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## Patient Safety Tip of the Week

April 7, 2020

### From Preoperative Assessment to Preoperative Optimization

My, how things change! Years ago, prior to planned surgery patients got a gazillion blood tests, the results of which were often ignored. They often got cardiac stress tests, which then often led to a diagnostic cascade and possible cascade of interventions. They were also typically sent for “medical clearance” to a primary care physician, who often had little understanding of the nuances of perioperative medicine. That referral was mostly a “CYA” in case something went wrong during surgery.

Ten years ago, in our August 17, 2010 Patient Safety Tip of the Week “[Preoperative Consultation – Time to Change](#)” we advocated for a change away from the blood work and cardiac workup and toward a new focus on several key elements: risk factors for opioid-induced respiratory depression such as obstructive sleep apnea, risk factors for delirium, and the presence of frailty. Enough time needs to be allotted for addressing these risk factors plus attention to nutritional status and smoking cessation.

Later, we focused on programs to better prepare patients before surgery, particularly the elderly and frail. Some of our columns (listed below) have discussed ACS’s Strong for Surgery Program, the POSH (Perioperative Optimization of Senior Health) Program, the Hospital Elder Life Program (HELP), the Geriatric Surgery Verification Program, and several columns dealing with “**prehabilitation**”.

This month’s issue of Anesthesia & Analgesia has several articles that call for a transition from preoperative assessment to preoperative optimization.

Aronson and colleagues ([Aronson 2020a](#)) detailed how they established a comprehensive preoperative assessment and management program to optimize patients for surgery at Duke University Hospital and School of Medicine.

They first describe what typically happens in the old preanesthesia clinic model, which is still commonly used for presurgical preparation. That usually includes an in-person clinic visit, a phone screen encounter, or a chart review only assessment. It typically covers a presurgery risk review, medication review, presurgical history, a limited physical

examination plus things like signing the anesthesia consent, reviewing the advance directive, and dealing with financial matters. All too often the PAC visit occurs just before the scheduled surgical date, leaving little opportunity to effectively manage modifiable comorbid medical conditions. They note that the latter occur in up to 20% of patients scheduled for surgery, so an opportunity to positively impact surgical outcome and cost is lost.

They then go on to describe how their multidisciplinary group implemented a Preoperative Anesthesia and Surgical Screening (PASS) Clinic to screen patients and to more proactively and efficiently manage modifiable risks at the time a patient's surgical candidacy is first considered. Preoperative screening and evaluation are protocol-driven and, if further optimization of a modifiable condition is warranted, referral is made to an optimization program. Because the surgical team is involved early, there is a better understanding of balancing mitigating modifiable risk factors versus the immediacy of the surgery.

A very important piece was their triaging system, used to determine which patients are phone screen eligible versus which need an in-person clinic visit. They used smart logic with an algorithm and decision rules to determine a patient's status on key points (such as cardiac history, ability to lie flat, presence of pain) without the need for chart review. A calculated score determines eligibility for a phone screen or an in-person visit. They also created a list of the 100 highest-risk procedures to bypass phone screen consideration and be directly scheduled for an in-person visit.

They also developed tracking tools and scheduling tools to determine where a patient was in terms of readiness for surgery. And they had to develop a new system for determining acceptable timeframes in which elective surgery could be postponed while optimization took place. Anything <2 weeks was considered insufficient time to effectively initiate an optimization program.

A patient–nurse navigator assists patients with scheduling and coordination of care. A patient tracking dashboard was developed for the nurse navigator and other designated key stakeholders. A pamphlet called “the PASSport” was created and distributed to patients to help guide and communicate follow-up patient appointments.

The PASS Clinic was launched in September 2018. Specific optimization programs include a preoperative anemia clinic, preoperative diabetes clinic, preoperative penicillin allergy testing clinic, preoperative nutrition clinic, preoperative pain clinic, and preoperative smoking cessation clinic. An interface with the pre-existing Perioperative Optimization for Senior Health (POSH) clinic has been established for coordinated geriatric care. The article includes a comprehensive list of the items that are evaluated in the PASS clinic along with threshold criteria to trigger referral to those various optimization programs.

They also used smart technology to trigger best practice advisories (BPA's) at specific times. For example, there might be one to ensure a diabetic patient had an endocrinology

consults a specific day prior to surgery. Another triggered anesthesiology to follow a protocol for patients with obstructive sleep apnea.

The Duke program has not yet been in place long enough to report on how it impacted patient outcomes. An extensive list of outcome parameters (clinical, fiscal/economic, and functional) is being collected. But we have previously reported on some prehabilitation programs that did demonstrate a positive effect on outcomes.

In our April 10, 2018 Patient Safety Tip of the Week “[Prepping the Geriatric Patient for Surgery](#)” we discussed some other preoperative programs for frail elderly patients. The Perioperative Optimization of Senior Health (**POSH**) study ([McDonald 2018](#)) looked patients who were undergoing elective abdominal surgery and were considered at high risk for complications (ie, older than 85 years or older than 65 years with cognitive impairment, recent weight loss, multimorbidity, polypharmacy, visual or hearing loss, or simply deemed by their surgeons to be at higher risk). Intervention patients received a multidisciplinary comprehensive preoperative evaluation that focused on cognition, medications, comorbidities, mobility, functional status, nutrition, hydration, pain, and advanced care planning.

Despite higher mean age and morbidity burden, older adults who participated in this interdisciplinary perioperative care intervention had fewer complications, shorter hospitalizations, more frequent discharge to home, and fewer readmissions than a comparison group. Though this was not a randomized, controlled trial (it was a before/after study design) and did not include a formal frailty measure, it is quite clear that most or all the intervention group patients were frail.

One small randomized trial of “prehabilitation” in high-risk patients (age >70 years and/or American Society of Anesthesiologists score III/IV) undergoing elective major abdominal surgery has recently been completed ([Barberan-Garcia 2018](#)). The researchers randomized 71 patients to the control arm and 73 to intervention. Prehabilitation covered 3 actions: motivational interview; high-intensity endurance training, and promotion of physical activity. The intervention group enhanced aerobic capacity, reduced the number of patients with postoperative complications by 51%, and the rate of complications.

Partridge et al. ([Partridge 2017](#)) conducted a randomized controlled study of preoperative comprehensive geriatric assessment and optimization vs. standard preoperative assessment in patients age 65 and above who underwent vascular surgery. They found preoperative comprehensive geriatric assessment was associated with a shorter length of hospital stay. Patients undergoing assessment and optimization had a lower incidence of complications and were less likely to be discharged to a higher level of dependency.

A randomized clinical trial in patients undergoing esophagogastric cancer surgery ([Minnella 2018](#)) found that prehabilitation improves perioperative functional capacity. The intervention consisted of preoperative exercise and nutrition optimization. Compared with the control group, the prehabilitation group had improved functional capacity

(measured with absolute change in 6-minute walk distance) both before surgery and after surgery

In our January 15, 2019 Patient Safety Tip of the Week “[Another Plus for Prehabilitation](#)” we highlighted a study ([Howard 2019](#)) showing that “**prehabilitation**” does, indeed, have a positive impact on surgical outcomes. The Michigan Surgical and Health Optimization Program (MSHOP) is a formal prehabilitation program that engages patients in 4 activities before surgery: physical activity, pulmonary rehabilitation, nutritional optimization, and stress reduction. Patients were referred to the program at the discretion of their surgeon, with at least 2 weeks between referral and the surgery. The program focused on walking (patients receive a pedometer to track steps), breathing (patients receive an incentive spirometer), nutrition and stress management. They also received advice on smoking cessation, if appropriate. A DVD and brochure with instructions and resources for each domain was provided to patients, as well as a way to log their participation. During their involvement in the program, patients receive emails, phone messages, and text message-based reminders to continue.

Overall, 70% of MSHOP patients complied with the program. MSHOP patients had better physiologic reserve (demonstrated by better systolic and diastolic blood pressures and lower heart rate compared to the other groups one hour into surgery). There was a significant reduction in class 3 to 4 complications in the MSHOP group (30%) compared with the nonprehabilitation (38%) and emergency (48%) groups. Total hospital charges averaged \$75,494 for the MSHOP group, \$97,440 for the nonprehabilitation group, and \$166,085 for the emergency group. That translates to an average savings of \$21,946 per patient. The authors note this represents a significant cost offset for a prehabilitation program. They conclude a prehabilitation program should be considered for all patients undergoing surgery.

More recent fiscal results of the MSHOP program were just reported ([Mouch 2020](#)). Compared to controls, those referred for prehabilitiation had significantly shorter median hospital length of stay (6 vs 7 days) and were more likely to be discharged to home (65.6% vs 57.0%). Moreover, there was considerable cost savings in the prehabilitation group (\$31,641 vs \$34,837 for total episode payments), with reduced costs for post-acute care for skilled nursing facility (\$941 vs \$1,566) and home health (\$829 vs \$960) services. Because their study was based upon claims data, they were unable to relate the LOS or cost savings to the occurrence of surgical complications.

A recent review of prehabilitation in gynecological surgery ([Miralpeix 2019](#)) recommended a safe, reproducible, functional, and easy-to-apply multimodal prehabilitation program for gynecologic oncology practice based on patient-tailored pre-operative medical optimization, physical training, nutritional counseling, and psychological support.

Not all studies have shown that prehabilitation improves outcomes. One recent randomized controlled study ([Carli 2020](#)) found that, in frail patients undergoing

colorectal cancer resection (predominantly minimally invasive) within an enhanced recovery pathway, a multimodal prehabilitation program did not affect postoperative outcomes. A systematic review ([McIsaac 2017](#)) found that few interventions have been tested to improve the outcomes of frail surgical patients, and most available studies are at substantial risk of bias. McIsaac is a lead researcher of an ongoing large randomized PREHAB clinical trial ([McIsaac 2018](#)). This is a single-center, parallel-arm randomized controlled trial of home-based exercise prehabilitation versus standard care among consenting patients >60 years having elective cancer surgery (intra-abdominal and intrathoracic) and who are frail (Clinical Frailty Scale >4). The intervention consists of > 3 weeks of exercise prehabilitation (strength, aerobic and stretching). The primary outcome is the 6 min walk test at the first postoperative clinic visit. Secondary outcomes include the short physical performance battery, health-related quality of life, disability-free survival, complications and health resource utilization. Hopefully the ongoing McIsaac study will provide definitive answers about utility of prehabilitation in preparing the frail geriatric patient for surgery.

In addition to the Duke study, the Mayo Clinic Proceedings have recently had a series of articles on preoperative and perioperative medicine. The editorial introducing these ([Mauck 2020](#)) discusses how modern perioperative medicine has evolved into a true multidisciplinary specialty that extends beyond the surgical and hospital encounter and includes preoperative risk evaluation and optimization as well as postoperative post-hospitalization recovery. While it does discuss the benefits of ERAS (Enhanced Recovery After Surgery) programs (see our February 11, 2020 Patient Safety Tip of the Week “[ERAS Rocks!](#)”), it strongly endorses the need for more during the preoperative phase. It notes that prehabilitation strategies focus on proactively starting the rehabilitation process in the weeks before surgery and include structured exercise programs to optimize cardiovascular, respiratory, and muscular conditioning, in addition to optimizing modifiable risk factors like malnutrition, anemia, and psychosocial issues. Because many patients are older and have multiple comorbidities, there is a need for non-anesthesiologist, non-surgeon clinicians who specialize in this area to provide the care needed.

The article on preoperative evaluation before noncardiac surgery ([Bierle 2020](#)) notes that preoperative risk assessment and risk modification requires analysis of:

- surgical urgency
- surgery-specific risk
- patient-specific risk
- status of relevant comorbidities

It goes into detail about assessing the risks for cardiac and pulmonary complications, DVT risk, bleeding risk, delirium risk, obstructive sleep apnea, post-op nausea and vomiting (PONV), and others. It does cover preoperative testing but stresses any testing must be done in a cost-effective manner that takes into account both the risks of the surgery (noting that some surgeries require little or no testing) and patient-specific risks. It specifically notes the importance in the elderly of cognitive screening and assessment for delirium risk and fall risk, noting that addressing malnutrition and frailty preoperatively with a program of “prehabilitation” improves postoperative outcomes.

The Duke PASS program comes at a time when there is increased scrutiny on how patients are managed before and during surgery. The Doctors Company recently released its Anesthesia Closed Claims Study ([Ranum 2020](#)), which found an increase in the percentage of claims related to improper management, noting that limited opportunities to conduct preoperative assessments were a significant contributing factor. They specifically note “Older and sicker patients needed closer investigation but production pressures often limited testing and input from attending or referral physicians.” They also note that those pressures limit their ability to “recommend safer locations for anesthesia care (e.g., hospital operating room vs. ambulatory surgery or GI or cardiac labs) or to prepare for complications that might occur as a result of multiple comorbidities or complicated health histories.” The importance of comorbidities was highlighted by the fact that, in cases with inadequate history and physical as a contributing factor, obesity impacted patients’ care in almost three times as many cases as other anesthesia cases, obstructive sleep apnea was six times more likely, hypertension three times more likely, and other comorbidities twice as frequently. Among their recommendations were ensuring that anesthesiology staff have adequate time and opportunity to conduct preop assessments and opportunities to refer patients to specialists to evaluate comorbidities. Sounds exactly what the Duke PASS program does!

Aronson and colleagues, in a separate editorial ([Aronson 2020b](#)), issue a call to action for preoperative optimization and discuss the many systemic, institutional, individual, and economic barriers and conflicts of interest that have prevented the transformation in the past.

It’s pretty clear to us that we need to resist the desires of both patients and surgeons to expedite elective surgery and, instead, allow adequate time for both preop assessment and patient optimization prior to surgery. Duke has done an outstanding job of designing and implementing a system that allows adequate time and funnels patients in a protocol-driven manner to get the care needed to make them better candidates for their planned surgery.

### **Some of our columns on preparation of patients prior to surgery:**

- September 25, 2012 “[Preoperative Assessment for Geriatric Patients](#)”
- May 2016 “[Guidelines for Perioperative Geriatric Care](#)”
- April 10, 2018 “[Prepping the Geriatric Patient for Surgery](#)”
- January 15, 2019 “[Another Plus for Prehabilitation](#)”
- September 17, 2019 “[American College of Surgeons Geriatric Surgery Verification Program](#)”

### **Some of our prior columns on preoperative assessment and frailty:**

- March 31, 2009 “[Screening Patients for Risk of Delirium](#)”
- January 26, 2010 “[Preventing Postoperative Delirium](#)”

- June 2010 “[The Frailty Index and Surgical Outcomes](#)”
- August 17, 2010 “[Preoperative Consultation – Time to Change](#)”
- August 31, 2010 “[Postoperative Delirium](#)”
- August 9, 2011 “[Frailty and the Surgical Patient](#)”
- September 2011 “[Modified HELP Helps Outcomes in Elderly Undergoing Abdominal Surgery](#)”
- October 18, 2011 “[High Risk Surgical Patients](#)”
- November 2011 “[Timed Up-and-Go Test and Surgical Outcomes](#)”
- April 3, 2012 “[New Risk for Postoperative Delirium: Obstructive Sleep Apnea](#)”
- August 7, 2012 “[Cognition, Post-Op Delirium, and Post-Op Outcomes](#)”
- August 14, 2012 “[Gait Speed: A New Vital Sign?](#)”
- September 25, 2012 “[Preoperative Assessment for Geriatric Patients](#)”
- September 3, 2013 “[Predicting Perioperative Complications: Slow and Simple](#)”
- November 2013 “[Predicting Perioperative Complications: Even Simpler!](#)”
- June 2014 “[Another Study Linking Frailty to Surgical Complications](#)”
- September 2, 2014 “[Frailty and the Trauma Patient](#)”
- February 17, 2015 “[Functional Impairment and Hospital Readmission, Surgical Outcomes](#)”
- June 2015 “[Get a Grip on It!](#)”
- January 26, 2016 “[More on Frailty and Surgical Morbidity and Mortality](#)”
- May 2016 “[Guidelines for Perioperative Geriatric Care](#)”
- May 31, 2016 “[More Frailty Measures That Predict Surgical Outcomes](#)”
- May 16, 2017 “[Are Surgeons Finally Ready to Screen for Frailty?](#)”
- February 2018 “[Global Sensory Impairment and Patient Safety](#)”
- April 10, 2018 “[Prepping the Geriatric Patient for Surgery](#)”
- January 15, 2019 “[Another Plus for Prehabilitation](#)”
- September 17, 2019 “[American College of Surgeons Geriatric Surgery Verification Program](#)”

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