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Patient Safety Tip of the Week

April 28, 2020 Can the Lab Spot Frailty?

Recognizing frailty is important for predicting complications in patients hospitalized for either medical or surgical reasons. Such recognition may help prevent complications and help plan for post-hospital care. It may also identify patients for whom "prehabilitation" may be useful. Our many columns on the impact of frailty on patient outcomes have highlighted a variety of useful tools to identify frail patients. But can the lab be used to identify frail patients? A new study suggests that it can, indeed.

Ellis and colleagues (Ellis 2020) created a frailty index (called "FI-Laboratory") from routine admission laboratory investigations in a prospective cohort of older adults admitted to a large tertiary hospital in the United Kingdom.

The authors propose that the FI-Laboratory "may be a plausible 'front door' tool that could inform potential interventions that may include management escalation, specific treatment paths, implementation of comprehensive geriatric assessments, and admission to 'senior-friendly' units."

In the current study of consecutive patients admitted to an acute geriatric unit, the researchers used 2 summary measures quantifying chronic and acute health states: the **Clinical Frailty Scale (CFS) score** (also known as the Rockwood score that we have discussed in several prior columns), and the **laboratory frailty index (FI-Laboratory)**. Data for FI-Laboratory items came from common laboratory tests that are routinely undertaken for clinical investigations within the first 72 hours of admission. There are 27 lab tests (listed in their supplemental table) from which the calculate the FI-Laboratory score. Their analysis included data from 2552 separate admissions for 1750 patients.

Higher CFS and FI-Laboratory scores were both associated with more days in hospital during the study period, even after accounting for multiple clinical and demographic factors. An increase in the CFS was associated with an increase in admission days (rate ratio 1.43). Each 0.10 (3 deficits) increase in the FI-Laboratory was associated with an increase in admission days (RR 1.47).

Similarly, higher CFS and FI-Laboratory were associated with being discharged to a higher level of care (odds ratio 1.30 for a 1-point increase in the CFS and 1.39 for a 0.10 increase in the FI-Laboratory). A presentation of falls or delirium was also associated with being discharged to a higher level of care.

Readmissions also correlated with CFS and FI-Laboratory scores. Hazard ratios for readmission were 1.18 for a 0.10 increase in the FI-Laboratory score and 1.26 for an additional point on the CFS. Older age was also an independent predictor of readmissions.

Lastly, both scores were predictors of mortality. 56.4% of the participants died during the follow-up period. A single point higher CFS and a 0.10 increase in the FI-Laboratory score were associated with increased risk of death (respective hazard ratios for mortality were 1.39 and 1.45).

The authors conclude that the FI-Laboratory score offers distinct, yet complementary, information to the chronic accumulation of deficits and is associated with several adverse outcomes, in addition to those conferred by the CFS and to chronological age. They suggest that the FI-Laboratory score can usefully measure accumulated deficits in older adults who present to the hospital with acute illness. The FI-Laboratory score combines features that both predispose to and precipitate acute illness. They posit that, by quantifying both acute and chronic deficits, the score may draw attention to risk that is not apparent clinically.

We generally favor frailty instruments that are simple and easy to administer, such as the Fried Index or the Modified Frailty Index (see our May 31, 2016 "More Frailty Measures That Predict Surgical Outcomes"). Even simpler measures, such as gait speed or the timed up-and-go test, may be very useful in predicting frailty and complications in various settings. But we can see a real value in the FI-Laboratory score. It can be calculated easily from readily available laboratory data. It could identify patients at risk for these adverse outcomes in whom there was no pre-existing data to determine a CFS score or other measure of frailty.

This study was done a a single center. It would be useful to see if the findings can be validated at other medical centers. But we definitely see promise for use of the FI-Laboratory score.

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"
- April 7, 2020 "From Preoperative Assessment to Preoperative Optimization"

References:

Ellis HL, Wan B, Yeung M, et al. Complementing chronic frailty assessment at hospital admission with an electronic frailty index (FI-Laboratory) comprising routine blood test results. CMAJ 2020; 192(1): E3-E8
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Supplemental tables
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