Cognitive Disorders Associated with Different Operations

Qayimov M.T Bukhara State Medical Institute
Babanazarov U.T Bukhara State Medical Institute

ABSTRACT

The term postoperative cognitive impairment was introduced to denote cognitive impairment that develops early (72 hours after surgery) and persists into the late postoperative period. Currently, the term POCD refers to the impairment of one or more cognitive functions, which is assessed using a series of neuropsychological tests performed before and after surgery.

Keywords: postoperative cognitive disorders, central nervous system, memory, examination tests.

Introduction

Until now, there are no clear data on the relationship of cognitive impairment after multiple operations with different anesthesias, the interval between operations [1]. There is no specific algorithm for the prevention and correction of cognitive disorders after multiple operations. Thus, a specific algorithm for the prevention and correction of post-operative cognitive disorders, and especially multiple post-operative cognitive disorders, is a multifaceted problem and requires a lot of research and work in this field.

The purpose of the work: to study cognitive disorders in patients after multiple operations performed during general anesthesia

Materials and methods. Inspections were conducted in the intensive care and surgical departments of the Bukhara Regional Multidisciplinary Medical Center in 2019-2022 . The surgical operation was performed under multicomponent general anesthesia and artificial lung ventilation. To achieve this goal, patients' cognitive function was examined before surgery and on the 3rd and 5th day after surgery.

Result and Discussion. A total of 120 patients from the main and control groups were studied as control subjects, of which 20 patients (nazo rat group) after one operation and 100 patients after multiple operations (main group). The age of patients is from 20 to 59 years, the average age is 39.5±1.2 years.

Distribution of patients by age

20-30 years old	30-50 years old	50 years old big
15	53	32

The criteria for the examination were: patients aged 20-59 years who had a history of single and multiple surgeries and who gave consent for the examination were included in the control and main groups. Patients with no anamnesis of encephalopathy, epilepsy, Parkinson's,

Alzheimer's, brain injury, degenerative diseases of the MNT system were selected.

The study selected 120 patients aged 20 to 59 years in the postoperative period under general anesthesia after various surgical interventions . 20 of them after one operation, and 100 after several operations. The operation was performed under general multicomponent anesthesia with artificial ventilation of the lungs. Patients were divided into two study groups: 1 group "after one operation", 2 group "after multiple operations". Neuropsychological tests (short - term memory, memory , cognitive ability , intellectual disability) were performed on all patients according to the "10-word" Luria test. The examination was carried out 1 day before the operation and 3-5 days after the operation. Out of 100 patients in the second group, 2 operations were performed - 18; 3 operations held 49; 4 operations were performed - 35 and 5 operations were performed - 6 patients.

Patients who underwent single and multiple operations

Patients	Number
Those who have had one operation	20
Those who have had many operations	100

Sex Distribution of patients according to

Male	A woman
35	65

A lot times operation those who are between women to men than numerically two times abundance identified.

Distribution of patients by the number of multiple operations

2 times	3 times	4 times	5 times
10	49	35	6

In the table, there are 10 patients who had 2 operations, 49 patients who had 3 operations, 35 patients who had 4 operations, 6 patients who had 5 operations observed

Diseases on many times pass the year operations departments in the section distribution

Urology	Gynecology	Traumatology	Lor members	Abdominal surgery	Neurosu rgery
7	11	3	12	30	37

Central Nervous System Temperament i Distribution of patients according to

Choleric	Sanguine	Phlegmatic	Melancholy
14	18	53	15

From the table apparently phlegmatic and Sanguines the majority organize is enough.

Blood groups Distribution of patients according to

Rh factor	O(I)	A(II)	B(III)	AB(IV)
Rh(+)	29	22	30	15
Rh(-)	3	1	-	-

A lot times operation those who are between B(III) and O (I) group patients the majority organize did.

Years according to conducted number of operations

1 year during	2 times	-16
	3 times	- 4 of them
2 years during	2 times	-7
	3 times	-19
	4 times	- 4 of them
3 years during	2 times	-8
	3 times	-34
	4 times	-8

Year during a lot those who have had multiple operations 2 years in analysis during 3 times (19 patients) and 1 year during 2 times (16 patients) had surgery the majority organize did.

Again and again operation years up to 5 times - 6 patients

5 years during	8 years during	9 years during	10 years during
1	1	2	2

He had 4 operations patients years section : 1 patient in 5 years , 1 patient in 8 years , 2 patients in 9 years , 2 patients in 10 years .

Those who have had up to 4 operations years section : a total of 35 patients

2 years during	3 years during	6 years during	7 years during	8 years during	9 years during	10 years during
4	8	5	7	3	5	3

He had 4 operations patients years in section : 4 patients in 2 years , 8 patients in 3 years , 5 patients in 6 years , 7 patients in 7 years , 3 patients in 8 years , 5 patients in 9 years , 3 patients in 10 years .

Those who have had up to 2 operations years section : a total of 10 patients

1 year during	2 years during
5	5

He had 2 operations patients years section: 5 patients in 1 year, 5 patients in 2 years.

Those who have had up to 3 operations years section : 49 patients in total

1 in	2 years	3 houses	4 years	5 years	6 years	7 years	8 years	10 years
1	8	8	10	7	3	4	3	5

He had 3 operations patients years in section : 1 patient in 1 year , 8 patients in 2 years , 8 patients in 3 years , 10 patients in 4 years , 7 patients in 5 years , 3 patients in 6 years , 4 patients in 7 years , 3 patients in 8 years , 5 patients in 10 years the patient

The results of the Luria test before the operation

Patients	The Luria test is normal	Luria test result
Those who have had an operation once	80-100%	70-90%
Those who have had many operations	80-100%	60-70%

2.2. Inspection methods.

A neuropsychological study (MMSE, Luria test for memorization of 10 words, clock drawing test, visual memory tests was conducted [2].

Sample level

1. Time orientation :
Date (day, month, year, day of the week, season) 0-5
2. Repositioning :
Where are we now?
(country, region, city, clinic, floor) 0–5
3. Perception:
Repeat three words: pen, house, penny 0-3
4. Attention and calculation:
Series score ("subtract 7 from 100") - five times or:
Say the word "Er" backwards from 0-5
5. Memory: remember 3 words (see point 3) 0-3
6. Speech: show a pencil and a clock, ask: "what is it called?" Please repeat the sentence: "No, if and or but" 0-3
7. Execution of the 3-step command: "Take a sheet of paper with your right hand, divide it in half and put it on the table" 0–3.
8. Reading: "Read and do" 1) Close your eyes 2) Write a sentence 0-2
9. Draw the number 0-1

Total score: 0–30

The test results can be interpreted as follows: 28-30 points - no cognitive disorders; 24-27 points - pre-dementia cognitive impairment; 20-23 points - mild dementia; 11-19 points - moderate dementia; 0-10 points - severe dementia.

2.3. General principles of transfer, method of memorizing 10 words A.R. Luria is designed to assess the state of arbitrary verbal memory.

10 word memorization technique A.R. It is designed to evaluate the state of verbal memory with the Luria test [3].

The stimulus material was 10 words, unrelated, semantically and emotionally neutral. Instruction: "I name the words that you must remember. After I call them, you can repeat them in any order."

Words are read clearly, without emotional color, with a time interval between words of 1 second. Numbers in the memorization protocol reflect the order of repetition of words. After the patient repeats the words for the first time, regardless of the result, it is necessary to say the following: "The research process is such that I repeat again the words that you remembered the first time and now remember [4].

Words are presented as many times as necessary for the patient to remember them completely in any sequence, but no more than 5 times. Regardless of the results of the study, after the 5th reproduction or earlier, the patient repeated all the words [5]. Delayed reproduction is evaluated after 50-60 minutes, the patient is not warned about it. During this period, other tests are conducted, but it is recommended not to conduct other methods aimed at evaluating mnestic functions. Time According to this protocol, a "memory curve" can be constructed. For this, the number of repetitions is drawn along the horizontal axis, and the number of correctly repeated words along the vertical axis.

"Memorizing 10 words" method Luria (auditory-speech memory study)

Purpose: to assess the state of auditory memory for words, fatigue, attention activity, memorization, storage, reproduction, voluntary attention [6].

It is recommended to use from the age of 5. Children aged 5.5-6 are able to multiply groups of words in the amount of 5 + 3. A 4.5-5.5-year-old child remembers a group of 3 words in the correct order - after 2-3 presentations, a group of 5 words - after 3-4 presentations.

Description. The technique of memorizing ten words A. R. Suggested by Luria. It allows you to study memory processes: memorization, storage and reproduction. This technique can be used to assess memory, voluntary attention, and fatigue in patients with neuropsychiatric diseases, as well as to study the dynamics of disease development and to consider the effectiveness of drug therapy [7].

Implementation of the technique requires an appropriate environment. There should be no extraneous conversations in the room. The subject is asked to memorize 10 words. They must meet several conditions:

1. monotony: all words are singular nouns. number, they. cases consisting of the same number of syllables (one or two syllables);
2. words, if possible, should not be related to each other (you can not suggest words for memorization: table - chair; fire - water, etc.).

App. The technique can be used for both children (from five years old) and adults.

The Montreal Cognitive Assessment (MoCA) is a widely used screening system for cognitive impairment [1] and was created in 1996 by Ziad Nasreddin in Montreal, Quebec. The scale has been validated in conditions of moderate cognitive impairment [8].

The questionnaire is a one-page, 30-item test that takes an average of 10 minutes [2] and is available in 46 languages.

The scale assesses a number of cognitive functions : short-term memory and recall (5 points) with two tests of remembering five nouns and recalling them from memory after about 5 minutes spatial-visual abilities with the task of typing (3 points) and drawing a copy of a three-dimensional cube (1 point) multiple aspects of executive function are assessed with a shift task adapted from part B of the numbered dot line drawing task (1 point), a phonemic fluency task (1 point), and a two-object verbal abstraction task (2 points) [9].

Attention, concentration , and working memory are assessed with an attention task (finding a target by pressing, 1 point), serial subtraction (3 points), and forward and backward numbers (1 point).

Language tasks are assessed by naming pictures of unfamiliar animals (lion, camel, rhinoceros; 3 points), repeating two syntactically complex sentences (2 points), and a spoken fluency task.

Abstract thinking is assessed by the task of describing similarities (2 points) finally, orientation to time and space is assessed by asking about today's date and place of the test (6 points).

The test was originally written in English, so some changes may be required in addition to direct translation to adapt the test in other countries. Cultural and linguistic differences may affect MoCA norms and results in different countries, for example in Swedish [10]. In some languages, additional scales have been proposed to equalize differences in science education. However, not all language versions are confirmed.

MMSE test. Assessment of cognitive functions is an important task in many diseases of the nervous system, especially in brain diseases.

The examination of cognitive disorders is also important for determining treatment tactics, evaluating the effects of ongoing therapy, and solving many other problems [11].

There are a large number of scales for assessing cognitive impairment, one of the most popular being the MMSE scale. The test got its name from the abbreviation - mini-mental state examination, in translation mini-research of cognitive state.

The test consists of several questions. Orientation definition. The patient is asked what date (year, season, day, month, day of the week) it is now, for each correct answer the patient is given 1 point [12]. Then they ask in which country, which city, which district of the city, which institution, which floor the patient is located, points are added for each correct answer. Thus, the maximum possible number of points in this section is 10.

Definition of perception . The patient is asked to listen to and repeat three unrelated words (for example, apple-table-coin or bus-door-rose). At the same time, they are warned that they have to play in a few minutes. 1 point is added for each correctly repeated word [13]. In this case, it is necessary to pay attention to the patient's attempt to repeat all the words.

Determination of attention and calculation ability . The patient is asked to verbally subtract 7 from 100 and therefore 5 times in a row. (100-93-86-79-72-65). One point is added for each correct subtraction. If the patient makes a mistake, you can ask him once if he is sure of the answer [14]. If the answer is incorrect, they are asked to further subtract from the correct number (for example, 100-7 is given 94, then they are asked what 93-7 is).

Definition of memory functions. The patient is asked to remember three words given in the second part. For each word - 1 point.

Determining the functions of speech, reading, and writing . The patient is shown two objects (watch, pencil, neurological hammer, etc.). 1 point is awarded for each correctly named answer. They are asked to repeat the phrase "no, if, but, and, no". One attempt is given, plus 1 point for correct repetition. They are asked to read the instructions (they write on paper - close your eyes). If the patient reads and closes his eyes, one point is added. Then they give a reading task: take a sheet of paper with your right hand, divide it in two with both hands and put it on your lap. Then they give you a piece of paper [15].

If all actions are performed correctly, 3 points are awarded (1 point for each step). Then it is suggested to write a complete sentence on paper (1 point). The last task is drawing. They are offered to draw two intersecting pentagons. In this case, if the intersection of two figures forms a rectangle and all the angles of the pentagons are preserved, the completed task is considered correct [16]. 1 point is also awarded. You can get 8 marks for the entire section as much as possible. In total, the maximum possible number of marks for the entire test is 30.

The analysis of the results is as follows:

In one case, the decline in cognitive functions is determined taking into account the current level of education. A decrease in cognitive functions in the absence of education is given by a score of less than 17 points, secondary education by a score of less than 20 points, higher education - by a score of less than 24 points.

In addition, there is another method of evaluation. 29-30 points no cognitive impairment, 24-27 points mild cognitive impairment, 20-23 points mild dementia (moderate cognitive impairment), 11-19 points moderate dementia (severe cognitive impairment), 0-10 points. If the results of the scale are less than 19 points, a psychiatric consultation is recommended to decide on the need to prescribe special therapy [17].

Techniques of general anesthesia and the type of anesthesia used, duration of general anesthesia, state of hemodynamics, presence and duration of episodes of hypotension and hypertension, observation of the depth of general anesthesia (superficial or, conversely, too deep episodes). anesthesia) using BIS technology, pain syndrome using visual analog VAS scale. Statistics are included in monitoring the depth of anesthesia .

It is episodes of superficial or excessively deep general anesthesia lasting more than five minutes during wax anesthesia [18].

To study the effect of the anesthetic factor on the postoperative cognitive state, two main methods of anesthesia used in the clinic for this pathology were identified: general intravenous injection.

The following characteristics were found when comparing the cognitive functions of patients before and after surgery. Complaints about the deterioration of cognitive functions before the operation (memory loss and attention) presented by 57.9% of patients in the 2nd group of patients (≥ 60 years). It should be noted that before the operation, 22 patients in this group had reduced FAB scores (≤ 16), 16 patients had a subnormal working memory test (Digit Span), and 18 patients had a MoCA cognitive assessment test with a score below 26 [19]. In general, the results of preoperative studies show the presence of lung and moderate cognitive impairment in 67% of patients in this age group. Only 8.1% of patients in group 1, whose age was less than 60 years, had similar complaints.

In our previous study, a fairly high sensitivity to changes in cognitive functions in the postoperative period was shown by patients with episodes of arterial hypotension during surgery.

Average BP < 70 mm Hg, lasting more than 30 minutes and in this case the cognitive deficit syndrome also includes a decrease in concentration and fatigue.

This is because arterial hypotension can lead to insufficient blood circulation in the brain effects, including on deep subcortical structures. In this study, it is not possible to confirm a statistically significant effect of intraoperative hypotension

episodes on the postoperative state of cognitive functions, because SBP <70 mm Hg. Art. Duration of more than 30 minutes was observed only in 5 patients in the sample, which does not allow us to draw statistical conclusions.

This study revealed a statistically significant ($p < 0.05$) effect of the age factor on postoperative indicators - MoCA scale [16-20], frontal dysfunction battery (FAB) and mental stability coefficient of the Schulte table test in patients who underwent spinal surgery.

In the postoperative period, the state of short-term memory worsened, increased inhibition of memory traces through interfering effects, i.e., impaired delayed reproductive function, increased inertia of mental activity was noted. speed of work, the ability to switch from one task to another, and impairment of regulatory functions [12-16].

Berryman S. et al., a meta-analysis showing deficits in working memory unit performance in people with chronic pain syndromes also supports the findings [21].

Direct exposure

General anesthesia time was not taken for postoperative deterioration of cognitive functions, but we showed that prolonged anesthesia has a negative effect on the postoperative mnestic state in the form of their deterioration of cal functions [22].

A number of studies confirm that anesthetics containing (isoflurane, sevoflurane) have a neuroprotective effect on incident-like ischemic brain damage. Our pilot randomized placebo-controlled study also found that intraoperative administration of citicoline at a dose of 1000 mg as an intravenous infusion had no effect wax anesthesia has significantly improved the post-anesthetic rehabilitation period. A significant improvement in cognitive functions and self-care skills was found in the main group at reassessment on the 4th postoperative day.

Conclusion

1. Cognitive dysfunction occurs in the majority of patients after multiple operations (in 69.2%) at the stage of transition from the intensive care unit to a specialized unit and at discharge from the hospital (54.1%). High situational and personal anxiety is determined in the range from 36.3 to 48.6% in patients who have undergone 4-5 or more operations.
2. There is a relationship between anesthetic management characteristics, type of surgical intervention and the development of emotional and cognitive disorders in the early postoperative period in patients who have undergone multiple operations.
3. It is recommended to use glycine after several operations to reduce cognitive and emotional disturbances in the early postoperative period.

References.

1. Alekseevich G.Y. Problems of cognitive dysfunction after coronary artery bypass grafting. / Rodikov M.V., Mozheiko E. Yu, Petrova M.M., Eremina O.V., Alekseevich G.V. // Sibirskoe medicinskoe obozrenie. – 2015. - №6. – P.30-36;
2. Afonasiev M.G. Comparative characteristics of the results of the use of isoflurane, sefoluran and propofol in the target concentration during reconstructive operations on the carotid arteries. / Kisluhina E.V., Makarevich A.V., Bondarenko A.N., Mikhailov I.P., Timerbaev V.Kh. // Anesthesiology and resuscitation. – 2014. - №4. – P. 14-19;
3. Ovezov A. M., Lobov M. A., Panteleeva M. V., Lugovoi A. V., Myatchin P. S., Guskov I. E. Correction of early cognitive impairment in children of school age, operated in conditions of total intravenous anesthesia // Anesthesiology and Resuscitation .No-3.- 2012.- pp. 1-4.
4. Ovezov A. M., Lobov M. A., Nad'kina E. D. ,Myatchin P. S., Panteleeva M. V., Knyazev A. V. Cerebroprotection in the prevention of early postoperative cognitive dysfunction in total intravenousesthesia // Treating doctor. No 3.-2013.-pp. 66-72.
5. Petrova M.M., Prokopenko S.V., Eremina O.V., Mozheiko E.Yu., Kaskaeva D.S. Distant results of cognitive impairment after coronary shunting // Fundamental research. – 2015. – № 1-4. – P. 814-820;

6. Polushin Yu.S., Polushin A.Yu., Yukina G.Yu., Kozhemyakina M.V. Postoperative cognitive dysfunction-what we know and where to go next.Bulletin of Anesthesiology and Resuscitation No. 1 (16). 2019. 19-28.
7. Usenko L. V. Cognitive impairment after general anesthesia in extracardiac interventions and the effect of early administration of Thiocetam in the postoperative period / L. V. Usenko, I. S. Polinchuk // Mezhdunar. neurol. journal. — 2011. — № 6 (44).
8. Usenko L.V., Krishtafor A.A., Polinchuk I.S. et al. Post-occupational cognitive disorders as a complication of general anesthesia.The importance of early pharmacological neuroprotection. Emergency Medicine, No. 2 (65) 2015 pp.24-30.
9. Shchelokova O.I., Nedbaylo I.N., Astakhov A.A. Comparative analysis of the frequency of detection of early postoperative cognitive dysfunction in patients subjected to intravenous anesthesia with propofol and ketamine // Modern problems of science and education. – 2018. – № 4.
10. Abrahamov D., Levran O., Naparstek S. et al. Blood-Brain Barrier Disruption After Cardiopulmonary Bypass: Diagnosis and Correlation to Cognition // Ann Thorac Surg. - 2017. - P. 161-169.
11. Burkhart C. S. et al. Can Postoperative Cognitive Dysfunction Be Avoided? // Hosp Pract (Minneap). 2012; 40 (1): 214–223.
12. Dhabhar F.S, Malarkey W.B., Neri E., McEwen B.S. Stress-induced redistribution of immune cells — from barracks to boulevards to battlefields: a tale of three hormones — Curt Richter Award winner. Psychoneuroendocrinology. 2012; 37: 1345–1368.
13. Evered L., Scott D. A., Silbert B., Maruff P. Postoperative cognitive dysfunction is independent of type of surgery and anesthetic // AnesthAnalg. 2011; 112 (5): 1179–1185.
14. Evered L, Scott DA, Silbert B, Maruff P (2011) Послеоперационная когнитивная дисфункция не зависит от типа операции и анестезии. Anesth Analg 112: 1179-1185.
15. Feng X. et al. Microglia mediate postoperative hippocampal inflammation and cognitive decline in mice //JCI Insight. – 2017. – Т. 2. – №. 7.
16. Fodale V., Santaria L.B., Schifilliti D., Mandel P.K. Anestetics and postoperative cognitive dysfunction: a pathological mechanism mimicking Alzheimer's disease // Anesthesia. — 2010. — Vol.65, № 4. — P.388-395.
17. Бабаназаров У. Т., Кайимов М. Т. ДВОЙНОЙ УДАР: ПЕЧЕНЬ И COVID-19 //European Journal of Interdisciplinary Research and Development. – 2023. – Т. 11. – С. 141-148.
18. Babanazarov Umid Turobkulovich, Sharopov Umarxo`ja Ravshanovich. (2023). APPLICATIONS OF QUERCETIN FOR THE PREVENTION OF COVID-19 IN HEALTHCARE WORKERS. Emergent: Journal of Educational Discoveries and Lifelong Learning (EJEDL), 4(01), 128–131. https://doi.org/10.17605/OSF.IO/NSJ6B
19. Babanazarov Umid Turobkulovich, Sharopov Umarxo`ja Ravshanovich. (2023). PREVENTIVE PURPOSE OF QUERCETIN FOR CORONAVIRUS INFECTION IN MEDICAL WORKERS. Academicia Globe: Inderscience Research, 4(01), 123–126. https://doi.org/10.17605/OSF.IO/ARQKW
20. Kline R.P., Pirraglia E., Cheng H., De Santi S., Li Y., Haile M., de Leon M.J., Bekker A. Surgery and brain atrophy in cognitively normal elderly subjects and subjects diagnosed with mild cognitive impairment // Anesthesiology. – 2012. – V. 116. – P. 603 – 612.
21. Lobov M., Knyazev A., Ovezov A. et al. Perioperative prevention of early cognitive dysfunction in children.

Intensive Care Med. 2010; 36 (Suppl. 2): 276.

22. Paule M. G., Li M., Allen R. R., Liu F., Zou X., Hotchkiss C., Hanig J. P., Patterson T. A., Slikker W. Jr., Wang C. Ketamine anesthesia during the first week of life can cause long-lasting cognitive deficits in rhesus monkeys // NeurotoxicolTeratol. 2011; 33: 220–230.