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Optimizing Anesthesia to Prevent Postoperative Cognitive and Functional Decline in Older Adults: A Randomized Controlled Trial

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Keywords

Postoperative Delirium, Postoperative Neurocognitive Disorders, Total Intravenous Anesthesia, Volatile Anesthesia, Geriatric Medicine

Abstract

Background

Postoperative delirium (POD) and longer term postoperative neurocognitve disorders (NCD) are the most common surgical complications in geriatric patients, with POCD affecting ~20% and POD affecting up to 50%. These are also independently associated with increased hospital length of stay, functional disability, and mortality. General anesthesia during surgery is most commonly maintained with inhaled volatile anesthetics (GAS); however, maintenance with total intravenous anesthesia (TIVA) is a technique with potential advantages. Previous preclinical studies have suggested that IV agentshave anti-inflammatory properties, while GAS is pro-inflammatory. The aim of this study is to compare the use of GAS vs. TIVA on POD, NCD, functional status, patient reported outcomes (PROs), and biomarkers in the geriatric population. We hypothesize that TIVA is associated with a lower incidence of neurocognitive and functional decline, as well as improved PROs compared to GAS.

Methods

This is a parallel-group, randomized, double-blind clinical trial enrolling patients ≥70 years undergoing elective, inpatient, non-cardiac surgery. 260 patients will be randomized to TIVA (propofol) or GAS (sevoflurane). Participants will have 4 visits over a one year period: preopoperative, surgery/hospitalization, 3 and 12 month follow ups. Data collection will occur in-person at each visit. Outcomes include assessments of cognition, frailty, functional status, and PROs, along with serum biomarkers. Delirium will be assessed once in the recovery room and twice daily on postoperative days 1-3. Medical records will be reviewed to screen for postoperative complications.

Expected Significance

We expect to generate evidence that can inform general anesthetic choice to optimize outcomes in geriatric surgical patients. Additionally, our data may detect biomarkers for POD and NCD risk and recovery. Over 50% of older Americans will need surgery during their life, so these findings will be of critical significance to the aging population.