

Patient Safety Tip of the Week

August 16, 2022

Perioperative Brain Health

For years, we’ve proposed that the 3 most important elements of a preoperative evaluation are assessment for (1) delirium risk, (2) frailty, and (3) obstructive sleep apnea. And we’ve done numerous columns, listed below, on the prevention and management of delirium and perioperative cognitive issues. So, we were quite delighted when the American Society of Anesthesiologists launched its [Perioperative Brain Health Initiative](#) in 2015.

This month, Vacas et al. published an excellent review on perioperative brain health in the older adult in *Anesthesia & Analgesia* ([Vacas 2022](#)). They categorize perioperative neurocognitive disorders (PND’s) according to the ASA Nomenclature Consensus Working Group:

1. Preoperative cognitive impairment
2. Postoperative delirium (POD)
3. Delayed neurocognitive recovery—impairment within the first 30 days of surgery
4. PND—occurring between 30 days and 12 months after surgery

They note that POD is the most common surgical complication in older adults and is defined as an acute fluctuating state of confusion, inattention, and level of consciousness that occurs within the first 7 days after surgery. Incidence of POD depends on the study methodology, patient population, and surgical procedure, but generally ranges from 5% to 65%. And new or worsening long-term cognitive dysfunction occurs in >10% of noncardiac surgical patients >60 years of age and has been reported in up to 50% of patients, depending on existing comorbidities or type of surgery. And, of course, PND’s are associated with prolonged hospital stays, other complications (like falls), functional decline, increased risk of institutionalization, death, and dementia, and increased health care costs.

They begin with the preoperative risk assessment, which includes consideration of both predisposing factors and precipitating factors. While you can’t modify risk factors such as age, there are some risk factors that can be modified or potentially optimized. These include frailty, polypharmacy, sleep, pain, vision and/or hearing impairment, diabetes, infection, neuropsychiatric conditions, and poor nutrition.

They have a nice discussion of the various **neurocognitive screening tools**, including estimated administration times. They note that the Mini-Cog, the Mini-Mental State Examination (MMSE), or the Montreal Cognitive Assessment (MoCA) are fast and applicable to the preoperative setting. But even the simple clock drawing exercise, which takes less than 2 minutes, can be a useful screening tool. They also recommend **screening for frailty**, using tools such as the Frailty Index, Clinical Frailty Scale, Risk Analysis Index, or ASA Frailty Toolkit.

Preoperative interventions include education on **lifestyle modifications** and possibly **neurocognitive rehabilitation**. The Neurobics randomized clinical trial showed that an electronic, tablet-based preoperative cognitive exercise targeting memory, speed, attention, flexibility, and problem-solving functions reduced the incidence of postoperative delirium from 23.0% to 14.4% ([Humeidan 2021](#)). They also noted that incorporation of elements from the **Hospital Elder Life Program (HELP)**, which we have discussed so often, may be part of a preoperative program.

Perhaps the most important preop intervention is a **focus on medications**, including those medications known to be risk factors for delirium (such as benzodiazepines) and other potentially inappropriate medications (PIM's) from Beers Criteria List. They also recommend identifying sleep disturbances, such as obstructive sleep apnea (note: they've hit our 3 most important points: delirium risk, frailty, and OSA!).

Lastly, they recommend involvement of a physician with expertise in geriatric medicine throughout the perioperative period.

The risk of perioperative neurocognitive disorders should be discussed with older patients and their families as part of the informed consent process.

During the intraoperative period, it does not appear that the type of anesthesia is a significant contributor to PND. And studies of EEG-guided hypnotic administration have yielded conflicting results on the occurrence of post-op delirium or PND. It makes sense to avoid hypotension during surgery, though evidence of the impact of intraoperative hypotension on delirium is soft. Though some studies have found no association, a recent retrospective study found an association between intraoperative hypotension, particularly duration of hypotension, and delirium occurrence ([Vlessides 2022](#)).

We've already discussed in many columns the post-operative interventions we do to reduce the likelihood of delirium or manage delirium that has already occurred.

We should avoid medications that commonly induce delirium, especially anticholinergic drugs, sedative/hypnotics, diphenhydramine, and benzodiazepines. Some pain medications may contribute to delirium, but so does inadequate pain control. Most recommend use of non-opioid analgesics where possible.

Multimodal interventions, such as those included in the **Hospital Elder Life Program (HELP)**, are important. These include return of the patient's visual and hearing aids,

early mobilization, and resumption of a normal diet, and attempts to create a more normal sleep/waking cycle. See our March 16, 2021 Patient Safety Tip of the Week “[Sleep Program Successfully Reduces Delirium](#)” for several sleep-promoting programs that have been used in prevention and management of delirium.

Vacas et al. also acknowledge the importance of early family engagement and social support. We always recommend families bring in familiar objects from home (like their clock radio).

Though the anesthesiologist may no longer be involved directly in the patient’s care, Vacas et al. remind us that we must be vigilant for the occurrence of delirium or any form of PND. That would include frequent use of screening tools like the Confusion Assessment Method (CAM), Confusion Assessment Method for the ICU (CAM-ICU), and others.

The Vacas article goes on to discuss future directions for research on perioperative neurocognitive disorders. This article is a nice summary of the current state of affairs for perioperative neurocognitive disorders. We hope that you’ll also go back to some of our many columns on prevention and management of delirium listed below.

Note that there are some newer ancillary studies touted to be predictors of delirium, such as EEG ([Kronemyer 2022](#)), ocular-based screenings ([Anesthesiology News 2020](#)), and measurement of preoperative plasma concentrations of Tau-PT217 and Tau-PT181 ([Liang 2022](#)), but these are not yet ready for widespread adoption.

Some of our prior columns on delirium assessment and management:

- October 21, 2008 “[Preventing Delirium](#)”
- October 14, 2008 “[Managing Delirium](#)”
- February 10, 2009 “[Sedation in the ICU: The Dexmedetomidine Study](#)”
- March 31, 2009 “[Screening Patients for Risk of Delirium](#)”
- June 23, 2009 “[More on Delirium in the ICU](#)”
- January 26, 2010 “[Preventing Postoperative Delirium](#)”
- August 31, 2010 “[Postoperative Delirium](#)”
- September 2011 “[Modified HELP Helps Outcomes in Elderly Undergoing Abdominal Surgery](#)”
- December 2010 “[The ABCDE Bundle](#)”
- February 28, 2012 “[AACN Practice Alert on Delirium in Critical Care](#)”
- April 3, 2012 “[New Risk for Postoperative Delirium: Obstructive Sleep Apnea](#)”
- August 7, 2012 “[Cognition, Post-Op Delirium, and Post-Op Outcomes](#)”
- February 2013 “[The ABCDE Bundle in Action](#)”
- September 2013 “[Disappointing Results in Delirium](#)”
- October 29, 2013 “[PAD: The Pain, Agitation, and Delirium Care Bundle](#)”

- February 2014 “[New Studies on Delirium](#)”
- March 25, 2014 “[Melatonin and Delirium](#)”
- May 2014 “[New Delirium Severity Score](#)”
- August 2014 “[A New Rapid Screen for Delirium in the Elderly](#)”
- August 2014 “[Delirium in Pediatrics](#)”
- November 2014 “[The 3D-CAM for Delirium](#)”
- December 2014 “[American Geriatrics Society Guideline on Postoperative Delirium in Older Adults](#)”
- June 16, 2015 “[Updates on Delirium](#)”
- October 2015 “[Predicting Delirium](#)”
- April 2016 “[Dexmedetomidine and Delirium](#)”
- April 2016 “[Can Antibiotics Lead to Delirium?](#)”
- July 2016 “[New Simple Test for Delirium](#)”
- September 20, 2016 “[Downloadable ABCDEF Bundle Toolkits for Delirium](#)”
- January 24, 2017 “[Dexmedetomidine to Prevent Postoperative Delirium](#)”
- March 21, 2017 “[Success at Preventing Delirium](#)”
- July 2017 “[HELP Program Reduces Delirium Rate and LOS](#)”
- January 2018 “[What Happens After Delirium?](#)”
- February 20, 2018 “[Delirium and Falls](#)”
- October 2018 “[Rapid Screening for Delirium](#)”
- November 13, 2018 “[Antipsychotics Fail in ICU Delirium](#)”
- February 12, 2019 “[2 ER Drug Studies: Reassurances and Reservations](#)”
- September 17, 2019 “[American College of Surgeons Geriatric Surgery Verification Program](#)”
- March 2021 “[The Fiscal Costs of Delirium](#)”
- March 16, 2021 “[Sleep Program Successfully Reduces Delirium](#)”
- January 4, 2022 “[Spin or Not: A Useful Secondary Finding in a Study](#)”
- February 1, 2022 “[Perioperative Delirium is Not Just Postoperative](#)”
- March 29, 2022 “[Disturbing Stats on Perioperative Benzodiazepine Use in Elderly Patients](#)”

References:

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<https://www.asahq.org/brainhealthinitiative>

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