Impact of Citicoline over Cognitive Impairments after General Anesthesia

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Abstract: Postoperative cognitive delirium - POCD is chronic damage with deterioration of the memory, the attention and the speed of the processing of the information after anesthesia and operation. It is admitted that anesthetics and other perioperative factors are able to cause cognitive impairments through induction of apoptosis, neuro-inflammation, mitochondrial dysfunction and so on. More and more medicaments are used in modern medicine, as, for instance, Citicoline, which are in a position significantly to reduce this unpleasant complication of the anesthesia.

Keywords: Postoperative cognitive delirium, anesthesia, Citicoline.

1. Introduction

It is known that anesthetics and other perioperative factors are able to cause cognitive impairments through induction of apoptosis, neuro-inflammation, mitochondrial dysfunction and so on.

Chronic damage with deterioration of the memory, the attention and the speed of the processing of the information after anesthesia and operation is understood under the title Postoperative cognitive delirium - POCD. (1) Monk and colleagues report on the availability of POCD in patients discharged from hospital in the following ratio:

- 36, 6 % of surgical patients aged 18-39 years;
- 30, 4 % of the patients aged 40-59 years;
- 41, 4 % of the people aged 60 and over. (2)

The conclusion that age is the main risk factor for the development of POCD may be drawn from here. (3)

The mechanisms resulting in cognitive damage after anesthesia and operative interference are still unclarified. The impact of the immune system (TNF-a) NF-αB in the signal cascade with the release of cytokines which impair the blood-brain barrier and the role of the inflammatory response which developed directly after the anesthesia and the operative interference are admitted. (4), (5)

Medicament Citicoline has been more and more frequently successfully applied in the last few years aimed at the reduction of the frequency of POCD.

It is a medicament which renders its effect through exerting impact over the phospholipids of the neural membranes, through which the transfer of the nervous impulse and the neuro-transmission is realized. (6), (7), (8), (9), (10), (11), (12)

Therefore, Citicoline is the main intracellular precursor of phospholipid phosphatidyl choline. (13), (14), (15), (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), (26)

It exerts impact over the cholinergic system and acts as a choline donor for the enhanced synthesis of acetylcholine.

2. Materials and Methods

46 patients with various diagnoses were investigated, operated through a laparoscopic surgical method during the period 2019 in the University Multi-Profile Active Treatment Hospital Sveta (Saint) Marina – town of Pleven aged between 33 years and 83 years.

General anesthesia was performed on all the patients in conformity with the protocol: pre-medication with Midazolam and Fentanyl, input with Propofol, Succinylycholine and maintenance of the anesthesia with Atracurium, Fentanyl and Sevoflurane in the usual dosages.

The patients were divided into two groups:
First group - 24 patients whom Citicoline was applied to 30 minutes prior to the end of the anesthesia and on the first and second postoperative days.
Second group - 22 patients whom Citicoline was not applied to.

The availability of an impaired cognitive function was investigated during the postoperative period on the first and second postoperative days, and simple mathematical equations were given to the patients for solution.

The frequency distribution of the patients per diagnoses is presented in Fig. 1 and Fig. 2.
The patients in the two investigated groups per gender are presented in Fig. 3.

3. Results

Alopsychic and autopsychic disorientation, amnesia and impossibility to solve the problems assigned appeared in the first group in two patients (aged 68 years and 79 years) (Fig. 4).

In the second group PODC was registered in 5 patients (aged 71, 83, 70, 71 and 63 years) (Fig. 5).
4. Discussion

A number of clinical studies on the impact of Citicoline over the cognitive impairments were conducted. (27), (28)

Most authors announce that Citicoline is exceptionally well tolerated by the patients. (29), (30). Hurtado O. and colleagues prove that the continuous treatment with Citicoline improves the functional recovery after experimentally caused insult and it manages significantly to increase the plasticity of the neurons which results in clinical improvement of the patients with a stroke. (31)

5. Conclusion

POCD is an unfavorable complication of the anesthesia which is frequently associated with the old age of the patients, the accompanying diseases as the cerebrovascular disease, experienced in the past stroke, big in volume surgical operations and so on. A number of studies conducted in the last few years have proven that POCD is the reason for impaired quality of life, disability and high percentage of lethality after the operative interference.

The application of various medicaments, which reduce the risk of postoperative development of POCD, is more and more preferred in ICU.

Great hope in this respect is placed on medicament Citicoline which turned out to have big advantages as compared to the remaining medicaments, which with regard to their effect are inferior to it.

References


