Automated anesthetic management and cognition outcomes

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Video Abstract

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Abstract

Many older patients experience a kind of 'brain fog' following surgery, in which cognition is impaired from lingering effects of anesthesia. It's temporary, but can still be disruptive. Now, there is early evidence that one way to prevent such problems is to automate more aspects of anesthetic management during surgery. That's the preliminary finding from a new randomized controlled trial appearing in the journal *Anesthesiology*. Researchers at a hospital in Belgium tested whether automating three aspects of anesthetic management – anesthetic depth, cardiac blood flow, and protective lung ventilation – improved performance on cognitive tests post-op, compared to when an anesthesiologist is in manual control. Going in, the idea was that machines could do an even better job than humans at keeping parameters within the recommended ranges, and this might lead patients to have less post-op cognitive impairment. The team recruited 90 patients 60 years or older with intermediate or high-risk elective non-cardiac surgeries. Half had anesthetic management controlled by a physician, and half used closed-loop systems to automate management, with an anesthesiologist on hand to override the machine if necessary. The day before surgery, all patients took a variety of cognitive tests, including the [Montreal Cognitive Assessment], a 30-item global cognition test often used to detect mild cognitive impairment and dementia. In the week following surgery, patients were re-assessed, and once again at 3 months after surgery. The researchers found that patients in the automated group had on average no change in their cognition scores from before and one week after surgery. The manual group, on the other hand, had a one-point decrease, which was statistically significant – and this persisted at 3 months post-surgery. None of the other cognitive tests showed differences between groups. As expected, the automated group had more anesthetic modifications per hour, and ultimately received less anesthetic. Patients in the automated group spent more time within the target range for anesthetic depth than controls. Interestingly, there was a correlation between the amount of time spent in very deep anesthesia and a decrease in the cognition score. The results suggest automated anesthetic management may help with delayed neurocognitive recovery, possibly by avoiding very deep anesthesia. The study, however, cannot distinguish between the effects of the three controller systems. Future studies are needed with more patients and with those at a higher risk of cognitive impairment.