General anaesthesia impacts brain functioning less than other patient risk factors, data spanning 12 years suggests

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After surgery under general anaesthesia, older patients often experience a decline in cognitive function that can last for months or even years.

This worsening brain function has been linked to deep anaesthesia during surgery.

A new study tracking 1,823 adults (aged 25 to 84 years) over 12 years, suggests that patient factors like high blood pressure, type 2 diabetes, and a lower level of education are stronger predictors of long-term cognitive decline than repeated surgery under general anaesthesia.

The findings, being presented at Euroanaesthesia, the annual meeting of the European Society of Anaesthesiology and Intensive Care (ESAIC), could aid efforts to help keep people's minds sharp as they age.

Post-operative cognitive decline (POCD) is characterised by impaired memory and concentration and can be temporary or persist for months to years after surgery. Estimates suggest that around 1 in 10 patients aged 60 and older show some degree of cognitive impairment three months after surgery, although the diagnostic criteria for POCD have not yet been standardised and causes and risk factors are still being explored.

Surgeries in older people are becoming more common, and with 12 million people aged 65 and older living in the UK, and the number expected to increase to around 20 million by 2041, this represents substantial numbers of people at potential risk.

To find out whether repeated exposure to surgery under general anesthesia during an individual's lifetime negatively affects their natural cognitive decline, Dutch researchers analyzed prospective data from 1,823 adults (average age 51 years, 50% male) with normal cognitive functioning from the Registration Network Family Practices—a register that is representative of the Dutch population.

Participants were interviewed at the start of the study and subsequently six and 12 years later. Each examination included a medical exam and a

battery of cognitive function tests to measure learning and memory, executive function, information processing speed, and selective attention and mental speed (with a colour and word brain teaser called the Stroop test in which a word like "blue" or "purple" is printed in green or red ink.) Modelling was used to look at the cognitive development of participants and correlated those to independent risk factors.

Patients who had undergone more than two general anaesthetics by the start of the study tended to be older and have other health conditions such as high blood pressure, coronary artery disease, or high cholesterol (hypercholesterolemia) compared to those who had never had an operation under general anaesthesia.

After adjusting for factors that are known to be linked with increased risk of cognitive decline, including age, sex, educational level, smoking status, alcohol abuse, and other illnesses, the researchers found that patients who had received at least one general anesthetic were significantly more likely to perform worse on the Stroop test (selective attention and mental speed) than individuals who had never undergone surgery. However, the number of general anesthetics did not appear to impact other areas of cognitive function and performance.

Instead, the findings suggest that having high blood pressure, high cholesterol, type 2 diabetes, a history of smoking, and a low education level had significantly more impact on long-term cognitive decline compared to an operation under general anesthesia.

For example, high blood pressure, high cholesterol, and type 2 diabetes had a significant impact on two of the four cognitive domains tested (selective attention and mental speed and information processing speed), whilst educational level significantly impacted all four cognitive domains.

"There is natural continuum of cognitive decline during an individual's lifetime, so after 12 years almost everyone in the study will have developed some form of cognitive decline. Different individuals cognitively age in different ways—the decline may be sudden or gradual, invalidating, or mild", explains lead author Dr. Christoph Pennings from Maastricht University Medical Center in the Netherlands.

"Our study suggests that repeated exposure to surgery under general anaesthesia has little effect on long-term cognitive decline, with subtle impairments in the ability to focus on specific tasks and how quickly you can process information and make decisions based upon that information. Instead, it appears that patient factors such as a history of high blood pressure, diabetes, and educational level are more important for the speed of cognitive decline over an individual's lifetime. These patient factors seem to be more important, but also better modifiable factors than a (necessary) operation under general anaesthesia."

The authors point out that their study was observational, so can't establish cause. They note some limitations including limited information on length and type of surgery, specific information on the type of anaesthesia and the fact that there was a long follow-up period in which surgical and anaesthetic techniques may have changed over time.

Provided by The European Society of Anaesthesiology and Intensive Care (ESAIC)

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