± 3.4 scores, as well as the indicator of somatic anxiety was 8.8 ± 2.7 scores against 7.1 ± 2.5 scores, respectively ($p < 0.01$).

Table 9

Indicators of anxiety on the HAM-A in patients who underwent CS with and without postoperative encephalopathy

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without postoperative encephalopathy	With postoperative encephalopathy	
Overall anxiety rate	16,2±5,5 / 15,0 (13,0–19,0)	21,5±5,7 / 21,0 (17,0–26,0)	<0,01
Mental anxiety	9,1±3,4 / 9,0 (7,0–11,0)	12,6±3,5 / 12,0 (10,0–16,0)	<0,01
Somatic anxiety	7,1±2,5 / 7,0 (6,0–8,0)	8,8±2,7 / 9,0 (7,0–11,0)	<0,01

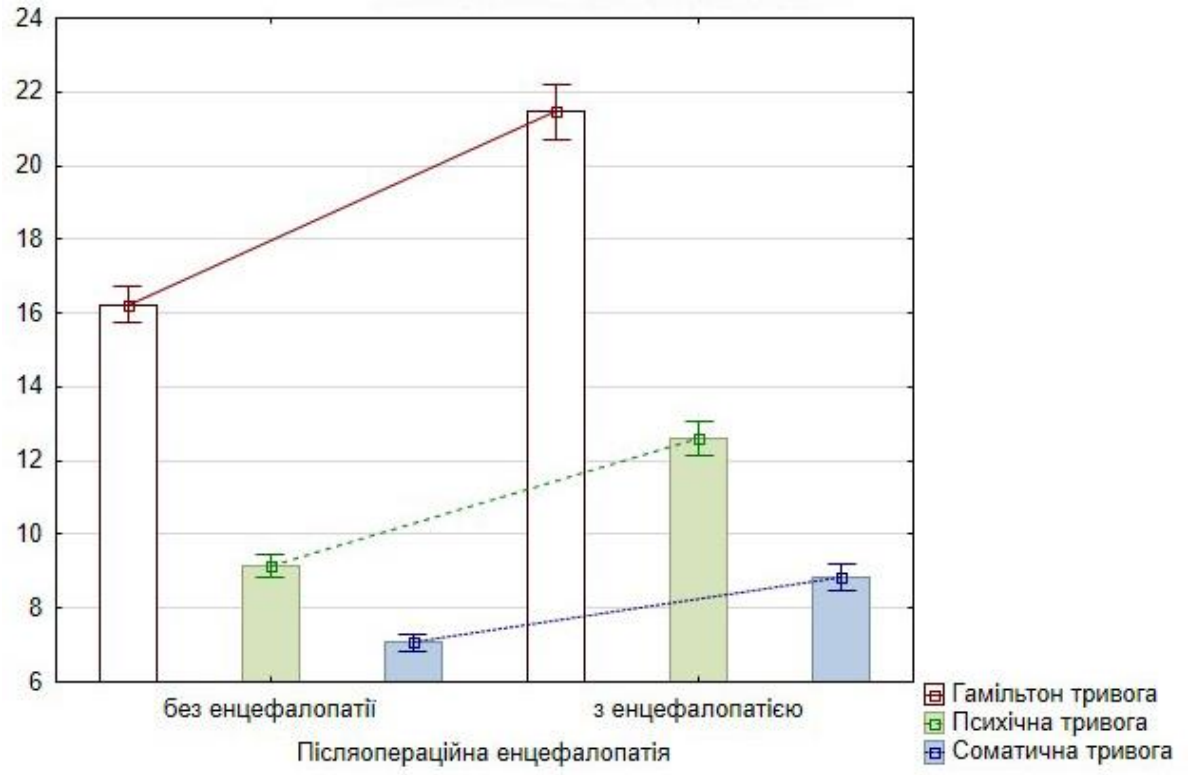


Fig. 9. Quantitative indicators of anxiety on the HAM-A (scores) in patients who underwent CS, with and without postoperative encephalopathy (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Cognitive dysfunction has been reported to be very common in patients who underwent CS. Patients with cognitive dysfunction have experienced some adverse changes in the affective sphere.

The mean rate of depression on the HDRS in patients who underwent CS with signs of postoperative cognitive dysfunction was 13.0 ± 5.9 scores, which corresponds to a mild, closer to moderate, level of depression. For the patients who had no signs of cognitive dysfunction, the indicator of depression was 8.3 ± 3.0 scores; the differences with the group of patients who had cognitive dysfunction were statistically significant (p <0,01) (Tab. 10, Fig. 10).

Table 10

Indicators of depression on the HDRS in patients who underwent CS with and without signs of postoperative cognitive dysfunction

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without signs of cognitive dysfunction	With signs of cognitive dysfunction	
Overall rate of depression	8,3±3,0 / 8,0 (6,0–9,0)	13,0±5,9 / 11,0 (9,0–17,0)	<0,01
Non-dynamic depression	7,5±2,5 / 8,0 (6,0–9,0)	11,1±4,1 / 11,0 (8,0–14,0)	<0,01
Agitated depression	4,4±1,3 / 4,0 (4,0–5,0)	6,1±2,7 / 5,0 (4,0–8,0)	<0,01
Depression with fear	4,7±1,5 / 4,0 (4,0–5,0)	6,8±2,9 / 6,0 (5,0–9,0)	<0,01
Undifferentiated depression	0,7±1,0 / 0,0 (0,0–1,0)	2,2±2,0 / 1,0 (1,0–4,0)	<0,01

In general, among patients with signs of cognitive dysfunction, 2.2% of patients had signs of very severe depression, 11.1% of patients had severe depression, 24.6% of patients had moderate depression, 43.4% of patients had mild depression, and 18.7% of patients had no signs of depression.

Patients with cognitive dysfunction also had higher levels of certain types of depression: non-dynamic was 11.1 ± 4.1 scores against 7.5 ± 2.5 scores (p <0.01) respectively; agitated was 6.1 ± 2.7 scores against 4.4 ± 1.3 scores (p <0.01); depression with fear was 6.8 ± 2.9 scores against 4.7 ± 1.5 scores (p <0.01); undifferentiated depression was 2.2 ± 2.0 scores against 0.7 ± 1.0 scores (p <0.01).

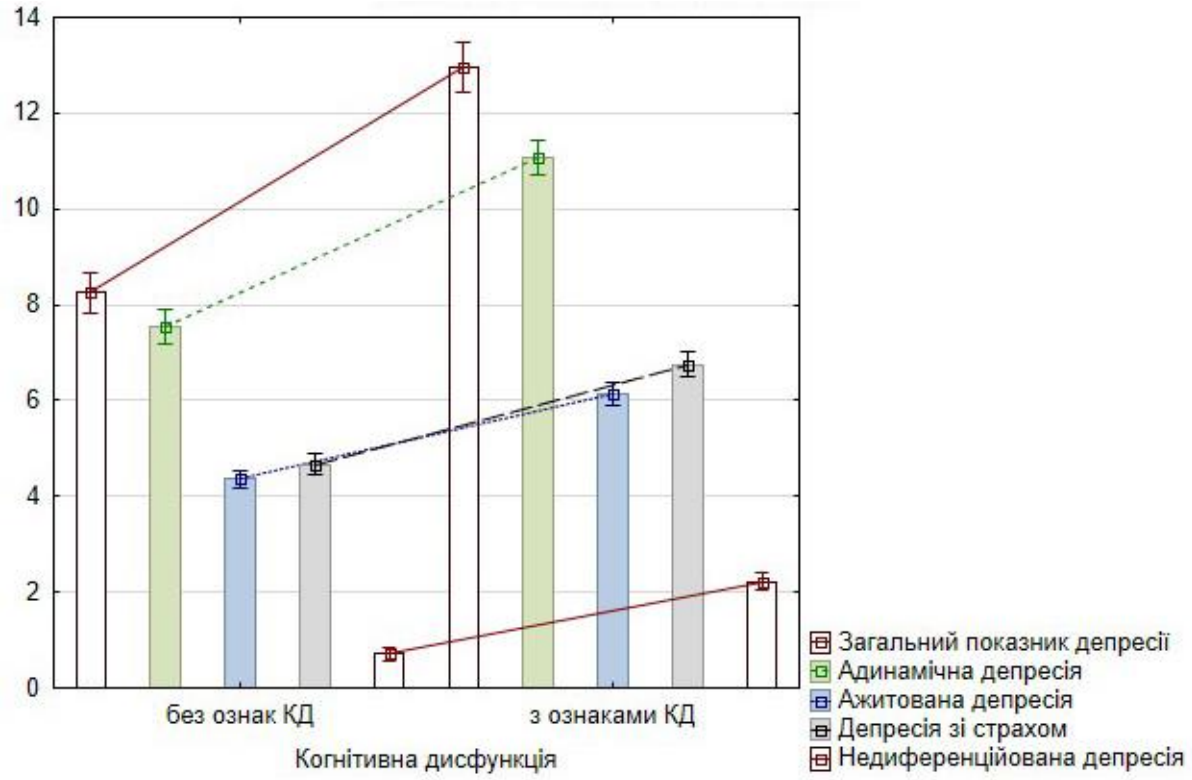


Fig. 10. Quantitative indicators of depression on the HDRS (scores) in patients who underwent CS, with and without cerebral infarction (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

The indicators of the BDI in patients with signs of postoperative cognitive dysfunction also had significant differences (Tab. 11, Fig. 11).

Table 11

Indicators of depression on the BDI in patients who underwent CS with and without signs of postoperative cognitive dysfunction

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without signs of cognitive dysfunction	With signs of cognitive dysfunction	
Overall depression on the BDI	3,1±4,5 / 1,0 (0,0–5,0)	11,0±9,2 / 9,0 (1,0–21,0)	<0,01
Cognitive-affective scale	2,0±3,1 / 0,0 (0,0–4,0)	7,3±6,2 / 6,0 (0,0–15,0)	<0,01
Subscale of somatic manifestations of depression	1,1±1,7 / 0,0 (0,0–1,0)	3,7±3,3 / 3,0 (1,0–7,0)	<0,01

The average rate of depression on the BDI in patients with postoperative cognitive dysfunction was 11.0 ± 9.2 scores, which corresponds to the average level of depression. In

comparison, in patients without signs of cognitive dysfunction, it was 3.1 ± 4.5 scores (p < 0.01). In general, 4.2% of patients had a high level of depression, 52.4% of patients had a moderate level of depression, 14.1% of patients had a mild level of depression, and 29.3% of patients had no signs of depression.

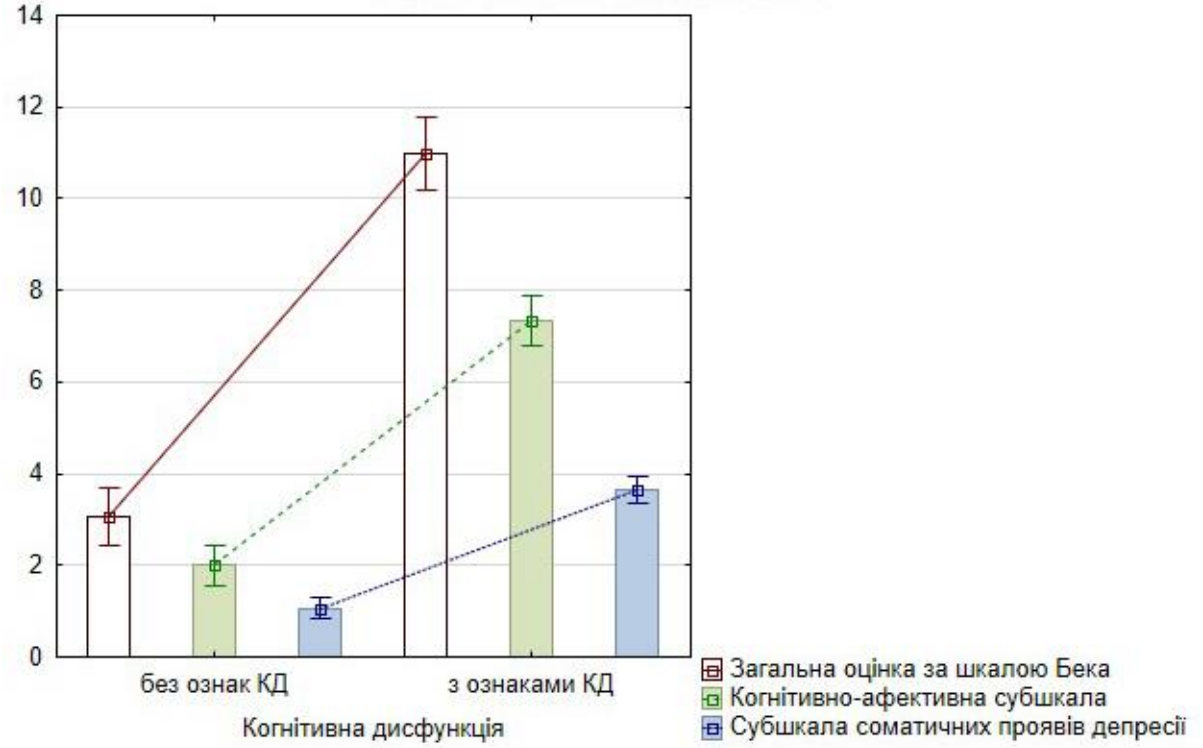


Fig. 11. Quantitative indicators of depression on the BDI (scores) in patients who underwent CS, with and without postoperative encephalopathy (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

The patients with postoperative cognitive dysfunction had significantly higher levels due to the individual sub-scales of the BDI: cognitive-affective was 7.3 ± 6.2 scores against 2.0 ± 3.1 scores (p <0.01), and a subscale of somatic manifestations of depression indicated respectively 3.7 ± 3.3 scores against 1.1 ± 1.7 scores (p <0.01).

Postoperative cognitive dysfunction was associated with increased levels of anxiety (Tab. 12, Fig. 12). The mean anxiety on the HAM-A in patients who underwent CS with the signs of postoperative cognitive dysfunction was 19.7 ± 5.8 scores, while in patients without signs of cognitive dysfunction, it was 13.2 ± 4.0 points (p <0 , 01); the indicator on the scale of mental anxiety was 11.4 ± 3.6 scores against 7.3 ± 2.3 scores (p <0.01); the indicator on the scale of somatic anxiety was respectively 8.3 ± 2.6 scores against 5.9 ± 2.1 scores (p <0.01). In general, 18.2% of patients with postoperative cognitive dysfunction had a high level of

anxiety, 40.5% of patients had a medium level of anxiety, and 41.3% of patients had a low level of anxiety.

Table 12

Indicators of anxiety on the HAM-A in patients who underwent CS with and without signs of postoperative cognitive dysfunction

Indicator	Indicator, scores M±m / Me (Q_{25}–Q_{75})		p
	Without signs of cognitive dysfunction	Without signs of cognitive dysfunction	
Overall anxiety	13,2±4,0 / 14,0 (10,0–15,0)	19,7±5,8 / 19,0 (15,0–23,0)	<0,01
Mental anxiety	7,3±2,3 / 7,0 (7,0–9,0)	11,4±3,6 / 11,0 (9,0–13,0)	<0,01
Somatic anxiety	5,9±2,1 / 6,0 (4,0–7,0)	8,3±2,6 / 8,0 (7,0–10,0)	<0,01

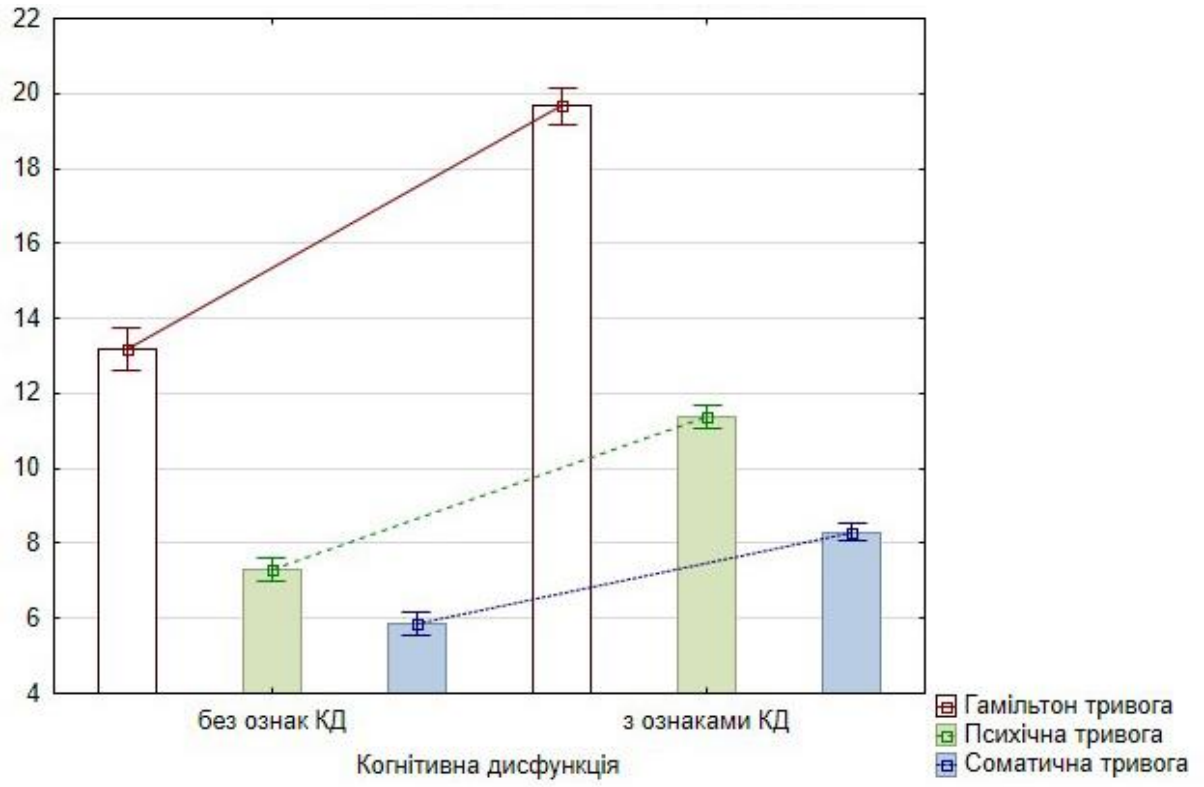


Fig. 12. Quantitative indicators of anxiety on the HAM-A (scores) in patients who underwent CS with and without postoperative encephalopathy (squares mark the average values of indicators, horizontal dashes mark 95% of the confidence interval)

Conclusion. Thus, the patients who have suffered from CS showed signs and symptoms of depression and anxiety. The most severe depressive and anxiety manifestations

characterise patients with cerebral infarction in the postoperative period after CS. It is less significant for the patients with signs of postoperative encephalopathy, and it is the least significant for patients with signs of cognitive dysfunction. At the same time, the severity of depressive and anxiety phenomena in patients with this pathology was significantly ($p < 0.01$) higher than in patients with CS without the corresponding pathology.

The identified data should be considered when developing treatment, rehabilitation and preventive measures for the patients who underwent CS with postoperative neurological complications.

Prospects for further research. The study of CS, in combination with the patient's psychological state in the postoperative period, is the basis of successful surgery on the cardiovascular system. In my opinion, it is necessary to continue the study of psycho-symptoms in patients who underwent CS, including their gender and age.

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