Electronic Frailty Index Predicts Increased Length of Stay, Discharge Destination, and Delirium Risk in Older Surgical Patients

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Background. Numerous studies have examined instruments for frailty assessment in the pre-operative setting, demonstrating a strong association between frailty and an increased risk of post-operative complications, readmissions, and mortality. However, the majority of these instruments require burdensome clinical data collection (i.e. comprehensive geriatric assessment, grip strength, or gait speed) that impedes implementation in busy clinical practices. We have previously developed an automated, electronic frailty index (eFI) based on information routinely captured in the Electronic Health Record (EHR). The purpose of this study was to explore frailty as a marker for post-operative complications that affect older adults’ cognitive (delirium) and physical function, healthcare utilization, and subsequent independence.

Methods. We extracted data from the EHR for 6,085 patients 65 years or older undergoing elective surgery at our institution from 10/2017 to 6/2018. We examined the association of the eFI with patient length of stay (LOS), discharge destination, and the risk of post-operative delirium.

Results. The cohort was 50.8% female, 87.0% white, with a mean age of 73.5 (SD=6.3) years. The eFI could be calculated for 79.1% of patients, with 31.1% classified as frail (eFI>0.21). For surgeries with an inpatient admission, a 0.1 increase in the eFI was associated with a 0.45 day (95% CI: 0.25, 0.66 days) increase in median LOS, and 0.49 (95% CI: 0.42, 0.58) lower odds of being discharged home without a need for post-acute care, adjusting for age, sex, comorbidity, American Society of Anesthesiologists class, and impaired cognition. While delirium was infrequently documented within the EHR (97 events), a 0.1 increase in the eFI was associated with a 1.46 (95% CI: 1.05, 2.01) higher odds of post-operative delirium.

Conclusion. Our results indicate that a passive EHR-based marker for frailty can identify a subgroup of older adults at risk for delirium, prolonged inpatient LOS, and the need for post-acute care; this could inform pre-operative counseling, consent, and care coordination.

DISCUSSION

Our data shows a positive correlation between m4AT status and a higher fall rate in hospitalized older adults. The m4AT screen can be a pragmatic nursing tool to screen for delirium and increased fall risk. We are exploring the temporal relationship between the fall and m4AT+ in the data.

Stratified fall risk facilitates personalized care from a 60 second test.

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Background. Fall history is the current best predictor of falls and is included in the Medicare welcome examination. Yet, this binary assessment of risk is limited in application because it must miss the first fall and requires reliable patient reporting. Clinicians may supplement assessments with functional tests and surveys, but these can be impractical and limited in prediction. Preliminary data (n=78) shows a 60 second open Romberg (60sR) test on a low-cost force plate, which yields a simple composite stability score (1-10 Brios), identifies 3 fall risk strata (high, moderate, low). The objective of this study was to determine the validity of this method for predicting falls and identify strata-specific risk factors for simplifying and personalizing fall prevention care.

Methods. 410 participants were recruited from the community (CD), 8 senior living facilities (SLF), 2 physical therapy clinics (PT), 2 outpatient clinics (OP) and a hospital surgical ward (HOS) for a prospective study (n=209), Timed Get Up and Go (TUG) comparison (n=191) and Johns Hopkins Fall Risk Assessment Tool (JHRAT) comparison study (n=10). The stability score was measured with a force plate (Zibrio SmartScale) during the 60sR test. 12 months fall history was recorded. SLF and CD were surveyed for prospective falls regularly up to 12 months. PT and OP performed a standard TUG test, and OP also a 30 sec. Sit to Stand test (SST). HOS patients were assessed with JHRAT. Receiver operating curves, survival, log rank, and regression analyses were performed.

Results. Fall risk strata from the stability score provides good prediction of falls and greater sensitivity than fall history or TUG. The stability score correlates well with JHRAT and SST. Fall probabilities progressively increased over time with increasing risk stratum (p<0.05). SLF high risk participants had lower probabilities of falling
than CD (p<0.05). Low risk participants were “protected” for approximately 90 days (p<0.05). The risk strata had different types of falls and significant risk factors associated (p<0.05).

Discussion. We demonstrate the validity of a stability score from a quick and easy fall risk test. Further, we identify risk factors to each fall risk stratum so clinicians can provide targeted care for personalized fall prevention care.

References

P4
Predictors of Functional Decline among Older Intensive Care Unit (ICU) Survivors
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Background: Critical illness often leads to functional decline among older adults, but clinicians currently have no way to identify which patients are at increased risk of this poor outcome. Our objective was to identify predictors of functional decline among older ICU survivors. Methods: Participants were drawn from the National Health and Aging Trends Study (NHATS), a cohort of Medicare beneficiaries age ≥65 who completed annual interviews from 2011-2015. We linked the dataset to CMS claims files to identify ICU admissions. Functional status before and after the ICU stay was determined from NHATS data using a previously validated measure of disability in activities of daily living and mobility (range 7(low)-28(high)). Post-ICU functional decline was defined as a ≥2-point increase in post-ICU disability. We evaluated 27 potential predictors using backwards selection (retention criterion p<0.20) to develop a multivariable logistic regression model (statistical significance p<0.05).

Results: The analytic sample included 376 participants who survived an ICU hospitalization. The mean age at initial interview was 79.9 years, 29.3% were of nonwhite race/ethnicity, and 166(44.1%) met criteria for post-ICU functional decline. Of 10 predictors retained in the final model (Table), increased age, exhaustion, low activity, slowness, probable dementia, possible dementia, and vision impairment were all associated with increased odds of functional decline, whereas greater pre-ICU disability was associated with decreased odds of functional decline. The model demonstrated good discrimination (C-statistic=72%) and calibration (Hosmer-Lemeshow p>0.05).

Conclusions: Using a nationally representative sample, we identified 8 predictors of functional decline among older ICU survivors. These predictors will inform development of a tool to identify patients at increased risk of post-ICU functional decline, with a goal of targeting them for additional interventions.

Table. Predictors of post-ICU functional decline among older survivors of critical illness (N=376)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>n (%) or mean ± SD</th>
<th>Odds ratio (95% CI)</th>
</tr>
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<tbody>
<tr>
<td>Age (years)</td>
<td>79.3 ± 7.4</td>
<td>1.04 (1.00, 1.08)</td>
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<tr>
<td>Exhaustion</td>
<td>182 (48.3)</td>
<td>1.32 (1.06, 2.29)</td>
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<tr>
<td>Low physical activity</td>
<td>231 (61.8)</td>
<td>1.32 (1.06, 2.28)</td>
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<tr>
<td>Slowness</td>
<td>150 (39.0)</td>
<td>1.58 (1.12, 2.21)</td>
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<tr>
<td>Probable dementia</td>
<td>42 (11.3)</td>
<td>3.47 (1.53, 7.96)</td>
</tr>
<tr>
<td>Possible dementia</td>
<td>83 (11.6)</td>
<td>2.06 (1.09, 3.85)</td>
</tr>
<tr>
<td>Vision impairment</td>
<td>52 (13.9)</td>
<td>2.09 (1.03, 4.29)</td>
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<tr>
<td>Pre-ICU disability (range 7-28)</td>
<td></td>
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<tr>
<td>Prior history of stroke</td>
<td>30 (8.0)</td>
<td>1.05 (0.59, 1.89)</td>
</tr>
<tr>
<td>Mechanical ventilation in the ICU</td>
<td>28 (7.4)</td>
<td>2.02 (0.87, 4.69)</td>
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P5 Student Presentation, Encore Presentation
Spinal Surgery for Degenerative Spine Disease - Opioid Prescription Filling Patterns in Geriatric Patients
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Introduction
The CDC estimates that 49,000 Americans died from opioid-related toxicity in 2017. A major contributor to this epidemic is long-term prescription of opioids for non-cancer pain, especially after a surgical procedure. One study showed that up to 7% of patients may develop new-onset chronic opioid use after elective surgery. Given the high prevalence of degenerative spine disease (DSD) in geriatric patients, this population may be at increased risk for chronic opioid use. Here we describe patterns and predictors of opioid utilization after spinal surgery for DSD in geriatric patients.

Methods
In this retrospective cohort analysis of a Medicare 5% database, we analyzed patients aged 66+ years with continuous coverage for one year prior to an index spinal operation for DSD-related diagnoses occurring between 2008 and 2014. All filled prescriptions for opioids were tracked post-operatively, and independent risk factors for continuing to fill prescriptions for opioids were determined using a Cox-proportional hazards regression. Patients were censored from the analysis if they died, experienced trauma, or lost Medicare coverage.

Results
A total of 14,408 patients met inclusion criteria: 2,013 patients underwent anterior discectomy and fusion (ACDF), 666 underwent posterior cervical fusion (PCF), 2,656 underwent lumbar microdiscectomy, 1,825 underwent lumbar laminectomy, and 7,248 underwent lumbar fusion. Of pre-operatively opioid naïve patients, 14.7% continued to fill prescriptions one-year post-operatively. Lumbar fusion, microdiscectomy, and PCF were associated with prolonged opioid utilization. Female sex, age >80, Charlson score >0, history of drug abuse, Medicaid eligibility, and pre-operative opioid use for 3 or 4 quarters were also associated with prolonged utilization.

Conclusion
A significant proportion of geriatric patients continue to fill prescriptions for opioids for at least a year after spinal surgery for DSD. Understanding the factors that are associated with chronic opioid utilization may aid in patient selection when considering spinal surgery for a geriatric patient with DSD.

P6
Clinical outcomes of intensifying older adults' antihypertensives at hospital discharge
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Background: Transient elevations of blood pressure (BP) are common in hospitalized older adults and often lead clinicians to discharge patients on intensified antihypertensives medication regimens. This practice may expose patients to overtreatment, particularly those whose BP was previously well-controlled, however the clinical outcomes are unknown.