

The Significance of Perioperative Changes in CSF tau levels in the Elderly

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Research Abstract

? DESCRIPTION (provided by applicant): Tau is a microtubule-associated protein found in neuronal axons, and is released after neuronal injury. Increased cerebrospinal fluid (CSF) tau levels predict the development of Alzheimer's disease, and increased CSF tau levels also

predict worsened outcomes after subarachnoid hemorrhage and traumatic brain injury. We have found increased CSF tau levels in patients after surgery and anesthesia, and numerous investigators have found that anesthesia and surgery increase tau levels and cause memory deficits in animal models (6-8). Taken together, these findings suggest the possibility that changes in CSF tau levels may also be associated with neurocognitive changes after anesthesia and surgery in our patients. Indeed, multiple studies have found neurocognitive changes (i.e. post-operative delirium and cognitive dysfunction) occur in a substantial fraction of patients after surgery and anesthesia, and a major risk factor for these disorders is age >60. Post-operative delirium and cognitive dysfunction are major complications in elderly patients: they are associated with decreased ability to perform IADLs, decreased quality of life, early exit from the work force, and increased one year mortality. Yet, the underlying pathophysiology of post-operative delirium and/or cognitive dysfunction is unclear, which impedes our ability to treat these syndromes and improve patient outcomes. In this application, we will extend our preliminary work demonstrating significant increases in CSF tau levels after anesthesia and surgery by determining the long-term trajectory of these perioperative CSF tau increases, and whether they are associated with delirium, cognitive dysfunction, or altered functional neural connectivity in elderly surgical patients vs age-matched controls. We will also obtain data on the relationship between changes in CSF tau levels, IADLs and quality of life in these patients' vs controls. This study is the first, adequately powered prospective clinical study to determine the long-term trajectory of perioperative changes in CSF tau levels, and to correlate these changes with changes in cognitive function, brain connectivity and functional status. Understanding these relationships could help develop strategies to prevent adverse effects of anesthesia and surgery in the elderly and to improve neurocognitive function for the millions of patients over age 60 who undergo perioperative care each year in the United States.

Further information available at:

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