Patient Safety Tip of the Week

January 26, 2016

More on Frailty and Surgical Morbidity and Mortality

In our June 2010 What's New in the Patient Safety World column "The Frailty Index and Surgical Outcomes" we noted a study by Makary and colleagues (Makary 2010) that showed frailty was associated with unwanted surgical outcomes. The Fried frailty index turned out to be very good in its ability to predict surgical outcomes. For instance, the odds ratio for frail patients for postoperative complications after major surgery was 2.54, for length of stay 1.69, and for discharge to a skilled nursing facility or assisted living facility 20.48. Odds ratios for those with intermediate frailty were somewhat lower but still predictive of all the above. And the frailty index was better than other tools used to predict outcomes (ASA score, Lee's revised cardiac risk index, and the Eagle score). Adding the frailty index to any of those tools significantly improved the predictability of outcomes.

We've done multiple other columns (listed below) identifying studies that also show an association between frailty and surgical outcomes. Many used different methods for defining frailty, some using many more variables than those in the Fried index and others using only one or two variables. Some have shown that even just using limited measures of frailty, such as the timed up-and-go test or measuring grip strength, have the ability to predict surgical complications.

In fact, we consider assessment for frailty one of the three most important things that need to be done in a preoperative evaluation for potential surgery, the other two being assessment for obstructive sleep apnea and assessment for delirium risk (see our August 17, 2010 Patient Safety Tip of the Week "Preoperative Consultation – Time to Change").

Two new studies further illustrate the association between frailty and surgical morbidity and mortality. The first is a new population-based study which looked at the impact of frailty on mortality for a variety of major non-cardiac surgeries in over 200,000 patients age 65 and older in Ontario, Canada between 2002 and 2012 (McIsaac 2016). Frailty was determined from administrative data using the Johns Hopkins ACG frailty-defining diagnoses indicator. 3.1% of the population met the ACG frailty-defining diagnoses indicator. This group was older and had more comorbidities than the non-frail population. In the year following surgery 13.6% of frail patients died, compared to only 4.8% of non-frail patients. After adjustment for a number of variables, the 1-year mortality remained significantly higher (adjusted hazard ratio 2.23) in the frail population. Mortality was especially high in the early postoperative period (HR 35 on postop day #3 but then

stabilizing between 2 and 3 by postop day 90). Though the hazard ratio decreased with increasing age, the association between frailty and mortality remained significant at all ages.

However, the relationship between frailty and mortality varied considerably by type of surgery. For example, the adjusted hazard ratio was not elevated for those undergoing pancreaticoduodenectomy or liver resection but was as high as 3.79 for those undergoing total hip replacement.

To differentiate the generally increased mortality of frail patients from that related to surgery, the researchers noted that the mortality diminished with time following surgery. That suggests that the stressors related to surgery were, in fact, major drivers.

Note also that it is quite likely there is already some bias in patient selection for the various types of surgery. But the results certainly suggest that individual risk:benefit analysis is important in the frail patient and consideration needs to be given to overall goals in this population when contemplating elective surgery.

The second study looked at the influence of frailty on complications of 21 common urological procedures (Suskind 2016). Data was from the ACS NSQIP database from 2007 to 2013. The frailty index used with this database does include impaired functional status but then adds a point for presence of or procedures/treatment for a number of comorbid conditions. They found that increasing frailty was associated with increasing odds of both minor and major complications and increasing frailty index scores were associated with increasing incidence of complications. This relationship held true for almost all the urological procedures included and was consistent across all age groups until the age of 81.

While we are not particularly fond of the frailty indices used in these two studies (we think they emphasize comorbidities much more so than patients' abilities to function), they are available from administrative data and have been shown elsewhere to correlate with frailty.

Several studies have shown that much simpler tools may predict complications in elderly patients undergoing surgery. In our August 9, 2011 Patient Safety Tip of the Week "Frailty and the Surgical Patient" we noted two studies by Robinson and colleagues (Robinson 2009, Robinson 2011) looked at outcomes in (mostly male) patients age 65 and older who were undergoing major elective surgical procedures in the VA medical system and correlated them with measures of frailty, disability, and comorbidity. Using a group of markers that were easy to use in a surgeon's office setting they were able to predict 6-month postoperative mortality and post-discharge institutionalization.

The evaluation for frailty need not be time consuming. Our September 3, 2013 Patient Safety Tip of the Week "Predicting Perioperative Complications: Slow and Simple" discussed studies showing how the time up-and-go test or tests of gait speed have a predictive value for frailty almost as good as more comprehensive evaluations. And our

June 2015 What's New in the Patient Safety World column "Get a Grip on It!" cited a study (Revenig 2015) that showed the combination of "shrinking" (weight loss) and reduced grip strength alone held the same prognostic information as the full 5-component Fried Frailty Criteria for 30-day morbidity and mortality.

Like all the studies noted in our previous columns the new studies add to the evidence base demonstrating the tremendous vulnerability of the frail patient undergoing surgery or other procedures. That is why it is imperative that the pre-op or pre-procedure assessment of patients include assessment for frailty. If it is determined that a patient is frail, they need to be informed of the increased risks of the surgery/procedure, in the context that their life expectancy may also be limited in view of the frailty even without the surgery or procedure. Only then can the potential risks and benefits be discussed for that individual patient. The patient's ultimate goals need to be considered in such decision making. The finding by McIsaac and colleagues of considerable variability by procedure type certainly needs further research but, as above, we think much of that is due to selection bias and we probably need to presume that the risks in the frail patient likely apply to all procedures.

And, while no study has demonstrated that any specific pre-op or pre-procedure preparation of the frail patient can minimize complications, the presence of frailty should make us increasingly vigilant for complications so they may be managed as early as possible. And the increased likelihood of discharge to a skilled nursing facility or assisted living center should be discussed with the patient prior to admission and planning for such contingencies be part of the care planning process from Day 1 or earlier.

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!"

References:

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McIsaac DI, Bryson GL, Walraven C. Association of Frailty and 1-Year Postoperative Mortality Following Major Elective Noncardiac SurgeryA Population-Based Cohort Study. JAMA Surgery 2016; published online ahead of print January 20, 2016 http://archsurg.jamanetwork.com/article.aspx?articleid=2482671

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Revenig LM, Canter DJ, Kim S, et al. Report of a Simplified Frailty Score Predictive of Short-Term Postoperative Morbidity and Mortality. J Am Coll Surg 2015; 220(5): 904-911 http://www.journalacs.org/article/S1072-7515%2815%2900116-7/abstract

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