ACRM
AMERICAN CONGRESS OF REHABILITATION MEDICINE

Archives of Physical Medicine and Rehabilitation

journal homepage: www.archives-pmr.org

Archives of Physical Medicine and Rehabilitation 2016;■:■■■-■■■

ORIGINAL RESEARCH

Do Falls Experienced During Inpatient Stroke Rehabilitation Affect Length of Stay, Functional Status, and Discharge Destination?

Jennifer S. Wong, MSc,[a,b] Dina Brooks, PhD,[a,b,c,d,e] Avril Mansfield, PhD[a,b,c,e,f]

From the [a]Toronto Rehabilitation Institute — University Health Network, Toronto, ON; [b]Rehabilitation Sciences Institute, University of Toronto, Toronto, ON; [c]Department of Physical Therapy, University of Toronto, Toronto, ON; [d]West Park Healthcare Centre, Toronto, ON; [e]Heart and Stroke Foundation Canadian Partnership for Stroke Recovery, Toronto, ON; and [f]Evaluative Clinical Sciences, Hurvitz Brain Sciences Research Program, Sunnybrook Research Institute, Toronto, ON, Canada.

Abstract

Objective: To compare length of stay, functional status, and discharge destination between individuals who fell during inpatient stroke rehabilitation and those who did not fall.

Design: Retrospective cohort study.

Setting: Rehabilitation hospital.

Participants: Individuals who fell during inpatient stroke rehabilitation (n=106; fallers group; mean age, 67.8±12.9y; mean time poststroke, 26.4±28.3d) were matched to individuals who did not fall (n=106; nonfallers group; mean age, 67.3±13.6y; mean time poststroke, 21.9±28.8d) on age and functional status (N=212).

Interventions: Not applicable.

Main Outcome Measures: Total length of stay, FIM assessed at discharge, and discharge destination.

Results: The mean length of stay for fallers was 11 days longer than nonfallers ($P=.0017$). Nonfallers and fallers did not differ on discharge total FIM scores ($P=.19$), and both groups were discharged home after inpatient rehabilitation (nonfallers: 77%; fallers: 74%; $P=.52$).

Conclusions: This study suggests that falls experienced during inpatient stroke rehabilitation may have contributed to a longer length of stay; however, falls did not affect discharge functional status or discharge destination.

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Falls are common poststroke, with 12% to 47% of individuals falling at least once during inpatient stroke rehabilitation.[1-5] Individual risk factors for falls among stroke survivors are numerous and interrelated[6] and can include impaired performance of activities of daily living,[1,3,4] inability to transfer,[7] decreased balance control,[5,8] and not following instructions.[2,9] Falls after stroke can have significant immediate physical and psychological consequences,[10] including injuries[2-4,11] (eg, hip fractures[12]), fear of falling,[13] reduced physical activity,[11] and depression.[14] In-hospital falls have been identified as one of the most common medical complications after stroke,[15,16] which can negatively influence stroke rehabilitation and recovery.[2]

Inpatient rehabilitation is a health care setting where patients are focused on improving function and maximizing their abilities. It is typically delivered during the subacute stage of stroke recovery (ie, <3mo poststroke) when patients are likely to receive the most benefit from intensive therapy.[17,18] Unfortunately, there is limited available evidence for the effectiveness of falls prevention interventions after stroke across acute care, rehabilitation, community, and institutional care settings.[19,20] Therefore, the incidence of falls will remain of concern because it may not be possible to prevent every fall.

Presented in part to the Ontario Injury Prevention Resource Centre, the BC Injury Research and Prevention Unit, and the Toronto Rehabilitation Institute, May 27, 2014, Toronto, ON, Canada.

Supported by the Toronto Rehabilitation Institute; the Canada Foundation for Innovation; the Ontario Innovation Trust; the Ministry of Research and Innovation; a Toronto Rehabilitation Institute Student Scholarship (Ontario Student Opportunity Trust Funds); a Canada Research Chair; and a New Investigator Award from the Canadian Institutes of Health Research (award no. MSH-141983).

The views expressed do not necessarily reflect those of the funders.

Disclosures: none.

0003-9993/16/$36 - see front matter © 2016 by the American Congress of Rehabilitation Medicine
http://dx.doi.org/10.1016/j.apmr.2015.12.005

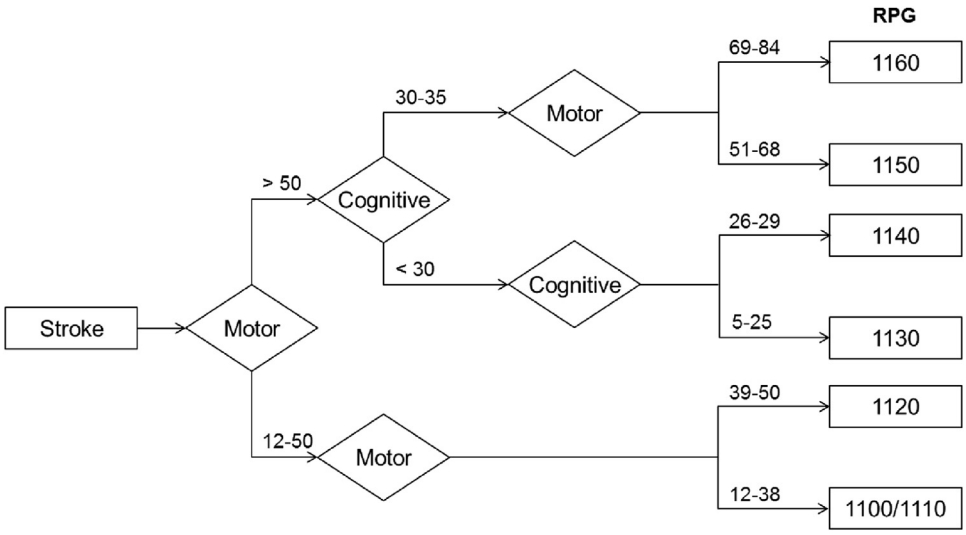

Fig 1 RPG classification system. The RPG algorithm is based on admission FIM scores, using the motor FIM score (minus tub/shower transfer) and cognitive FIM score to divide patients into groups. Each RPG is then used to predict performance measures (eg, LOS) and resource utilization. The RPG algorithm was established by the Ontario Joint Policy and Planning Committee[24] and was modified by combining the 2 lowest functioning groups for the purpose of this study. Abbreviation: RPG, Rehabilitation Patient Group.

Little evidence exists on the effect of falls on rehabilitation outcomes; therefore, it is important to understand the effect that falls have on the course of patient recovery and delivery of care during the critical subacute phase of stroke. The primary objective of this study was to compare length of stay (LOS), functional status, and discharge destination between individuals who fell during inpatient stroke rehabilitation and those who did not fall. It was hypothesized that patients who fell would have poorer recovery than those who did not fall. This would be demonstrated by a longer LOS, worse functional outcomes at discharge, and less likely to be discharged home after the rehabilitation stay among individuals who fell.

Methods

Study design

A retrospective cohort study involving a chart review was conducted. The chart review involved consecutive admissions to the specialized stroke unit at the Toronto Rehabilitation Institute from October 1, 2009, to September 30, 2012. The Toronto Rehabilitation Institute Research Ethics Board approved this study, and a waiver of patient consent for the purpose of this review was obtained.

Participants

The inpatient stroke rehabilitation unit housed 20 to 23 beds during the time of data collection and admitted patients who were medically stable and had the endurance to participate in the program. Patients received multidisciplinary care, including individualized physiotherapy, occupational therapy, and speech-language therapy for 1 hour per discipline per day, 5 days per week, over a typical LOS of 4 to 6 weeks. Excluding duplicate admissions for another stroke and individuals without imaging (n=20), 504 patients with confirmed stroke were admitted to the stroke unit during the 3-year period. Patients were excluded from the analysis if they were not living at home before their acute stroke hospitalization (n=18) or if their FIM[21] scores on admission were missing (n=17). The study sample was created by matching all individuals who fell at least once during inpatient rehabilitation (ie, fallers) with a randomly selected sample of individuals who did not fall (ie, nonfallers). A fall was defined as any time an individual came to rest unintentionally on the ground, floor, or other lower level.[22] Matching was necessary because, on average, fallers and nonfallers tend to differ on measures of function and impairment on admission that are predictive of the current study's primary outcomes.[5,23] The sample of nonfallers was matched to fallers by stratified random sampling according to the Rehabilitation Patient Group and age. The Rehabilitation Patient Group algorithm was developed to provide a case-mix classification system to estimate inpatient rehabilitation costs and is often used to determine LOS (ie, one of the primary outcomes).[24] Admission FIM scores and age (ie, <40, 40–59, 60–79, ≥80y) were used to stratify all individuals. Because of the distribution of the study sample, the 2 lowest Rehabilitation Patient Group categories from the original algorithm were combined, representing patients with a motor score of 12 to 38, leaving 6 possible Rehabilitation Patient Group categories (fig 1).

List of abbreviations:

ALC alternate level of care
BBS Berg Balance Scale
LOS length of stay

Data extraction

All data were recorded in patients' clinical charts during their rehabilitation stay by clinical staff (medical and allied health professionals) and extracted by trained research staff using a chart review form. Data were checked for inconsistencies and logical errors that may have arisen because of errors in extraction and were corrected, as necessary. The following variables were extracted to describe the cohort: age, sex, Berg Balance Scale (BBS)[25] score on admission, and date and type of stroke. Falls