

HYPOCALCEMIA AS A FACTOR IN THE DEVELOPMENT OF COGNITIVE DYSFUNCTIONS AFTER THYROID SURGERY

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ABSTRACT

The state of cognitive function in 52 patients (45 women and 7 men) with thyrotoxicosis was studied in the pre- and postoperative period, operated on under general anesthesia. The age of the patients varied from 37 to 53 years. Postoperative cognitive dysfunction was detected in 38 patients, which is 73%. Of the 38 patients with POCD, 32 were patients with hypocalcemia, which is 84.2%. This study confirms the severe course and high prevalence of cognitive dysfunction in the postoperative period under general anesthesia after surgery in patients with thyrotoxicosis with hypocalcemia.

Keywords: cognitive dysfunction, anesthesia, calcium.

Introduction

The problem of postoperative cognitive dysfunction syndrome (POCD) as a manifestation of damage to the central nervous system under general anesthesia, it is one of the most relevant in anesthesiology in recent decades, as it affects the social status of patients and, accordingly, affects the quality of life [1,10,11].

The syndrome of postoperative cognitive dysfunction is cognitive disorder developing in the postoperative period and manifested by a decrease in memory, concentration and other disorders of higher nervous activity, confirmed by neuropsychological testing data in the form of a decrease in indicators of at least by 10-20% of the preoperative level [17].

LITERATURE ANALYSIS AND METHODOLOGY

Studies by foreign authors demonstrate the frequency of this complication in not oncological patients up to 31-40% [14], which is probably due to the greater alertness of doctors regarding this complication and the possibilities of diagnostic procedures. In women of oncogynecological profile, the frequency of cognitive disorders after surgery can reach 60% in the early postoperative period [4]. The risk factor for postoperative cognitive dysfunction is old age [15]. Potential risk factors, in addition to late age, are also genetic predisposition, and cognitive impairments already present in the patient [16]. The association of postoperative cognitive dysfunction with higher mortality of patients was revealed. T. Monk et al. [13] found that the risk of death within one year was higher among patients diagnosed with POCD at the time of discharge from the hospital. Clinical studies have shown that POCD occurs more often after surgery under general anesthesia in the presence of postoperative complications.

These data are consistent with the hypothesis of the inflammatory component of pathogenesis [17]. Recently, in the modern literature, there are more and more publications devoted to the topic under discussion, with an emphasis on the prevention of cognitive disorders [5-7].

With the help of Ca (calcium), the stability of cell membranes, activation of apoptosis, lymphocytes, the formation of learning skills and short-term memory is ensured. Ca plays an important role in almost all metabolic processes. Without his participation, normal lipolysis, glycogenolysis are impossible, gluconeogenesis. Ca regulates the sympathetic and parasympathetic nervous system, vascular tone and heart function, the production of hormones and neurotransmitters, participates in nervous and neuromuscular conduction, activates the enzymes of the blood coagulation system, and thyrotoxicosis is often accompanied by hypocalcemia, hyperphosphatemia, hypercalciuria [3,19].

It is known that thyroid dysfunction can significantly affect both the central and peripheral nervous system. In hyperthyroidism, damage to the nervous system is associated with the toxic effect of thyroid hormones, accelerated metabolism and increased sensitivity to catecholamines [2,18].

The purpose of the study. To study the state of hypocalcemia as a development factor cognitive dysfunction after thyroid surgery.

A study of the state of cognitive functions after surgery on thyroid gland under general anesthesia in 52 patients, 45 of them women and 7 men. The age of the patients ranged from 37 to 53 years. A standardized neurological examination was performed 1-2 days before and 3-5 days after the postoperative period. Neuropsychological testing (short-term memory, attention, mental performance, intellectual lability) was carried out using the Luria test "10 words". Testing was carried out 2 days before surgery and 3-5 days after surgery.

All patients received standard preoperative preparation, premedication and intensive postoperative therapy in accordance with the disease for which surgical intervention was performed. All patients underwent introductory anesthesia with ketamine at the rate of 2 mg / kg of weight, basic anesthesia with fentanyl and droperidol, with the use of muscle relaxants and ventilators in the normoventilation mode. The average duration of anesthesia was 1h 25 min ± 15 min. During anesthesia, all patients had stable hemodynamics, pulse oximetry indicators were within normal limits. Breathing upon exiting the state of anesthetic sleep was independent. At the end of the operation, all patients were extubated and, on their own breathing, were transferred to the intensive care unit for 1-2 days a day depending on the condition. According to the data of the anesthesia charts of the operated patients, anesthesia aids in medium dosages were used for the anesthetic aid.

The operation and the level of calcium in the blood (before the operation) Table 1

Title operations	Number of patients	Gender		The level of calcium in the blood mmol / l medium indicator
Total thyroidectomy	38	Men	4	1.80
		women	34	1.04-2.29
Hemistrumectomy	15	Men	3	1.88
		women	12	1.52-2.15
Subtotal thyroidectomy	15	Men	2	1.72
		women	13	1.22-1.88
Extended resection Thyroid gland with	3	Men	1	1.4

cyst		women	2	1.62
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DISCUSSION AND RESULT

When assessing cognitive functions in the postoperative period by POCD in patients, the deterioration of the results of the "10 words" test was verified by at least 10% compared to the initial data. When testing cognitive functions in the observed 52 patients after thyroid surgery POCD was noted in 38 patients, which is 73%. If you pay attention to the fact that calcium is directly involved in the process of human mental activity, secondly, in diseases of the thyroid gland, its exchange is often it is violated [8], it turns out that out of 38 patients with POCD, 32 were patients with hypocalcemia, which is 84.2%.

The clinical picture of early POCD in the patients we observed was expressed by a decrease in mental performance, attention stability, the pace and volume of short-term memory, intellectual lability, which it was the reason for their social and household maladaptation, a decrease in daily life activity.

**Distribution of patients with thyroid diseases by groups blood and serum calcium levels.
table 2**

Number of patients	Group blood	Ca ⁺² up to 2.0mmol/l	Ca ⁺² more 2.0mmol/l
18	O (I)	15	3
22	A (II)	18	4
26	B(III)	22	4
5	AB(IV)	4	1

As can be seen from Table 2, out of 52 patients, hypocalcemia was noted in 43 patients (82.6%), while in the second and third blood groups more: out of 16 patients in 13; and out of 19 patients in 16. Thus, general anesthesia has a negative effect on the state of cognitive functions in patients, especially with hypocalcemia.

Conclusion

The results of this study obtained by us made it possible to identify hypocalcemia as a factor in the development of early POCD in patients after thyroid surgery. Patients with thyrotoxicosis with hypocalcemia are at risk for the development of POCD.

The practical significance of the concept of CD is the possibility of early diagnosis of cognitive disorders and early initiation of neuroprotective treatment and simultaneous correction of hypocalcemia in the pre and postoperative period.

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