Preoperative Cognitive Assessment of the Elderly Surgical Patient

A Call for Action

BEING sick is not good for the brain. Surgery and all that goes with it (e.g., stress, inflammation, pain, medications, anesthesia) makes people sick transiently. It should come as no surprise, then, that brain dysfunction is common perioperatively. This is a particular problem in elderly patients, with 30–80% becoming delirious after major surgery and 30–40% and 10–15% developing early and late postoperative cognitive dysfunction (POCD), respectively.1,2 This cognitive morbidity is also important; delirium and POCD are associated with longer hospital stay and cost, premature withdrawal from the workforce, and greater 1-yr mortality.1,3 Therefore, both in terms of incidence and associated adverse outcomes, perioperative brain dysfunction is every bit as serious as the other varieties of organ system dysfunction for which we routinely screen and evaluate surgical patients preoperatively. Why, then, don’t we routinely and formally assess cognition preoperatively?

The article by Evered et al.4 in this issue of the Journal sheds light both on the complexity of doing so and what we might find if we looked. Evered et al. prospectively assessed cognition in 152 patients older than 60 yr who were scheduled for elective total hip replacement. They used two different constructs to identify impairment. The first, called preexisting cognitive impairment (PreCI), is defined entirely by performance on neuropsychologic tests. In this case, it was defined by poor performance on two of seven cognitive tests, where impairment was defined as performance 2 SD below norms for a given test.4 This construct has been used previously in the context of cognitive decline associated with cardiac surgery.5 The second construct was a subtype of mild cognitive impairment (MCI) called amnestic MCI (aMCI). MCI is a formal, widely accepted neurologic syndrome characterized by subjective and objective evidence of impairments, including decreased performance on formal cognitive testing, but symptoms are mild enough that they do not interfere with activities of daily living.6,7 MCI is a subtype of MCI characterized by memory complaints or decline as reported by the patient and ideally confirmed by an informant or nurse or physician; objective evidence of memory impairment on memory-related – but not other – neuropsychometric measures; essentially normal activities of daily living; and absence of dementia.6,7 Evered et al. asked subjects and informants structured questions about memory and tested immediate and delayed recall on a widely accepted test of auditory verbal memory: aMCI was diagnosed when a subject had subjective memory complaints and performed 1.5 SD below norms on two of three trials of the Auditory Verbal Learning Test.4 Their results are striking. Approximately one in five patients scheduled for elective total hip replacement surgery had either PreCI or aMCI, and prevalence increased with age, with PreCI identified in 55% of those in their 80s.8 Based on objective criteria alone (i.e., performance on neuropsychologic tests), 70% of patients with PreCI also satisfied criteria for aMCI but, when the subjective component of aMCI was included, only 33% of subjects classified as PreCI also met criteria for aMCI—so what one finds depends on how one searches. As far as we know, this is the first study to compare a construct of cognitive impairment adopted by anesthesiologists with one used by neurologists, and it has a number of important clinical implications.

First, Evered et al. show that mild cognitive deficits are a common affliction of elderly patients having major orthopedic surgery, even when they are able to perform normal activities of daily living. Not previously documented in noncardiac surgical patients, this result is perhaps no surprise because approximately 10–40% of community dwelling elderly patients have MCI.6,7 Accordingly, it is reasonable to assume that the data of Evered et al.4 apply to elderly patients having most types of major elective noncardiac surgery. The implication is clear: we are routinely anesthetizing and operating on a large percentage of elderly patients whose brain is compromised preoperatively. The problem is that the deficits are often subtle enough that they would be missed by casual observation in the preoperative testing center, and patients are often reticent to admit to memory or cognitive problems. This emphasizes that we should be formally testing for cognitive impairment preoperatively, just as we test for occult anemia, pulmonary dysfunction, or cardiac disease in certain age groups.

Second, the study of Evered et al.4 highlights the importance of coming to consensus about what and how to test. This is where the situation gets tricky. Because age-related cognitive decline affects specific cognitive domains, not global brain function, results obtained from a preoperative cognitive evaluation will vary with the tool used to perform the assessment. Evered et al. show, for example, that simply

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adding subjective report of cognitive complaints—one of the diagnostic criteria for aMCI—to objective neuropsychologic testing reduces the percentage of subjects defined as being impaired from 50% to 22%. With this in mind, Evered et al. argue that rather than creating new criteria and definitions of preoperative cognitive impairment we should use criteria established for MCI. We strongly agree with this approach, at least conceptually. As Evered et al. point out, adopting this convention would allow perioperative physicians to speak the same language as neurologists and psychogeriatricians. In addition, big dividends would accrue if cognitive risk and outcomes of surgical patients could be evaluated against the large database of the broader population, where the cognitive trajectory of MCI is well established, biomarkers are actively being sought, and interventions to prevent or slow decline are being developed.

Why might thinking in terms of MCI be helpful? The reason is that a diagnosis of MCI has diagnostic utility, which derives mainly from two features. The first is the growing recognition that for treatments of dementing illnesses such as Alzheimer’s disease to be successful, it might be that they must be started before the brain is severely damaged, in the predementia phase. MCI presumably identifies such people. The second is that MCI identifies patients with a high risk of progressing to dementia; patients with aMCI convert to dementia at a rate of 6 –15% per year, with the higher rate progression to dementia; patients with aMCI convert to dementia at a rate of 6 –15% per year, with the higher rate.

Indeed, there is no easy solution to screening for dementia, let alone MCI, which is why current emphasis is on finding biomarkers in cerebrospinal fluid or blood.13,14 Cerbrospinal fluid measures already appear to be fairly reliable...
indices of Alzheimer-type pathology in the brain, even presymptomatically.\(^1\) Although a preoperative lumbar puncture may not prove practical, optimism about the ultimate development of Alzheimer disease-related, plasma-based screening tools is high. Moreover, talking about MCI rather than PreCI or POCD gets us no closer to understanding the neurobiology of perioperative cognitive morbidity because MCI is itself a constellation of symptoms rather than a defined clinical-pathologic entity. Nonetheless, an effort to clinically identify patients with MCI preoperatively would be a good, if imperfect, first step, because it could serve as a warning sign that may affect clinical care decisions and expectations and position us to capitalize on suitable biomarkers as they become available.

This leaves us with two major challenges. The first is to identify cognitive impairment in patients before they come to the operating room. This requires that we look for it. A paradigm shift is therefore necessary such that cognitive assessment becomes a routine part of the preoperative screening of elderly patients, not just a research tool. Developing and validating a cognitive evaluation tool that is practical, reproducible, and robust will not be easy, because the brain is a complex organ and cognitive assessment is a complicated business under any circumstances, let alone under the production pressure of the preoperative clinic or operating room. But the task is an important and necessary one, and framing the approach toward identifying MCI (and even mild dementia, which is frequently not detected clinically) has tangible and theoretic benefits. An abbreviated and validated assessment tool for MCI, much like the Confusion Assessment Method is a surrogate for the longer and more dated assessment tool for MCI, much like the Confusion Rating Scale, has critical questions because if it turns out that POCD and MCI are similar entities, POCD would move from being a new syndrome somehow created de novo by anesthesia and surgery to a preexisting condition of reduced cognitive reserve that is unmasked by anesthesia and surgery.\(^1\) Such knowledge would profoundly affect how we think about the problem of perioperative cognitive morbidity, measure and research it, and intervene to mitigate it.

The work of Evered et al.\(^4\) is the best documentation to date that many elderly patients presenting for major orthopedic, and presumably most elective noncardiac surgery procedures, are cognitively compromised at baseline. The fact that we currently make no effort to identify such patients preoperatively is an embarrassing state of affairs considering that the brain is a principal target of general anesthetic agents, the field of anesthesiology champions thorough preoperative evaluation, and perioperative cognitive morbidity in the elderly is so common and costly. It is time to be as concerned about the preoperative functioning of the brain in vulnerable patients as we are about preoperative functioning of other vital organ systems. As such, it is time to routinely screen elderly surgical patients preoperatively for the presence of cognitive impairment. Long neglected, the brain deserves the attention and what we learn will help improve cognitive outcomes in the older surgical patient.

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