Geriatric Anesthesia

Use of the Montreal Cognitive Assessment Test to Investigate the Prevalence of Mild Cognitive Impairment in the Elderly Elective Surgical Population

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Postoperative cognitive disorders are common in elderly elective surgical patients, and studies have shown that individuals with mild cognitive impairment (MCI) have an increased risk of developing postoperative cognitive dysfunction (POCD). Hence, early preoperative detection of MCI could be used to reduce the incidence of POCD. Neurocognitive dysfunction is not routinely assessed in the preoperative period in a formal way. The Montreal Cognitive Assessment (MoCA) test may compensate for the lack of neuropsychological test batteries for MCI in surgical patients in a routine preoperative setting. A study was done to determine the efficacy of the MoCA in estimating the prevalence of MCI among elderly elective surgery patients, to determine the proportion of patients with MCI who did not have recorded diagnosis of cognitive impairment, to detect the effect of increasing age on the prevalence of MCI, and to ascertain the effect of timing and location of testing for MCI.

A group of 113 patients were recruited from the Day of Surgery Admission Unit and were tested at admission on the day of surgery. Another group of 102 patients were recruited for preadmission clinic who presented up to 6 weeks prior to the surgery. The results showed that the overall combined prevalence of MCI was 56% and that it increased with age. Mild cognitive impairment was found in more than 50% of patients aged 65 years and 80% of patients 80 years or older. A Spearman rank-order correlation revealed an inverse linear relationship between age and total MoCA score ($r = -0.349, P < 0.001$). It was found that of the 121 patients detected with MCI only 2 (1.7%) had a recorded diagnosis of cognitive impairment of any type at any time point. Testing on the day of the surgery or several weeks prior to surgery yielded similar results.

In conclusion, it was observed that MoCA was a simple and fast screening test effective in preoperatively detecting MCI in an elderly population. Routine detection of MCI, particularly in an elderly population, could provide an opportunity for formal interventions such as geriatric consultation, adequate pain management, early surgery, and staff education to reduce the incidence of POCD in this at-risk group.

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Cognitive Decline in the Elderly After Surgery and Anaesthesia: Results From the Oxford Project to Investigate Memory and Ageing (OPTIMA) Cohort

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Postoperative cognitive dysfunction following anesthesia and surgery in patients, especially in the elderly, is of increasing concern. Short-term postoperative cognitive dysfunction is well known, but the effects of general anesthetics on long-term cognitive decline in people have not been well established. A longitudinal cohort study of cognitive function in patients and control subjects from the OPTIMA (Oxford Project to Investigate Memory and Ageing) was done to assess the effects of anesthesia and surgery on the trajectory of cognitive decline with increasing age. The study also aimed at establishing the effects of age, sex, and the apolipoprotein E e4 variant (APOEe4), which is known to be associated with a greater risk of cognitive decline and diagnosis of Alzheimer dementia, on this relationship. The authors used mixed-effects modeling with open-source computer software R to model the relationship between Cambridge Cognitive Examination (CAMCOG) score and multiple explanatory variables on which it might be dependent. They took the value of $P < 0.05$ to indicate significance throughout.

Decline in cognitive functions was noted in 394 patients (198 women, 196 men) with median age at recruitment 72.6 years (interquartile range [IQR], 66.6–77.8 years) and a median initial CAMCOG score at recruitment of 98.0 (IQR, 93.0–101.0). During a median follow-up of 4.1 years (IQR, 2.0–7.6 years), 1922 CAMCOG observations were made up to a maximum of 23 years. The first surgery occurred in 109 patients at a median time of 3 years from enrollment, and a second surgery occurred in 37 of these patients at a median time of 5.1 years from recruitment. The results showed that cognitive function declined in patients who were older at the time of recruitment ($P = 0.0006$), were male ($P = 0.0253$), and had the APOEe4 allele ($P = 0.0017$). It was noted that a first surgery significantly increases the rate of decline in CAMCOG ($P = 0.025$) and that a second surgery reversed that decline at borderline significance ($P = 0.0498$).

In conclusion, elderly people were at risk of more rapid cognitive decline following surgery with general or regional anesthesia. This effect was seen in those who had already suffered cognitive impairment (either mild cognitive impairment or possible or probable Alzheimer disease). Although age and the presence of the APOEe4 allele exacerbate cognitive decline, there is no direct independent interaction with the effects of surgery and anesthesia. The long-term cognitive damage can lead to dementia in the elderly.
Cognitive Decline After Surgery and Anaesthesia: Correlation Does Not Mean Causation

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Postoperative cognitive dysfunction is a transient alteration in cognitive function, including memory, information processing, and executive function, lasting a few days to as long as a few weeks after surgery. There is an increasing concern about the potential impact of surgery on the cognitive ability in older people undergoing surgery. It is paramount to determine whether surgery or anaesthesia may precipitate or accelerate cognitive decline, leading to dementia—chronic cognitive decline with impaired functional ability—in the elderly. A longitudinal observational cohort study was carried out by Patel et al ("Cognitive Decline in the Elderly After Surgery and Anaesthesia: Results From the Oxford Project to Investigate Memory and Aging [OPTIMA]") to establish the association of surgery and anaesthesia with cognitive decline in older people. This study included more than 1100 people (cognitively normal and cognitively impaired older people) to understand the causes, treatment, and prevention of dementia.

Repeated neuropsychological assessments, as well as brain scans, blood and cerebrospinal fluid sampling, and physical examination, were performed. The authors used the Cambridge Cognitive Examination (CAMCOG) score as a tool to assess changes in cognition. Comparing the trajectory of decline in people with 2 or more cognitive measures showed that cognitive decline appears to accelerate after surgery in elderly patients diagnosed with cognitive impairment (n = 394; 109 underwent surgery; 36 of these patients operated on were diagnosed with mild cognitive impairment). This study is prone to reverse causation. Patients who underwent surgery after a diagnosis of mild cognitive impairment (n = 16) appear to fall by 5 to 10 CAMCOG points (dementia = <80 CAMCOG points) over a 2-year period, compared with a smaller drop in patients who did not undergo surgery. However, there are no data about the type of surgery or anaesthesia used in these cases, and it is noted that statistical significance may not necessarily translate or relate to corresponding clinical significance. Hypoxemia, hypotension, embolism, medications, and postoperative infections are all associated with the development of postoperative cognitive dysfunction and delirium and could contribute to cognitive decline. It was seen that in patients with preexisting cognitive impairment a second surgery reverses the cognitive decline seen after first surgery. In conclusion, although it has been seen that surgery and anaesthesia impact cognitive decline, methodological concerns, lack of clarity regarding the dose-response relationship, and inconsistency in the existing literature make these findings uncertain. Better understanding of the impact of surgery and anaesthesia on cognitive dysfunction is paramount for informed decision making between surgeons, anesthetists, and patients. This study also highlights the need for future high-quality research on the cognitive consequences of surgery and anaesthesia.

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