



ORIGINAL ARTICLE

Use of a Standardized Assessment to Predict Rehabilitation Care After Acute Stroke

Joel Stein, MD,^{a,b,c} Janet Prvu Bettger, ScD,^d Alyse Sicklick, MD,^e
Robin Hedeman, OTR, MHA,^f Zainab Magdon-Ismail, EdM, MPH,^g Lee H. Schwamm, MD^{h,i}

From the ^aDepartment of Rehabilitation and Regenerative Medicine, Columbia University College of Physicians and Surgeons, New York, NY; ^bDivision of Rehabilitation Medicine, Weill Cornell Medical College, New York, NY; ^cNew York-Presbyterian Hospital, New York, NY; ^dDuke University School of Nursing, Durham, NC; ^eGaylord Specialty Healthcare, Wallingford, CT; ^fKessler Institute for Rehabilitation, West Orange, NJ; ^gAmerican Heart Association/American Stroke Association—Founders Affiliate, Albany, NY; ^hDepartment of Neurology, Massachusetts General Hospital, Boston, MA; and ⁱHarvard Medical School, Boston, MA.

Abstract

Objective: To pilot a program of formal assessment of rehabilitation needs and predictors of referral to rehabilitation.

Design: A prospective pilot project to collect standardized measures of stroke severity and function: National Institutes of Health Stroke Scale, premorbid modified Rankin scale, Short Portable Mental Status Questionnaire, and Barthel Index (BI). These were collected in addition to routine data in the Get With The Guidelines-Stroke registry. Logistic regression was used to examine predictors of referral to any institution-based rehabilitation versus discharge home and referral to an inpatient rehabilitation facility (IRF) versus a skilled nursing facility (SNF).

Setting: Twenty-two hospitals within the Northeast Cerebrovascular Consortium (located in the northeastern United States).

Participants: Data were collected on individuals with acute ischemic and hemorrhagic stroke (N=736).

Interventions: Not applicable.

Main Outcome Measures: Discharge disposition location.

Results: The BI score was recorded in 736 (81%) patients. In multivariable analyses, a higher BI score (85–100) was the only factor associated with return home versus need for institution-based rehabilitation ($P<.001$). Among patients discharged to IRF versus SNF, discharge to IRF was less likely in older patients (odds ratio [OR], .96; confidence interval [CI], .94–.98; $P<.001$) and in those with prestroke disability (modified Rankin scale score, 2–5) (OR, .47; CI, .28–.78; $P=.004$) and more likely in those with moderate-severe (BI score, 25–40; OR, 3.26; CI, 1.45–7.30; $P=.004$) or moderate (BI score, 45–60; OR, 2.47; CI, 1.17–5.21; $P=.018$) activities of daily living (ADL) impairment.

Conclusions: Formal standardized assessment of rehabilitation needs was feasible in this pilot project. Patients' sociodemographic characteristics, premorbid function, and ADL impairment discriminated better between discharge home and institution-based rehabilitation than between IRF and SNF. Selection of IRF versus SNF appears to be influenced either by unmeasured clinical characteristics of individuals with stroke or by nonclinical factors, such as cost, geography, referral relationships, or IRF availability.

Archives of Physical Medicine and Rehabilitation 2014; ■: ■ ■ ■ ■ - ■ ■ ■ ■

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Rehabilitation after stroke can be provided at an inpatient rehabilitation facility (IRF), at a long-term acute care hospital, at a skilled nursing facility (SNF), by outpatient rehabilitation, or

by home health care. In many cases, an individual patient may receive care in more than 1 type of rehabilitation setting sequentially (eg, IRF followed by outpatient). Clinical

Presented as an abstract to the International Stroke Conference, February 5-7, 2013, Honolulu, and the Quality of Care and Outcomes Research Conference, May 15-17, 2013, Baltimore, MD.

Supported by the Northeast Cerebrovascular Consortium and the American Heart Association/American Stroke Association through staff and information system support.

Disclosures: Bettger is supported by the Agency for Healthcare Research and Quality Comparative Effectiveness Research Mentored Scholar Program (grant no. K12HS019479; principal investigator: Oddone). Schwamm serves as chair of the American Heart Association (AHA) Get With The Guidelines (GWTG) Steering Committee, as a consultant to the Massachusetts Department of Public Health, and is founder of the Northeast Cerebrovascular Consortium (NECC). Stein is ex-Chair of the NECC and reports nonfinancial support from the American Heart

Association; Myomo, Inc; Tyromotion, Inc; grants From Tibion, Inc; research support from Nexstim, Inc; and personal fees from QuantiaMD outside the submitted work. Sicklick chairs the NECC Rehabilitation Work Group. Magdon-Ismail is employed by the AHA. The GWTG program is funded by the AHA/American Stroke Association. The program is also supported in part by unrestricted educational grants to the AHA by Pfizer, Inc (New York, NY), Merck-Schering Plough Partnership (North Wales, PA), and the Pharmaceutical Roundtable, which did not participate in the design, analysis, preparation, or approval of this article. The other authors have nothing to disclose.

rehabilitation guidelines,¹⁻⁴ regional consortia recommendations for stroke care,⁵ and national standards for stroke care quality⁶⁻⁸ require that all individuals with stroke be “assessed for rehabilitation” in the acute care setting. Findings from the American Heart Association’s Get With The Guidelines-Stroke registry of more than 600,000 people sustaining strokes indicate that almost 90% of the patients with stroke at participating institutions had an assessment for rehabilitation documented, but how adherence is achieved across the more than 1300 participating hospitals is unclear.⁹ In the absence of an established standard for this assessment process, the lack of a generally accepted standardized assessment for rehabilitation, and the lack of objective clinical criteria for selecting appropriate rehabilitation services, it is likely that there is substantial variability in the process and quality of this assessment.

Although there are only limited data regarding the relative efficacy of different levels of rehabilitation, matching each patient with the optimal rehabilitation venue would appear beneficial for patients. The lack of clear guidelines for assessment and referral to rehabilitation services may contribute to variation in the types of rehabilitation provided to individuals with stroke, leading to suboptimal outcomes after stroke.

The purpose of this project was to pilot a formal assessment of rehabilitation needs that included standardized measures of function and sociodemographic factors known to influence referral and utilization of rehabilitation after an acute stroke. A secondary goal was to determine whether these factors were associated with referral to institution-based rehabilitation care compared with discharge home, and type of institution-based rehabilitation after hospital discharge (IRF vs SNF).

Methods

The Northeast Cerebrovascular Consortium (www.thenecc.org) was established in 2006 to improve systems of stroke care in its region (comprise of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont).⁵ Hospitals within the 8-state Northeast Cerebrovascular Consortium region participating in the Get With The Guidelines-Stroke program in 2009 (N = 254) were eligible to participate. Participation in this study was voluntary, and sites did not receive funding for their participation. Site recruitment began in January 2010 and continued through May 2011. Twenty-two hospitals participated in this pilot project, representing a convenience sample, with 15 large urban academic medical centers and 7 community hospitals.

Institutional review board

Data analysis was conducted at Duke University, which has approval to analyze the aggregate de-identified data. The institutional review board determined that this project was conducted on de-identified data and for quality improvement purposes and did not meet the regulatory definition of research.¹⁰

List of Abbreviations:

ADL	activities of daily living
BI	Barthel Index
CI	confidence interval
IRF	inpatient rehabilitation facility
OR	odds ratio
SNF	skilled nursing facility

Data collection

Participating hospitals prospectively collected data supplementing the standard Get With The Guidelines-Stroke data for patients with stroke admitted to each hospital over a 3-month period. Details regarding data collection for the Get With the Guidelines-Stroke database are reported elsewhere.¹¹ Data were collected by existing clinical staff, including nurses, physical and occupational therapists, and speech/language pathologists. Although guidance regarding data collection and coding was provided to all sites, no formal training was provided.

Sites were queried and selected in part on the basis of the nature of their routine collection and recording of data on patients with both ischemic and hemorrhagic strokes as part of their routine evaluation of disability and long-term care needs. Because of logistic limitations, sampling methodologies varied across participating hospitals, but there was no randomization or allocation scheme of cases for study entry. Data were collected on each subject at a single time point during the acute hospitalization. Although participating sites were encouraged to collect each subject’s data close to the time of hospital discharge, no specific requirement was established regarding the timing of data collection during the hospital stay. Seven patient data elements were added to supplement the standard Get With The Guidelines-Stroke database. Sociodemographic characteristics included educational attainment, previous living location, and caregiver availability in the home after discharge.^{12,13} Educational attainment was categorized as less than high school, high school diploma/GED, some college or associate degree, four-year college degree, or graduate degree. Previous living location was categorized as home, long-term care, or unable to determine/other. Caregiver availability was categorized as never, intermittent availability, or whenever needed or continuously available. Four measures of function were recorded, including the Barthel Index (BI), which includes 10 items and provides a score of 0 to 100 of activities of daily living (ADL) abilities.^{14,15} The Short Portable Mental Status Questionnaire is a 10-point scale, with a higher score indicating more severe cognitive impairment.¹⁶ Patients unable to answer items of the Short Portable Mental Status Questionnaire because of aphasia were scored as giving an incorrect answer. Prestroke disability was estimated using the modified Rankin scale on the basis of medical records and/or interview of the patient/caregiver.¹⁷⁻¹⁹ Each participating hospital received training over the phone to standardize the use of project instruments and coding instructions. Monthly all-site calls were available to answer questions and obtain feedback.

Outcome

The outcome of interest was discharge destination. Patients discharged home or home with home health services were coded as “home.” Discharge to all hospital-level rehabilitation programs, including freestanding IRFs, IRF units within an acute care hospital, and long-term acute care hospital, were coded as “IRF.” SNF included patients discharged to either a Medicare-certified SNF or a swing bed unit in an acute care hospital. The primary outcome of this study was discharge home compared with discharge to institution-based rehabilitation (SNF, IRF, or long-term acute care hospital). The secondary outcome was discharge to IRF compared with SNF among those who were not discharged home. Long-term acute care hospital patients were excluded from the secondary analysis.

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