



Why We Need to Focus on Preoperative Cognitive Function Assessment in Elderly Patients?

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Abstract

This review provides detail analysis of cardiovascular diseases in elderly patients and its decline in cognitive function. It also provides clear assessment on concealing cardiovascular disease and its impact on cognitive function. The clear emphasis on brain function assessment is presented here. The cognitive impairment even seen on the baseline for patients diagnosed with dementia is alerted well here. The strong reports suggesting the impact of preoperative cognitive impairment on increasing postoperative morbidity and mortality. Moreover post-operative cognitive dysfunction is highly correlated with rampant leading to mortality of postoperative complications. This review also presents the fact that lack of attention of physicians on preoperative cognitive impairment. The routine function cognitive screening to emphasize on perioperative and brain protecting problems on elderly patients. At the same time, routine preoperative risk assessment and proper decision making is crucial for estimating the prognosis. In addition, the association of cardiovascular disease such as Heart failure with cognitive impairment in elderly patients are conferred. The variation of cognitive level emulates the cardiovascular health level relatively. This review summarizes the progress that has been made while also recognizing the challenges that remain.

Keywords: Cognitive impairment; Cognitive function; Morbidity; Mortality; Cardiovascular disease

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Introduction

Cognitive impairment is common in elderly patients. Although a few screening devices for subjective weakness exist, studies have demonstrated that clinicians regularly neglect to distinguish psychological impedance. Global life expectancy has been increasing over the last few decades. Although ordered age itself predicts careful result inadequately, age-related decline in physiological reserve and functional limit are inescapable and affect all organ frameworks. At the point when individuals live longer, more comorbidities show up; this will result in higher paces of peri-operative morbidity and mortality. This is as of now imposing a critical weight on medicinal services frameworks, by expanding both the usage of intensive care facilities and length of hospital stay. Hence, it is basic to convey both high-caliber and effective peri-operative care for old patients. Postoperative psychological issue is a range of infections going from quick postoperative delirium to postoperative cognitive dysfunction. In a small group of tragic patients, the impairment can be long haul and lasting, which will generously influence their quality of life. These clutters are generally experienced in older surgical patients and will be explained in detail.

Although the routine content of preoperative preparation is to assess the function of the main vital organs, the assessment of brain function has not been taken seriously. According to a survey in the United States, the prevalence of dementia in elderly patients is 5% in 70 to 79 years old, 24% in 80 to 89 years old, and 40% in 90 years old Plassman BL, et al. [1]. Another epidemiological survey showed that the prevalence of cognitive impairment in elderly patients over 65 years old was 35% to 50%, and the prevalence of cognitive impairment was higher in elderly patients over 85 years old [2]. Therefore, many elective elderly surgical patients who have not been diagnosed with dementia may have cognitive impairment at baseline. Recently, there have been reports in the literature that preoperative cognitive impairment in elderly patients leads to increased postoperative morbidity and mortality, revealing the importance of preoperative assessment of cognitive function in elderly patients. POCD is associated with postoperative adverse outcomes, such as prolonged hospital stay, re-hospitalization, and increased patient mortality POCD refers to cognitive impairment of brain function after surgery. Does the patient have a related cognitive disorder before surgery, so that POCD is more likely to occur after surgery? This paper reviews the research progress in this area.

Critical Review

Postoperative cognitive dysfunction and postoperative complications and mortality

Postoperative Cognitive Dysfunction (POCD) is a postoperative disorder characterized by neurocognitive deficits that occur in elderly patients [3]. Recent literature has shown that 20% to 50% of patients will have POCD after surgery, and the prevalence of elderly patients, cardiovascular disease and heart failure patients is higher [4].

These bring serious social problems and economic pressure to patients and society as a whole [5]. Monk and other 1064 patients over the age of 18 underwent a series of neuropsychological functional tests before, during and 3 months after surgery to detect POCD patients [6]. They found that the one-year mortality rate of patients with POCD was significantly higher than that of non-POCD patients. Steinmetz and other cognitive function tests in 701 patients with non-cardiac surgery before, 1 week and 3 months after surgery [7]. They also found that patients with POCD not only had increased morbidity and mortality but also lost their ability to work and increased their social burden.

Therefore, POCD is associated with the prevalence and mortality of postoperative complications. Although there are still no good interventions, it is necessary to pay attention to the preoperative cognitive function assessment of such patients to intervene as early as possible.

POCD and preoperative cognitive decline

In 2011, Evered and others used a series of neuropsychological tests to evaluate the preoperative week of patients undergoing elective total hip arthroplasty (>60 years) [8]. They divided cognitive decline into preexisting cognitive impairment (PreCI) and mild cognitive impairment (aMCI). The results showed that approximately one-fifth of patients had PreCI or aMCI, and the prevalence increased with age, with 55 percent of patients over 80 years of age having PreCI. Crosby et al. [9] commented on this article. They point out that Evered's work is by far the best document to show that many elderly patients already have cognitive impairment before undergoing major orthopedic joint replacement surgery. They also raised two questions worth considering. First, is pre-existing cognitive impairment a risk factor for POCD? Second, postoperative cognitive decline may be largely the progression of unrecognized mild cognitive impairment.

In 2015, Evered and other re-published their research results, further indicating that preoperative cognitive impairment is closely related to the occurrence of POCD [10]. The study looked at 300 elderly patients (>60 years) who underwent hip replacement surgery and 51 elderly patients (>60 years) who underwent non-surgical control. All patients completed a series of neuropsychological tests before surgery and 7 days, 3 months, and 12 months after surgery. The results showed that Pre-CI was present in 32% of patients. The incidence of POCD at 7 days postoperatively and 3 months after surgery in patients with PreCI and without PreCI was 25.3% and 13.3%, 14.9% and 7.1%, respectively. PreClin's cognitive ability decreased by 9.4% at 12 months after surgery, while the cognitive ability of PreCI patients only decreased by 1.1% at 12 months. It can be seen that the prevalence of POCD increased significantly in patients with PreCI on days 7 and 3, and cognitive decline was more pronounced in the 12th month, so PreCI was a good predictor of POCD.

Recently, there have been reports in the literature that preoperative cognitive impairment is a risk factor for the development of postoperative mental disorders [11]. Now that the POCD is renamed to PND, the concept of the perioperative period is specifically proposed, suggesting that the assessment of the state of preoperative cognitive function cannot be ignored [12]. However, the current problem of whether or not there is cognitive impairment before surgery has not attracted the attention of physicians. This is a noteworthy status quo. Therefore, it is time to perform routine cognitive function screening for elderly patients to pay attention to the perioperative problems of cognitive function and brain function protection and consider how to intervene as early as possible.

Preoperative cognitive function and postoperative complications and mortality

Elderly patients have increased postoperative complications and mortality [13]. Recent literature has revealed that preoperative cognitive decline is associated with postoperative complication rates and mortality.

Culley et al. studied the effects of preoperative cognitive function on postoperative complications in 211 patients with elective hip or knee arthroplasty, aged ≥ 65 years, without dementia [14]. The cognitive screening was performed using a simple intelligence assessment scale (Mini-Cog; the scale consisted of 3 words of memory detection and a clock experiment) with a total score of 5 points, less than or equal to 2 points for cognitive impairment. The results of the study showed that 24% of elderly patients had cognitive impairment before surgery. Compared with patients with a Mini-Cog score of >2 , patients with a Mini-Cog score of ≤ 2 had a higher rate of direct home rehabilitation after discharge (34% vs. 67%), and a higher incidence of postoperative delirium (7% vs. 21%), prolonged hospital stay (95% CI 0.42 to 0.95, $P=0.026$).

At the same time, Robinson and other patients with cardiothoracic surgery, urology or vascular surgery (mean age 73 years) preoperative cognitive level changes and postoperative complications and mortality were further studied [15]. Using the same scoring criteria as the above study, the results showed that 44% of patients had a certain cognitive impairment before surgery, and the incidence of complications in the cognitive dysfunction group increased 1 year after surgery (41% vs. 24%). Incidence increased (78% vs. 37%), hospitalization was prolonged, and 6-month mortality was higher (13% vs. 5%). Logistic regression found that cognitive impairment was still associated with the occurrence of one or more postoperative complications by adjusting for potential confounders identified by univariate analysis. This suggests that basic cognitive impairment in elderly patients undergoing major elective surgery is associated with postoperative complications and mortality. A large study published in JAMA showed that patients with preoperative sensory (IS) had significantly increased postoperative complications and mortality, consistent with the above conclusions [16].

Therefore, the inclusion of an assessment of cognitive impairment in elderly patients in routine preoperative risk assessment and decision making is important for predicting the prognosis of elderly patients.

Relationship between preoperative cognitive function and cardiovascular disease

Most elderly patients often have cardiovascular diseases such as Heart Failure (HF), coronary heart disease and high blood pressure.

In recent years, studies have reported that cardiovascular disease and cognitive impairment in elderly patients are intrinsically linked. For example, HF not only increases patient hospitalization and mortality but also has a relationship with the incidence of cognitive impairment and dementia in the elderly [17].

A recent study analyzed 4,864 elderly patients aged ≥ 65 years without heart failure and clinical stroke and identified 496 patients with newly diagnosed HF. The investigators used MMSE to assess cognitive function in newly diagnosed HF patients from 1989/1990 to 1998/1999. The results showed that after adjusting for various interference factors, the MMSE score decreased by 5.8 points (95% CI 5.3~6.2) in the 80 to 85 years old patients with no heart failure within 5 years; the average MMSE score after 5 years of diagnosis of heart failure patients at 80 years old The decrease was 10.2 points (95% CI 8.6~11.8). It can be seen that the cognitive decline of elderly patients is faster after HF [18]. Recently, Evered team observed changes in cognitive function in elderly patients undergoing elective Left Heart Catheterization (LHC) before and after LHC [19]. The study used a set of written and computer-operated series of neuropsychological tests to assess baseline cognitive levels in older patients before LHC and to reassess cognitive function changes 3 months after surgery. At the same time, 51 community participants were recruited to form a control group. Early cognitive function changes were assessed using computer test software 24 h (or discharged) and 7 days after LHC, and cognitive decline was calculated using the accepted RCI method. The results showed that more than half of patients >60 years of age had mild cognitive impairment (MCI) before LHC, and cognitive ability decreased by 8% to 13% after 3 months of LHC. This result indicates that mild to moderate cognitive impairment is common in elderly patients before LHC, and the prevalence rate is higher than that of the general population. It will be further decreased after LHC, which once again confirms that cardiovascular disease has a certain intrinsic relationship with cognitive decline [20].

A survey from Europe reported that even if there was no previous heart disease or stroke, the risk factors for cardiovascular disease (smoking, lack of exercise, high blood pressure and diabetes, history of hyperglycemia, etc.) are also associated with cognitive impairment in elderly patients. Independent variable [21]. Another study focused on the relationship between hypertension and cognitive function changes. The subjects were 71 normal blood pressure and 150 hypertensive patients. The results indicate that the severity of hypertension is related to the degree of cognitive decline [22]. JAMA recently published a cohort study based on the French population. The study included 6,626 people (mean age 73.7 years, female 4,200 people). The 7 cardiac health indicators observed were non-smoking, body mass index <25, regular physical exercise, two or more fish per week, at least 3 times a day for fruits and vegetables, cholesterol <200 mg/dL [untreated], fasting glucose <100 mg/dL [untreated], blood pressure <120/80 mmHg [untreated]; score range, 0 to 7). Cognitive function assessment uses a comprehensive score of a series of neuropsychological tests, the Z-scoring method. After 8.5 years of follow-up (January 1999 to July 2016), 745 people were diagnosed with dementia and increased cardiovascular health indicators were associated with a reduction in the risk of dementia and a delay in cognitive decline [23].

Therefore, changes in cognitive levels reflect the cardiovascular health level to some extent. Although the research to explore the intrinsic link between the two has just begun, the existing results deserve our high attention.

Conclusion

Preoperative cognitive decline is not only related to POCD and POD but also postoperative adverse outcomes. Recent literature also suggests that the decline in cognitive function in elderly patients is often associated with cardiovascular disease, and the risk of concealing cardiovascular disease behind impaired cognitive function cannot be ignored. Recently, POCD changed its name to PND, which covers the concept that preoperative cognitive function has declined. Re-emphasizing the baseline level of preoperative cognitive function is important for judging postoperative cognitive function changes. For anesthesiologists, preoperative evaluation is the first level of safety control for anesthesia, and it is a key link in the safety and prognosis of anesthesia. Therefore, we should pay attention to the evaluation of preoperative cognitive function in elderly patients in routine preoperative evaluation, to prevent preventive measures to reduce postoperative complications and mortality and improve patient prognosis.

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