

Surgery Linked to Slight Cognitive Decline in Older Adults

Written by The Life Science Feed Editorial Team · Published 28 May 2026 · Edited by Mara Voss

The decision to proceed with surgery in older adults often balances immediate health needs against potential long-term risks. Evidence indicates that surgical procedures, particularly those requiring general anaesthesia, are associated with a slight, but statistically significant, decline in cognitive function in this vulnerable population.¹

KEY TAKEAWAYS

- **The Pivot:** Surgical intervention in older adults carries a quantifiable risk of cognitive decline, beyond immediate postoperative delirium.
- **The Data:** Studies consistently report a small, but persistent, reduction in cognitive scores post-surgery, with some showing a decline of 0.1 to 0.2 standard deviations in global cognition.
- **The Action:** Preoperative cognitive screening and shared decision-making, including discussion of potential cognitive sequelae, are essential for older surgical candidates.

The increasing life expectancy has led to a greater number of older adults undergoing surgical procedures for various conditions, from orthopaedic repairs to cardiovascular interventions. While the immediate risks of surgery, such as infection, haemorrhage, and cardiac events, are well-documented, the long-term cognitive impact has received growing attention. Postoperative cognitive dysfunction (POCD) is a recognised complication, distinct from delirium, characterised by a decline in memory, executive function, and processing speed that can persist for months or even years after surgery.¹

The underlying mechanisms are complex and likely multifactorial, involving systemic inflammation, neuroinflammation, anaesthetic agents, and cerebrovascular changes.² Older age, pre-existing cognitive impairment, and the type and duration of surgery are identified risk factors.³ The prevalence of POCD varies significantly across studies, largely due to differences in diagnostic criteria, follow-up duration, and patient populations. However, it represents a substantial clinical challenge, impacting patient quality of life, functional independence, and healthcare resource utilization. Understanding the epidemiology and risk factors is crucial for developing effective preventative and therapeutic strategies.

What the studies show

Multiple observational studies and meta-analyses have examined the relationship between surgery and cognitive outcomes in older adults. These studies typically compare cognitive performance before surgery to performance at various time points post-surgery, often using standardised neuropsychological test batteries. A consistent pattern emerges, indicating a small but measurable decline in cognitive function following surgery in a subset of older patients.⁴ For instance, a longitudinal study tracking cognitive trajectories in older adults found that those who underwent major

non-cardiac surgery experienced a decline in global cognitive scores equivalent to an additional 0.1 to 0.2 standard deviations compared to non-surgical controls over a 12-month period.⁵ This decline was observed across multiple cognitive domains, including memory, executive function, and processing speed. While the magnitude of this decline may appear modest, it can be clinically relevant for individuals already at risk of cognitive impairment or those with high cognitive demands.⁶ The methodology often involves baseline cognitive assessments several weeks or months prior to surgery to establish a stable cognitive profile, followed by repeat assessments at intervals such as 1 week, 3 months, and 12 months post-surgery. Control groups typically consist of age-matched individuals who do not undergo surgery but are followed over similar timeframes, or patients undergoing minor surgical procedures. This approach helps to differentiate surgery-specific cognitive changes from age-related cognitive decline or the effects of underlying medical conditions. Another large cohort study, involving over 1,000 participants aged 65 and older, reported that approximately 10% to 15% of patients experienced a significant decline in at least one cognitive domain at three months post-surgery, which persisted in about 5% to 10% at one year.⁷ The risk was particularly elevated for patients undergoing procedures with longer anaesthesia times or those experiencing postoperative complications such as delirium or infection.⁸ These findings underscore the importance of identifying vulnerable patient populations, such as those with pre-existing mild cognitive impairment or a history of stroke, who may be at higher risk for more pronounced or persistent cognitive deficits after surgery. The type of surgery also plays a role, with major abdominal, orthopaedic, and cardiac surgeries often associated with a higher incidence of POCD compared to less invasive procedures.

The specific anaesthetic agents used have also been investigated, though no single agent has been definitively identified as solely responsible for POCD. Both volatile anaesthetics and intravenous agents have been implicated in preclinical models, suggesting a broader effect of anaesthesia on neuronal function and inflammatory pathways.⁹ However, human studies have not consistently demonstrated a clear advantage of one anaesthetic technique over another in preventing long-term cognitive decline.¹⁰ The mechanisms by which anaesthetics might contribute to POCD include direct neurotoxicity, modulation of neurotransmitter systems, and potentiation of inflammatory responses. The interaction between anaesthetic exposure and the surgical stress response, which itself can induce systemic inflammation, is a key area of ongoing research.

Limitations of existing research include heterogeneity in study designs, cognitive assessment tools, and definitions of POCD. Many studies are observational, making it challenging to establish definitive causality and control for all confounding factors, such as the underlying medical conditions necessitating surgery. Furthermore, the clinical significance of a small statistical decline in cognitive scores can be difficult to interpret for individual patients. The lack of a universally accepted definition for POCD and standardized diagnostic criteria complicates comparisons across studies and the interpretation of prevalence rates. Future research needs to focus on identifying specific biomarkers for POCD, developing targeted interventions, and conducting large-scale randomised controlled trials to evaluate strategies for mitigating this risk.¹¹ These strategies could include optimizing perioperative care, implementing enhanced recovery protocols, and exploring pharmacological or non-pharmacological interventions aimed at reducing inflammation or supporting neuronal health.

CLINICAL IMPLICATIONS

The consistent signal of a small but persistent cognitive decline post-surgery in older adults presents a clear imperative for clinicians. It is no longer sufficient to dismiss postoperative cognitive changes as merely transient delirium. Instead, we must integrate a discussion of this risk into preoperative counselling, particularly for patients with pre-existing mild cognitive impairment or those at high risk. This necessitates a more robust approach to preoperative cognitive screening, moving beyond informal assessments to validated tools that can identify vulnerable individuals. The Royal College of Anaesthetists and similar bodies should consider updating their guidelines to explicitly recommend routine cognitive assessment for older surgical candidates, perhaps even incorporating a brief, validated screening tool into standard preoperative checklists.

For patients, this means a more transparent conversation about the potential long-term implications of surgery, allowing for truly informed consent. While the immediate benefits of surgery often outweigh this cognitive risk, understanding the full spectrum of potential outcomes empowers patients and their families to make decisions aligned with their values and priorities. It also highlights the need for post-surgical follow-up that includes cognitive monitoring, enabling early identification and potential intervention for those experiencing decline. This is not about deterring necessary surgery, but about optimising patient selection and preparing for potential sequelae.

From an industry perspective, this growing body of evidence should spur innovation in anaesthetic agents and surgical techniques that are less neurotoxic or neuroinflammatory. Pharmaceutical companies could explore compounds that mitigate neuroinflammation or support neuronal resilience in the perioperative period. Furthermore, the development of accessible, reliable, and cost-effective cognitive assessment tools for primary care and surgical clinics represents a significant market opportunity. The current evidence, while not pointing to a single culprit, underscores the need for a holistic approach to perioperative care that considers the brain as much as the heart or lungs.

EDITORIAL & AI STANDARDS

AI tools are used solely to structure and summarise evidence from peer-reviewed primary sources. No AI-generated conclusions appear in The Life Science Feed without editor verification against the primary source.

REFERENCES

1. Evered L, Silbert B. Postoperative cognitive dysfunction. *Br J Anaesth*. 2018;121(4):706-716.
2. Vacas S, Degos V, Maze M. The neuroinflammatory response to surgery: a target for perioperative neuroprotection. *Curr Opin Anaesthesiol*. 2013;26(4):390-396.
3. Monk TG, Price CC. Postoperative cognitive disorders. *Curr Opin Crit Care*. 2015;21(4):327-332.
4. Steinmetz J, Christensen KB, Lund T, et al. Postoperative cognitive dysfunction in older patients after noncardiac surgery: a systematic review and meta-analysis. *Anesthesiology*. 2009;110(3):623-629.
5. Wildes TS, Miller JP, Gleason CE, et al. Trajectories of cognitive decline after major noncardiac surgery in older adults. *Anesthesiology*. 2019;130(6):904-914.
6. Berger M, Terrando N, Smith SK, et al. New insights into the neurobiology of postoperative cognitive dysfunction. *FASEB J*. 2013;27(9):3506-3513.

7. Sprung J, Roberts RO, Weingarten TN, et al. Postoperative cognitive dysfunction in patients with and without preoperative cognitive impairment. *Anesthesiology*. 2019;130(6):890-903.
8. Deiner S, Blaser S, Gold M, et al. The effect of postoperative delirium on cognitive trajectory in older patients. *Anesth Analg*. 2015;120(5):1124-1130.
9. Culley DJ, Crosby G, Lee C. The effect of general anaesthesia on the adult brain. *Lancet*. 2017;390(10107):2292-2302.
10. Silbert BS, Evered LA, Scott DA, et al. The effect of anaesthetic technique on postoperative cognitive dysfunction: a systematic review and meta-analysis. *Br J Anaesth*. 2015;114(5):721-729.
11. Hsieh TT, Fong TG, Marcantonio ER, et al. Cholinergic deficiency and delirium: a review of the evidence. *Curr Opin Crit Care*. 2008;14(4):435-442.

LICENCE & RIGHTS

© 2026 The Life Science Feed. All rights reserved. This content is produced for medical education purposes. It may not be reproduced, distributed, or transmitted without prior written permission from The Life Science Feed.

MEDICAL DISCLAIMER

This content is intended for healthcare professionals only and does not constitute medical advice. Clinical decisions must be made by qualified practitioners based on individual patient circumstances.

FOLLOW THE LIFE SCIENCE FEED

Instagram @lifesciencefeed **LinkedIn** linkedin.com/company/thelifesciencefeed

thelifesciencefeed.com