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Postoperative Cognitive Dysfunction: A Narrative Literature Review

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A B S T R A C T

Postoperative cognitive impairment includes memory problems, difficulty concentrating, problems solving problems, and decreased thinking skills. This literature review aimed to describe postoperative cognitive dysfunction in clinical practice. In general, the occurrence of POCD is associated with inflammation and physiological changes in the brain that affect cognitive function. The mechanism by which postoperative cognitive dysfunction (POCD) occurs is not fully understood. However, several factors, such as inflammatory reactions, drug influence, anesthesia, and other factors, are thought to play a role in the occurrence of this condition. Postoperative cognitive dysfunction (POCD) and postoperative delirium (POD) are two conditions that are closely related and often interrelated. POD can trigger a systemic inflammatory reaction which then triggers POCD, and people who experience POD tend to be more likely to develop POCD. In conclusion, POCD can be seen in most postoperative patients in the old patient. With the high number of geriatric patients doing surgery, the effect of anesthesia and surgery on the risk of dementia is high. Geriatric mental status needs to be monitored before and after surgery because the old patient can quickly experience cognitive dysfunction after surgery.

1. Introduction

Postoperative cognitive dysfunction (POCD) is a cognitive disorder that occurs after a person has had surgery.[1-3] These cognitive impairments can include memory problems, difficulty concentrating, problems solving problems, and a general decline in thinking ability. POCD usually occurs after major surgery in older people, but it can happen to anyone, regardless of age and type of surgery performed.[4-6] The exact cause of POCD is not fully understood, but several factors that may play a role in developing this condition include systemic inflammatory reactions, changes in blood circulation, and exposure to anesthetic drugs. POCD symptoms may last days to weeks after surgery and will often improve over time. However, in some cases, cognitive impairment can last longer or even be permanent. The risk of POCD at three months and one-year post-surgery is 29% and 33.6%.[7,8] This literature review aimed to describe postoperative cognitive dysfunction in clinical practice.

Mechanism of occurrence of POCD

In general, the occurrence of POCD is associated with inflammation and physiological changes in the brain that affect cognitive function.[8-10] The mechanism by which postoperative cognitive dysfunction (POCD) occurs is not fully understood. However, several factors, such as inflammatory reactions, drug influence, anesthesia, and other factors, are thought to play a role in the occurrence of this condition. Surgery can trigger a systemic inflammatory reaction that plays a role in stimulating the immune system to fight infection or injury. However, an excessive

inflammatory reaction can cause damage to the brain and trigger POCD. Surgery can affect blood flow to the brain and cause a lack of oxygen and nutrients to brain cells. The anesthetic drugs used during surgery can affect brain function and trigger POCD.[11,12]

Basic neuroscientific research on cognitive and behavioral disorders as the basis of anesthesia will improve our understanding of the effects of anesthetic agents on brain mechanisms during conscious and unconscious states. Older patients often experience cognitive decline after surgery and anesthesia. There are two common cognitive disorders which are POCD and delirium. These disorders involve disturbances in cerebral oxidative metabolism and abnormalities in multiple neurotransmitters and ion gate voltages. Uncontrollable responses of glial cells, neurotoxin changes, and neurotrophic relief are conditions associated with POCD. There is evidence of biological changes in the brain, particularly postoperative inflammation. Intracellular complexes and their differences are related to causal pathways.[5,7]

The link between postoperative cognitive dysfunction and postoperative delirium

Postoperative cognitive dysfunction (POCD) and postoperative delirium (POD) are two conditions that are closely related and often interrelated. POD is a state of confusion and acute behavioral changes that occur after surgery and can cause difficulties in communicating and thinking. POD usually occurs in older people and people who have risk factors such as pre-existing cognitive impairment, underlying disease, and the use of certain medications.[8,10] POD can be defined as an acute confusional state accompanied by disturbances of consciousness, perception, memory, and orientation. Decreased attention is the most common symptom of POD, making it possible to distinguish it from other neurocognitive disorders. POD can develop into an active or passive form; a passive form is a form that is often encountered but is often overlooked and is often associated with a poor prognosis. Patients with passive delirium are often misdiagnosed as depression or dementia. With risk factors ranging from 30% to 50%, POD is the most common postoperative complication in elderly patients. Therefore, periodic examinations of POD are usually performed in elderly patients three times a day, carried out in conjunction with post-anesthesia care and continuing until 5th day after surgery.

Meanwhile, POCD is a similar but more long-term condition in which significant cognitive decline occurs after surgery. POCD often occurs in older people and can cause memory problems, difficulty concentrating, and difficulty solving problems. These two conditions are thought to have a relationship because POD can be a risk factor for POCD. POD can trigger a systemic inflammatory reaction which then triggers POCD, and people who experience POD tend to be more likely to develop POCD. In addition, the two conditions may share risk factors, such as age and poor health, and may also be associated with the use of anesthetic drugs.[11,12]

POCD management and consideration of anesthetic choice

The management of POCD depends on the severity and cause. Some actions that can be taken to treat POCD include a thorough health evaluation, the use of anti-inflammatories, cognitive rehabilitation therapy, and lifestyle changes. A thorough examination of the patient's health is carried out to determine risk factors and other health problems that may affect the development of POCD.[11-13] The use of certain medications, such as anti-inflammatories and certain nutritional supplements, can help reduce inflammation and improve brain function. Cognitive rehabilitation therapy aims to improve the patient's cognitive abilities through physical and mental exercises and cognitive strategies. Lifestyle changes such as eating a healthy diet, exercising regularly, avoiding smoking, and reducing consumption of alcohol and illegal drugs can help prevent and treat POCD.

The choice of anesthesia can affect the risk of POCD.[14,15] Several studies have shown that general anesthesia using inhaled drugs may increase the risk

of developing POCD, especially in older patients and those with other risk factors. However, using intravenous anesthetic drugs such as propofol and ketamine is associated with a lower risk of developing POCD.[11-13] Selection of the type of anesthesia should be considered based on patient characteristics, type of surgery performed, and other risk factors.

2. Conclusion

POCD can be seen in most postoperative patients in the old patient. With the high number of geriatric patients doing surgery, the effect of anesthesia and surgery on the risk of dementia is high. Geriatric mental status needs to be monitored before and after surgery because the old patient can quickly experience cognitive dysfunction after surgery.

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