

# Preoperative Cognitive and Frailty Screening in the Geriatric Surgical Patient: A Narrative Review

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## ABSTRACT

**Purpose:** The identification of older patients who may have deficits in cognitive or functional domains will become more pressing as increasing numbers of these patients present for preoperative evaluations. The number of older adults with deficiencies in these areas is projected to grow, and more of these patients will present for assessment in preoperative clinics with the expectation that surgeries will be performed.

**Methods:** We review current outcomes data for preoperative cognitive impairment and frailty.

**Findings:** We point to a number of directions research is taking as systems for the prevention of postoperative cognitive and functional decline are being developed. We also discuss the current status of screening and examine potential instruments that can be used in the setting of the preanesthesia clinic.

**Implications:** Clinicians may anticipate that geriatric screening tools focused on cognitive and functional domains will play a direct role in the ongoing evolution of presurgical assessment and triage. (*Clin Ther.* 2015;■:■■■-■■■) © 2015 Elsevier HS Journals, Inc. All rights reserved.

**Key words:** cognition, frailty, geriatric, screening, surgical outcome.

## INTRODUCTION

As the population of the United States continues to age, a greater proportion of surgical and anesthetic services are devoted to geriatric patients. In addition to a standard history and physical, optimal preoperative screening for specific geriatric syndromes includes cognitive and functional testing, frailty score calculation, fall risk documentation, nutritional assessment, and depression screening.<sup>1</sup> In this review, we focus on 2 important but frequently overlooked components of the preoperative assessment of the

geriatric patient: cognitive and frailty screenings. Our review is intended to highlight methods and outcomes that are useful in the busy, time-compressed, and highly structured setting of a preanesthetic clinic, where evaluation of patients may be performed by advanced practice providers in addition to physicians. This is not intended to be a systematic review of the literature, but rather a review of the current state of practice and a map of potentially useful techniques in this setting.

Evidence suggests that the aged are most at risk of postoperative deleterious neurocognitive outcomes.<sup>2</sup> In fact, 30% to 80% of older adults become delirious after major surgery, 30% to 40% experience early postoperative cognitive dysfunction (POCD), and 10% to 15% develop late POCD.<sup>3</sup> Postoperative delirium and POCD are associated with increased cost, length of hospital stay, and 1-year mortality. Although it is well-established that preoperative cognitive impairment is the leading risk factor for postoperative delirium and POCD, preoperative cognitive function is not routinely or formally assessed. Therefore, one of the main arguments for routine preoperative cognitive screening in older adults is for purposes of risk stratification.

In addition to cognitive screening, recent research has begun to evaluate the role of scoring patients on the basis of frailty. Patients who are defined as frail, by various metrics, have been shown to have increased short-term and long-term mortality and increased susceptibility to specific outcomes such as myocardial infarction and stroke.<sup>4</sup>

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The concepts of cognitive dysfunction and frailty both point to dimensions of measurable preoperative function that directly correlate with postoperative outcomes. These include well-investigated associations with morbidity, mortality, postoperative complications, institutionalization after discharge, and postoperative delirium.<sup>5,6</sup>

A number of frailty and cognitive scoring systems are available and have been validated for use by clinicians.<sup>7,8</sup> The institution of a scoring system may assist clinicians in both triage of patients as they prepare for surgery and also the anticipation and provision of necessary postoperative care, whether in the inpatient or outpatient setting.

### PREOPERATIVE SCREENING OF COGNITIVE STATUS

The geriatric patient's preoperative cognitive status should be evaluated and carefully documented for several reasons. First, it is difficult to determine whether a change has occurred postoperatively without a thorough understanding of the preoperative state. It is likely that preoperative cognitive impairment is frequently unrecognized because of lack of formal screening. One study found that cognitive impairment was present in 35% of patients presenting for elective coronary artery bypass graft surgery.<sup>9</sup> Another investigation found cognitive impairment or dementia in 68% of patients aged >60 years presenting for vascular surgery, and the impairment was previously unrecognized in 88.3% of patients.<sup>10</sup>

Second, evidence suggests that the presence of preoperative impaired cognition is associated with postoperative morbidity and mortality. Postoperative delirium is one of the most commonly cited postoperative complications associated with preoperative impaired cognition.<sup>11-13</sup> In addition, preoperative cognitive impairment is associated with POCD and cognitive decline.<sup>14</sup>

The presence of impaired cognition preoperatively has implications that extend beyond neurocognitive complications. A recent retrospective cohort study of 3530 participants found that participants with preoperative impaired sensorium were substantially more likely to experience postoperative pneumonia, ventilator dependence, progressive renal insufficiency, urinary tract infection, stroke, venous thromboembolism, and postoperative death.<sup>5</sup> Several other studies have similarly concluded that preoperative

impaired cognition is associated with an increased mortality rate.<sup>11,15</sup>

### CURRENT STATUS OF PREOPERATIVE COGNITIVE SCREENING

Few institutions in the United States systematically screen patients for preoperative cognitive impairment partly because many tests require specialized training to administer and score and are time and labor intensive. Often, the only patients that are identified as having preexisting cognitive dysfunction are those that either have a diagnosis of dementia or report subjective memory complaints. An important barrier preventing more widespread screening is the identification of a screening tool that is well suited for busy preanesthesia clinics. The ideal screening tool would be self-administered, brief, automatically scored, and communicate with the electronic health record. Other considerations include finding a validated test that is reliable across multiple languages, cultures, and education levels. In a review of practical preoperative cognitive screening tools, Long et al<sup>8</sup> identified 6 screening tools that could be administered in  $\leq 2.5$  minutes.

To date, most preoperative cognitive screening has occurred in the context of outcomes research. One group found that patients with lower scores on the animal fluency test were at higher risk of developing postoperative delirium.<sup>16</sup> The animal fluency test requires patients to name as many animals as possible within 60 seconds. Other studies have used the Mini-Cog,<sup>17</sup> a test that combines a clock drawing task with a 3-item recall, as a preoperative cognitive screening tool. Poor preoperative performance on the Mini-Cog was associated with an increased incidence of postoperative delirium<sup>18</sup> and an increase in 6-month mortality.<sup>15</sup> Similarly, poor performance on the rapid screening test Cognitive Disorder Examination, was associated with postoperative delirium in older people undergoing hip fracture surgery.<sup>19</sup> After cardiac surgery, better preoperative performance on the Clock-in-the-Box test, a screening tool that takes >2 minutes to deliver, was associated with a reduced risk of being discharged to a facility.<sup>20</sup>

Another screening tool that has been used in the preoperative arena is the Montreal Cognitive Assessment (MoCA), a 10-minute, 30-point screening test.<sup>21</sup> With the use of the MoCA, cognitive impairment or dementia was found in 68% of patients aged >60

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