Assessment of Cognitive Impairment
The Holy Grail of Risk Prediction?

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The prediction of outcomes for patients with heart failure (HF) is a goal shared by both the patients and the clinicians who care for them. For patients with HF, and for others, patient-specific outcome goals often center around the achievement of personal milestones and quality of life, whereas clinicians, hospital systems, and administrators are often concerned with predictors that include survival and economic effects. Risk scores that are derived using clinical variables and developed from patient cohorts in randomized clinical HF trials can help clinicians to provide patients with estimation of need for hospitalization and predicted survival.

Because of the enormous economic burden of hospital readmission to the US healthcare system, the Patient Protection Affordable Care Act of 2010 created incentives to reduce readmissions. Section 3025 of the Affordable Care Act added section 1886(q) to the Social Security Act establishing the Hospital Readmissions Reduction Program, which requires the Centers for Medicare and Medicaid Services (CMS) to reduce payments to inpatient prospective payment system hospitals with excess readmissions. Approximately 20% of Medicare beneficiaries hospitalized for HF are readmitted within 30 days of hospital discharge. An initial focus of CMS has included those patients readmitted to hospitals with a discharge diagnosis of HF, so interest has been keen to develop strategies to predict an individual patient’s risk of readmission. Although patient-level characteristics have been scrutinized to build accurate risk tools and methods of assessment to predict rehospitalization and survival, inconsistencies about which patient characteristics are uniformly predictive remain.6,7

In this issue of Circulation: Heart Failure, Patel et al report on an important and novel approach to the prediction of outcomes for patients hospitalized with HF. In view of the fact that cognitive impairment is common in elderly patients with HF and that it has been correlated with poor outcomes and mortality, the investigators sought to determine whether cognitive impairment as assessed by the Mini-Cog test was associated with worse outcomes for patients after hospitalization for HF. The primary outcome of the study was time between hospital discharge and first occurrence of all-cause readmission or all-cause mortality.

Various instruments have been evaluated with regard to their ability to assess cognitive impairment in patients with HF. The Mini Mental State Examination is the most frequently used screening measure, but does not seem to be an adequate instrument to detect the type of cognitive impairment seen in HF. In addition, the results of the Mini Mental State Examination have been found to be influenced by the patients’ level of education and literacy, as well as by cultural and ethnic backgrounds. The test also takes between 10 and 30 minutes to administer; and although the Mini Mental State Examination has been widely used, it has also been protected by copyright.

The Mini-Cog test has been validated16,17 as a brief screening tool to differentiate patients with dementia from those without dementia. It is a 2-part test of executive function (the ability to plan, manage time, organize activities, and manage working memory) that can be used when there is a suspicion of cognitive impairment or during routine screening as a vital sign. The test combines a 3-item recall test with a clock-drawing test. During the test administration, the patient is told 3 items and is asked to repeat back and remember those 3 items. The patient is then asked to draw a clock face with all the numbers, and then draw in the hands of the clock to indicate a certain time. After the patient has drawn the clock face, he or she is asked to repeat back the 3 items that were previously stated. The Mini-Cog test can be administered in ≈3 minutes, requires no special equipment, and is not significantly influenced by level of education or language variations. The Mini-Cog test has not been previously evaluated in a population of hospitalized patients.

This study included 720 consecutive elderly patients at a single center who completed the Mini-Cog assessment during hospitalization for HF. As part of a care transitions program that was designed for patients >65 years, care coordination nurses, both licensed practical nurses and registered nurses, assessed patients, educated patients and their families, and facilitated the patient’s transition from hospital to community as part of routine clinical care. Patients were assessed regardless of insurance status and part of the assessment included administration of the Mini-Cog test at a median of 2 days before discharge. Mini-Cog test results were photographed, and the image was included in the electronic medical record.

Patients who were seen by a nurse but did not complete the Mini-Cog were excluded for a variety of reasons including the test not being offered or deferred and never completed, the patient declining the test, or the patient being unable to perform the Mini-Cog for a different reasons not related to cognitive function. Patients who died before discharge or...
were discharged to hospice were not included in the cohort. Compared with patients who did complete the Mini-Cog test, patients who did not tended to be uninsured whites who were generally sicker (higher N-terminal pro-brain natriuretic peptide and higher history of dialysis), and had longer hospital length of stay. They also experienced higher inpatient death rates, but lower postdischarge death rates.

The study found a high prevalence of cognitive impairment in these hospitalized patients with 23% of the cohort affected. Patients with cognitive impairment tended to be older, women, and black. These patients also tended to live in or own houses of lower estimated price, have a higher prevalence of previously diagnosed dementia, and they were more likely to be discharged to a facility rather than home. During a mean follow-up time of 6 months (range, 0–16 months), 48% of patients were readmitted and 3% died. Compared with patients without cognitive impairment, patients with cognitive impairment had significantly higher event rates at 30 days and the association between Mini-Cog test performance and composite outcome was significant in both unadjusted and multivariable-adjusted models. In Random Survival Forest framework, Mini-Cog test performance was the most dominant contributor to discriminative prediction from among 55 covariates used to construct the prediction ensemble. The authors also noted that Mini-Cog performance added incremental value beyond a baseline diagnosis of dementia as documented in the medical record. A secondary analysis of 30 days post discharge showed effect modification by venue of discharge, whereby patients with poor Mini-Cog test performance discharged to a facility (skilled nursing facility, long-term acute care hospital, inpatient rehabilitation facilities, or other) had a longer time to first readmission or death as compared with those discharged home.

There are several important limitations to this study that need to be considered in interpreting these findings. Most importantly, 36% of the 1128 patients who were eligible for study inclusion were not assessed for cognitive impairment because of the reasons noted by the authors. The patients not assessed were clearly sicker and their inclusion in the study group may well have altered the results. In addition, outcome data were collected from only 9 hospitals in the healthcare system that includes the hospital from which the study patients were discharged. To determine the true effect of the Mini-Cog test on outcomes, data on both deaths and all-cause readmission rate (a risk-standardized metric that is inclusive of all readmissions, regardless of hospital) need to be collected regardless of venue of readmission. Last, the finding that discharge to a facility rather than to home was protective is intriguing, but this finding needs to be considered in the light of patient preference. Hospital discharge to a skilled nursing facility, long-term acute care hospital, or inpatient rehabilitation facility is accomplished only when such a care setting is recommended by the physician or other clinician and that recommendation is agreed to by the patient and his or her family. In this study, patient acceptance of such a recommendation may exemplify a type of healthy user bias that may have influenced the study outcomes.

How should the findings of this study be incorporated into the daily care of elderly patients hospitalized with HF?

First, the finding that poor Mini-Cog test performance is an independent predictor of hospital readmission risk, regardless of the mechanism, is important. Replication of this data in other settings and by other groups is needed, but in the meantime clinicians and care coordinators can add administration of the Mini-Cog test to their armamentarium aimed at risk reduction. Results of the test can be considered along with other variables when determining how best to advise a patient and his or her family about safety, survival, and long-term care. And the results can also influence the level of scrutiny brought to bear on individual patient risk for readmission. Finally, goals that are valued by patients and their families will be achieved only with ongoing efforts at refining risk assessments and tying those assessments to meaningful outcomes.

Disclosures

None.

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