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Patient Safety Tip of the Week

February 1, 2022

Perioperative Delirium is Not Just Postoperative

We've done many columns on postoperative delirium. But delirium in the perioperative period is not limited to the postoperative period. It may also occur pre-operatively or during the operative period itself. A recent study from the Pennsylvania Patient Safety Authority (Taylor 2021) discussed delirium in these other periopeative periods and its association with anesthetics and adjunct agents.

The researchers queried the Pennsylvania Patient Safety Reporting System (PA-PSRS) database for event reports to identify bouts of delirium/ agitation associated with anesthetics and/or adjunct agents that occurred during the pre-, intra-, or postoperative period and identified 97 event reports from 63 healthcare facilities over a two-year period. While postoperative delirium was most commonly seen (84%), delirium was also seen preoperatively in 8% and intraoperatively in 8%.

An example of a pre-operative bout of delirium/agitation was a patient scheduled for an esophagogastroduodenoscopy (EGD who was given propofol in preparation for the procedure. He became extremely agitated and thrashed on the stretcher. The physician then canceled the procedure and recommended the patient have the procedure completed at a hospital and under general anesthesia.

Delirium/agitation during the intra- or postoperative period, when compared with preoperative, was related with more severe patient behavior, injuries, and additional healthcare services or monitoring. During the intra- and postoperative periods, patients had dangerous behavior themes described in 75% and 74% of the event reports, respectively, compared with only 25% in the preoperative events. Only 13% of the preoperative events had an injury while 38% and 43% of the intra- and postoperative events had an injury, respectively.

The adverse behaviors encountered in the reports included combativeness, agitation, kicking, thrashing, exiting or attempting to exit from a bed or table, and disruption, removal or attempted removal of apparatus such as intravenous lines, catheters, oxygen, and nasogastric tubes. Some of the specific patient injuries included abrasions, bruises, lacerations, or skin tears, prolapse/dehiscence, tooth loss, asphyxiation, hematoma, and progressive ischemia.

While those with a preoperative bout of delirium or agitation suffered minimal harm, 88% of the preoperative events resulted in a procedure cancellation.

But the PPSA study showed delirium has an impact beyond the patient. 54% of reports mentioned at least one unique behavior that represented an immediate and high **risk of staff harm**. Five reports explicitly stated that staff were physically impacted and possibly harmed. For example, in one of those 5 events a staff member was kicked in the face. There may be numerous effects on staff and the healthcare organization. It could lead to difficulty completing an ongoing procedure and procedures scheduled for the remainder of the day. They also point out here could be longer-term implications of a staff injury, which may include the following: staff pain and suffering, burnout, service line or department loss of productivity due to understaffing, and financial burden for both the injured staff and organization. They conclude that the potential impact of perioperative delirium/agitation on patients, staff, and the organization would justify a robust intervention package to reduce risk.

Speaking of interventions, a recent German study (Deeken 2021) showed that a multifaceted multidisciplinary prevention intervention reduced postoperative delirium occurrence and days with delirium in older patients undergoing different elective surgical procedures but not cardiac procedures. First, structured delirium education was provided to clinical caregivers at each site. Then, the study delirium prevention team assessed patient delirium risk factors and symptoms daily. Prevention was tailored to individual patient needs and could include: cognitive, motor, and sensory stimulation; meal companionship; accompaniment during diagnostic procedures; stress relaxation; and sleep promotion. Overall, the intervention reduced postoperative delirium incidence (odds ratio, 0.87, P = .02) and percentage of days with delirium (intervention 5.3% vs. control 6.9%; P = .03). The effect was significant in patients undergoing orthopedic or abdominal surgery (odds ratio 0.59, P = .047) but not cardiac surgery (odds ratio, 1.18).

In the PPSA article, Taylor et al. offer an intervention package, based on previous literature and ongoing practices at VA Pittsburgh Healthcare System, that staff should critically review and consider implementing at their facility. That includes screening for risk factors for delirium ahead of the procedure and meeting with the high-risk patient and family to identify triggers that may influence or exacerbate a bout of delirium/agitation. It involves adjusting the environment, preparing the bed or table to prevent patient harm, and securing any IV access to minimize the risk of dislodging. Choice of anesthetics/sedating agents is discussed, especially avoiding benzodiazepines. The package also suggests considering either dexmedetomidine and/or ketamine (keep in mind the evidence for use of these agents is still weak in our opinion). During the surgical/procedural timeout, staff should be reminded that the patient is at high risk for delirium. As case concludes, staff should call ahead to recovery room/post-anesthesia care unit (PACU) to initiate intervention protocol for emergence of the high-risk patient. Postoperatively, triggers should be avoided, and the bed should be configured to help avoid patient injury should agitation occur (eg. padding on siderails). A debriefing meeting with patient and family should be considered, as well as a debriefing meeting

among staff. The authors add the caveat that this proposed intervention package as a whole has not been experimentally evaluated for efficacy nor the risk of unintended consequences.

See our many prior columns (listed below) for discussion of other nonpharmacological interventions to prevent and manage delirium (eg. the HELP program, ABCDE bundle, etc.).

The PPSA study focused on delirium or agitation in relation to anesthetics and adjunct agents. The role of anesthetic agents and adjuncts during surgery in causing post-op delirium has long been debated. A recent study (Li 2021) found that, in patients aged 65 years and older undergoing hip fracture surgery, regional anesthesia without sedation did not significantly reduce the incidence of postoperative delirium compared with general anesthesia. The study was a randomized, allocation-concealed but open-label, multicenter clinical trial of 950 patients, aged 65 years and older, with or without preexisting dementia, and a fragility hip fracture requiring surgical repair from 9 university teaching hospitals in China. Postoperative delirium occurred in 6.2% in the regional anesthesia group vs 5.1% in the general anesthesia group.

But there are certainly questions about that study. The incidence of delirium was way lower than we would expect in an elderly population undergoing surgical repair for hip fracture. The accompanying editorial (Avidan 2021) also comments on that disparity and notes some methodological issues with the Li study. But it does point out that other recent studies have also failed to show that general anesthesia is associated with higher rates of post-op delirium than spinal or regional anesthesia. REGAIN trial (Regional vs General Anesthesia for Promoting Independence after Hip Fracture) was a randomized trial to evaluate spinal anesthesia as compared with general anesthesia in over 1600 previously ambulatory patients 50 years of age or older who were undergoing surgery for hip fracture at 46 US and Canadian hospitals (Neuman 2021). There was no significant difference in the incidence of postoperative delirium, which occurred in 20.5% of patients in the spinal anesthesia group vs 19.7% in the general anesthesia group.

Delirium is a common complication of elderly patients having surgery or acutely hospitalized for a variety of medical conditions. It is associated with a number of poor patient outcomes, such as longer hospital stays, increased risk of post-hospital institutionalization, and accelerated cognitive decline. Patients with delirium have an increased mortality rate, not only for the current hospitalization but also in the year following the episode of delirium. Diwell et al. (Diwell 2018) looked at mortality rates for patients with full-blown delirium and those with “subsyndromal” delirium. The hazard ratio (HR) for full-blown delirium was 2.31, and for “subsyndromal” delirium 1.26. After adjustment the HR remained significant for the full-blown syndrome but not for the “subsyndromal” delirium. Two items from the CAM (Confusion Assessment Method) assessment tool were significantly associated with mortality following adjustment: acute onset and disorganized thinking. The authors conclude there is a dose-response relationship between mortality and delirium, with full-blown delirium having the greatest risk and “subsyndromal” delirium having intermediate risk.

Our understanding of the underlying mechanisms of delirium is yet evolving. Its underlying mechanism is undoubtedly multifactorial and we know of many contributing factors and precipitating factors. The reason(s) for the increased mortality are also unclear. As Diwell et al. point out, some of the features of delirium itself may lead to complications that could lead to death. For example, falls are common in those with full-blown delirium and those with hypoactive delirium might be more prone to aspiration pneumonia. On the other hand, the nature of the underlying medical conditions that led to delirium may play a big role in mortality risk. Our personal view is that delirium is a state of reduced physiologic "reserve", much like the reduced physiologic reserve seen in frailty which is a frequent accompaniment of delirium. That reduced reserve may render patients more vulnerable both acutely and in the longer run.

While delirium thus has prognostic significance, we still need to take steps to prevent its occurrence and manage it as best we can when it does occur.

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"

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https://jamanetwork.com/journals/jama/fullarticle/2787494

Avidan MS, Whitlock EL, Mashour GA. General Anesthesia and Postoperative Neurocognitive Outcomes. JAMA 2021; Published online December 20, 2021
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Neuman MD, Feng R, Carson JL, et al. for the REGAIN Investigators. Spinal anesthesia or general anesthesia for hip surgery in older adults. N Engl J Med 2021; 385(22): 2025-2035
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