



# Cognitive Dysfunction After Multiple Surgery

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## ABSTRACT

The state of cognitive function was studied in 121 patients aged 20 to 59 years in the postoperative period under general anesthesia after various surgical interventions. Of these, 63 patients were after one operation and 58 patients after multiple operations. POCD was diagnosed in 26 (41.3%) of 63 patients of group 1 after one operation, then after multiple operations in 45 (77.3%) of 58 patients of group 2, that is, almost twice as many. This study confirms that multiple surgery may be a factor in the development of cognitive dysfunction.

## Keywords:

cognitive dysfunction, multiple surgery, anesthesia.

## Introduction

Currently, the problem of the safety of anesthetic management of surgical interventions in patients of various age groups with aggravated and unaggravated neuropsychiatric anamnesis is becoming more and more urgent. The relevance of this problem is determined by the medical and social consequences of cognitive disorders, which can have an undesirable effect not only on the duration of hospitalization and its cost, but also on the quality of life of patients in the late postoperative period [2, 5,7].

The problem of the syndrome of postoperative cognitive disorders as a manifestation of damage to the central nervous system under general anesthesia is one of the most relevant in anesthesiology in recent decades, as it affects the social status of patients and, accordingly, not only affects the quality of life, but also, in addition, 10 % of lawsuits in the field of medicine are associated with this complication [3,8,10].

Postoperative cognitive dysfunction (POCD) is a cognitive disorder that develops in the postoperative period and is manifested by a decrease in memory, concentration of attention, and other disorders of higher nervous activity,

confirmed by neuropsychological testing data in the form of a decrease in indicators by at least 20% of the preoperative level [11]. According to other authors, a decrease in cognitive status by 10% compared with the initial results indicates the development of postoperative cognitive dysfunction [12].

POCD is a syndrome caused by a decrease in these functions after surgery relative to the preoperative level, determined by the results of neuropsychological testing [9]. In this case, surgical intervention should be understood as a mechanical effect on tissues and organs for therapeutic or diagnostic purposes under conditions of general or local anesthesia [1]. Studies by foreign authors demonstrate the frequency of this complication in non-cancer patients up to 31–40% [13], which is probably due to greater alertness of doctors regarding this complication and the possibilities of diagnostic procedures. In women with oncogynecological profile, the frequency of cognitive disorders after surgery can reach 60% in the early postoperative period [4,9,14].

Currently, POCD is considered as a multifactorial complication. [6]. The MASK multicentre retrospective study of 997 children under repeated exposure to general anesthesia

before the age of 3 years demonstrated reduced response and fine motor impairment at 8–12 and 15–20 years of age [14,15]

At the same time, to date, there is no data on the prevalence of cognitive dysfunction (CD) after multiple operations; the incidence and structure of this pathology has not been determined when using various types of anesthesia. Given the significant volume of surgical interventions performed under general anesthesia, including multiple ones, the relevance of studying the structure and prevalence of KD in this category of patients.

Purpose of the study: to determine the frequency, severity and course of KD in patients after multiple surgeries.

### Material and Methods

The study included 121 patients aged 20 to 59 years in the postoperative period under general anesthesia after various surgical interventions. Of these, 63 patients after one operation and 58 patients after multiple operations. Surgery was performed under general multicomponent anesthesia with artificial lung ventilation. Patients were divided into two study groups: 1g. "after one operation", 2gr. after multiple surgeries. Conducted neuropsychological testing (short-term memory, attention, mental performance, intellectual lability) by the Luria test "10 words". Testing was carried out 2 days before surgery and 3-5 days after surgery. Of the 58 patients of the second group, 2 operations were transferred - 24; 3 operations-20; 4 operations-8 and 5 operations-6 patients.

### Results and Discussion

When assessing cognitive functions in the postoperative period, POCD in patients was verified by worsening the results of the "10 words" test by at least 10% compared with the initial data. On the 3rd-5th day after the operation, all patients were retested according to the mental status assessment scale. POCD was diagnosed in 26 (41.3%) of 63 patients in group 1 and in 45 (77.3%) of 58 patients in group 2. If the indicators of the test using the Luria method of "10 words" in patients of the first group before surgery were within the normal range, then in patients of the second group, a decrease

in the indicator was noted already before surgery by 30-40%.

The clinical picture of early POCD in the patients we observed after multiple operations (group 2) was characterized by a more pronounced decrease in the stability of attention, the rate and volume of short-term memory, and intellectual lability compared with patients in the second group. If the deterioration in the results of the test "10 words" after operations in the first group was 20-30%, then in the second group it was 50-60%, respectively.

It should be noted that if before discharge from the hospital, a decrease in short-term memory was detected in the first group in 33% of patients, then in the second group in 79%, which is twice as much as compared. It was noted that the shorter the interval between operations, the more pronounced impairment of cognitive function. These patients, who underwent 2 surgeries (13 patients), 3 surgeries (8 patients) for 1 year, apparently can be explained by poor academic performance by restoring neuronal function.

The incidence of POCD, according to the results of our study, can be up to 77.3% after multiple operations, versus 41.3% after a single operation, which is almost twice as much. According to foreign authors, in non-cancer patients of different ages, the incidence of POCD after one operation is 31–40% [13].

### Findings

The results of our present study revealed a more frequent occurrence and prevalence of early POCD in patients after multiple surgeries compared to after one. The study revealed the dependence of the severity, depth and frequency of the syndrome of postoperative cognitive dysfunction on the number of operations, which proves the significance and promise of further research on this problem with the development of an algorithm for the prevention of cognitive impairment before and in the postoperative period.

Thus, multiple surgery can be an undoubted factor in KD. The severity and high frequency of occurrence of the syndrome of postoperative cognitive dysfunction after multiple operations have a more negative effect on the quality of life,

which indicates the undoubted relevance of the problem under study.

Postoperative cognitive dysfunction, due to its high prevalence and multifactorial nature, seems to be an urgent multidisciplinary problem, involving specialists from various fields - anesthesiologists, neurologists, clinical neurophysiologists, pathophysiologists, and medical psychologists. Understanding the pathogenesis of cognitive disorders and determining the optimal variant of their perioperative prevention and correction are among the most important problems of modern medicine.

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