Patient Safety Tip of the Week

January 15, 2019

Another Plus for Prehabilitation

Seems like we've written many, many columns on the impact of frailty on a variety of medical outcomes but the impact on surgical outcomes has been most striking. Our surgical colleagues often say to us "Yes, I recognize when patients are frail. I tell them and their families that they are at greater risk for the surgery. What else am I supposed to do?"

Several studies have demonstrated that hospital multidisciplinary teams, usually led by geriatricians or other healthcare professionals who focus on those with frailty, may have a positive impact on outcomes for hospitalized frail patients. But the missing piece has always been whether doing anything **preoperatively** to ready frail patients for surgery makes a difference.

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.

Now a new study (Howard 2019) adds to a slowly growing body of evidence 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.

A significant limitation of this study is that it was not specifically a study of a frail population and there were no specific inclusion criteria for frailty. But a retrospective comparison of frailty data between groups (using psoas muscle size as a proxy for frailty) did identify a higher incidence of frailty in the MSHOP group. Therefore, those patients would have been expected to do worse. But this study demonstrates that surgical prehabilitation is beneficial in that these patients do not have the inferior outcomes and patients who completed prehabilitation had superior outcomes in some cases.

This was also not a randomized, controlled trial. Rather patients were referred at the discretion of their surgeon (hence, some likely selection bias) and groups were chosen for comparison by propensity score matching.

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 ($P = 0.001$).

A small randomized clinical trial in Canada (Minnella 2018) compared prehabilitation with a control group. Intervention consisted of preoperative exercise and nutrition optimization. Participants were adults awaiting elective esophagogastric resection for cancer. Compared with the control group, the prehabilitation group had improved functional capacity (measured by change in 6-minute walk distance) both before surgery and after surgery.

But a larger randomized study is ongoing (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.

One other program we've previously mentioned is the American College of Surgeons' Strong for Surgery program. This program is intended to optimize patients' overall status prior to surgery and provides a toolkit with checklists. "Strong for Surgery" empowers hospitals and clinics to integrate checklists into the preoperative phase of clinical practice for elective operations. The checklists are used to screen patients for potential risk factors that can lead to surgical complications, and to provide appropriate interventions to ensure better surgical outcomes." The checklists in the Strong for Surgery Toolkit target eight areas known to be influential determinants of surgical outcomes:

1. Nutrition
2. Glycemic Control
3. Medication Management
4. Smoking Cessation
5. Safe and Effective Pain Management after Surgery
6. Delirium
7. Prehabilitation
8. Patient Directives

It's certainly logical that optimizing patients prior to surgery might improve outcomes. We are finally beginning to validate that concept and identifying the components of such "prehabilitation" programs that lead to success.

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"

References:

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McIsaac DI, Saunders C, Hladkowicz E, et al. PREHAB study: a protocol for a prospective randomised clinical trial of exercise therapy for people living with frailty having cancer surgery. BMJ Open. 2018; 8(6): e022057. Published online 2018 Jun 22
https://bmjopen.bmj.com/content/8/6/e022057

American College of Surgeons. Strong for Surgery. Updated November 2018
https://www.facs.org/quality-programs/strong-for-surgery

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