Association of Urinary Incontinence with Cognition, Transfers and Discharge Destination in Acute Stroke Inpatient Rehabilitation

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Background: Acute-stroke prognostic indicators remain controversial including relationship of urinary incontinence with outcomes in cognition, transfers, and discharge destination. *Objective:* To examine if urinary incontinence is associated with inpatient-rehabilitation (IR) outcomes in cognition, transfers, and discharge destinations. *Design:* Retrospective observational study of 303 of 579(52%) acute-stroke patients admitted to IR 2012-2015 with complete urinary incontinence (total assistance for bladder management). Discharge Functional Independence Measure (FIM) scores were correlated for continence, cognition, transfers-(bed/chair/wheelchair), and discharge destination. *Results:* Patients were admitted to IR on average 7.4 days after acute stroke. Average length-of-stay in IR was 14 days. At discharge 118 of 303(39%) remained urinary incontinent (total assistance). Continence/bladder-management FIM scores at discharge were associated with cognition FIM scores at discharge (chi square =105.8; $P < .0001$), and associated with transfer FIM scores at discharge (chi square = 153.1; $P < .0001$). Patients total to moderate assistance for continence at discharge included greater percentage that were dependent to moderate assistance for cognition and transfers than those minimal assistance to independent for continence. Continence/bladder-management FIM scores at discharge were associated with discharge disposition destinations (chi square = 29.98; $P < .002$). Patients total to moderate assistance for continence at discharge included greater percentage of acute care transfers, and skilled-nursing-facility dispositions, than patients that recovered to minimal assist to independent for continence. Urinary-incontinence recovery to minimal assistance to independent was associated with a home/community disposition rate of 82%. *Conclusions:* 52% stroke patients were total assistance with bladder management for urinary incontinence on IR admission. Partial to complete continence recovery occurred in 61%. Continence/bladder-management FIM scores at discharge were associated with cognition and transfer FIM scores, and discharge destinations.

Key Words: Stroke—urinary incontinence—rehabilitation—outcome assessment—prognosis—discharge destination

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Introduction

Nearly 800,000 strokes occur in the United States each year, resulting in approximately $34 billion in direct and indirect annual costs that include the costs of medical complications, and institutional care.[1,2] Two thirds of strokes occur in individuals aged more than 65 years.[3] The U.S. population >65 years of age is projected to more than double to 92 million by 2060.[4] Thus the prevalence of Americans living with stroke is expected to gradually increase as the U.S. population ages, as will the related costs. In an effort to manage costs while improving care, prognostic indicators may be useful poststroke, to identify patients who may benefit most from inpatient rehabilitation (IR), to identify those at risk for medical complications and institutionalization, and to determine interventions that will improve outcomes.

Age, dysphagia, National Institutes of Health Stroke Scale scores, cognition, and initial functional level after stroke (including transfers and continence) are factors that have been found to have an association with postacute stroke prognosis, functional outcomes and discharge dispositions.[5-10] Poststroke urinary incontinence (UI) is common, affecting more than one third of acute stroke patients, and persisting in up to 25% at 1 year.[7] The presence of impaired cognition, UI and/or the need for help with transfers at the time of discharge from acute care is particularly associated with a higher likelihood of an adverse outcome, including an unfavorable discharge disposition location from acute care after a stroke.[6] Furthermore, low Functional Independence Measure (FIM) scores, and UI are among the factors that may be predictive of poorer outcomes on admission to IR.[5,8-9] However, a gap exists in the medical literature since the published studies do not specifically examine the impact of various poststroke impairments, such as UI, in relation to postacute IR functional outcomes, and discharge disposition destinations. Thus the purpose of this study is to examine if UI recovery or lack of recovery, during IR is associated with rehabilitation outcomes in cognition, transfers, and discharge disposition destinations after an acute stroke.

Methods

This is a retrospective observational study done at an IR facility. Participants included 303 of 579 (52%) of acute stroke patients admitted to IR from calendar years 2012 through 2015 with complete UI. There were no exclusion criteria apart from complete UI on admission, defined as a bladder management FIM score of 1 indicating need for total assistance with bladder management and urinary sphincter control. All acute stroke patients admitted to the inpatient IR facility regardless of stroke type, location or any other clinical or demographic factor were included in this study if they were admitted with a bladder management FIM score of 1. Average length-of-stay in IR was 14 days. Average days in acute care prior to admission to IR post onset of acute stroke were approximately 7.4 days.

Four groups were compared at discharge based on continence/bladder-management FIM scores at discharge. The main outcome measure of this study was comparison between groups of discharge cognition, urinary continence, and transfers-(bed/chair/wheelchair) FIM scores, and postacute disposition locations. Possible postacute disposition locations included home/community, skilled nursing facilities (SNF), or back to an acute care hospital. Cognition FIM score was obtained as a cognitive skills average FIM score from FIM scores for comprehension, expression, social interaction, problem solving, and memory. All data were obtained from the Uniform Data Systems for Medical Rehabilitation (UDSMR) Rehab Metrics Reports, and Patient Profiles searching for those patients that were admitted to the facility with bladder management scores of 1 indicating total assistance with bladder management and complete UI. All facility FIM raters were certified by UDSMR and are recredentialed biannually. This study was approved by the hospital's Clinical Research Review Committee.

The MedCalc Version 14 statistical package (MedCalc Software bvba, Ostend, Belgium) was used for all analyses; $P < .05$ was the level of significance for comparisons. Aggregate data (means/standard deviations/percentages) were used for all calculations. All empirical/clinical data were obtained from UDSMR, average scores were calculated, and data was grouped for comparison. There were 4 main comparison groups that included: (1) those patients having bladder management FIM scores of 1 indicating a need for total assistance for continence at IR discharge, and no UI recovery; (2) those patients having bladder management FIM scores of 2-3 indicating maximal to moderate assistance for continence at IR discharge; (3) those patients having bladder management FIM scores of 4-5 indicating those patients in whom UI improved to a minimal assist to supervision level at IR discharge; and (4) those patients having bladder management FIM scores of 6-7 indicating those patients in whom UI improved to a modified independent or independent level at IR discharge. These 4 groups were then compared for FIM scores at discharge for cognition, and transfers-(bed/chair/wheelchair), and also compared for discharge disposition locations. Chi-square analyses were computed comparing the categorical groups used in this study.

Results

Fifty-two percent of acute-stroke patients (N = 303) had complete UI on IR admission. At discharge 118 of 303, 39%, remained bladder incontinent (total assist), while UI recovered at least partially in 185 of 303, (61%).

Continence at discharge was associated with cognition FIMs at discharge (chi square = 105.8; $P < .0001$). Patients with total to moderate assistance for continence at