One-Leg Standing Time of the Affected Side Moderately Predicts for Postdischarge Falls in Community Stroke Patients

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Background: The purpose of the present study was to investigate the predictive accuracy of one-leg standing time at hospital discharge on falls in stroke patients. *Methods:* This was a retrospective cohort study. Participants included stroke patients (n = 65) who could walk when discharged from inpatient rehabilitation ward. To investigate the relationship between one-leg standing time and falls, logistic analysis was utilized with a criterion variable including the presence or absence of falls after 1-year hospital discharge as well as explanatory variables including Brunnstrom stage, knee extension strength on the affected side, Barthel Index, 10-m walking speed, and one-leg standing time on both sides. The accuracy of prediction by one-leg standing time was measured by the area under the curve of the receiver operating characteristic curve. *Results:* Among the 65 patients, 38 (58.5%) experienced a fall 1 year after discharge. One-leg standing time of the affected side was not significantly associated with the falls (odds ratio: .89; 95% confidence interval: .79-1.01). When the fall incidents were assessed by area under the curve of the receiver operating characteristic curve, one-leg standing time of the affected side was observed to have increased marginally to .93 (95% confidence interval: .87-.99) as compared to the traditional prediction mode area under the curve (area under the curve .88; 95% confidence interval: .81-.97). *Conclusions:* One-leg standing time of the affected side may be considered as a moderately effective and simple assessment method for predicting postdischarge falls in a clinical setting. **Key Words:** Stroke—fall—one-leg standing time—simple assessment.
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Introduction

Falls are a secondary complication in chronic stroke patients. The incidence rate of falls that occur within 1 year after hospital discharge is 35%-60%.[1-8] Falls in stroke patients may cause hip fractures that lead to the deterioration of their ambulatory function, increasing their dependence on assistance with activities of daily living.[9]

The ability to predict falls in stroke patients after hospital discharge may make it possible to implement countermeasures to prevent falls earlier in patients at a high risk of falling. This may decrease the incidence of falls and fractures after stroke. Prior research in various countries has investigated methods of fall prediction in community-dwelling stroke patients. Some of the assessment tools commonly used are the Berg Balance Scale (BBS),[1-5] Performance-Oriented Mobility Assessment

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(POMA),[10] Falls Efficacy Scale (FES),[6,7,11] Timed Up and Go Test (TUGT),[2,4,11] Functional Reach Test (FRT),[3] 6-minute walk test,[7] Four Square Step Test (FSST),[7] 10-m walking speed,[12] Barthel Index (BI),[13] and knee extension strength on the affected side.[12] BBS, POMA, FES, and BI are comprehensive balance assessments that assess multiple individual tasks in which these individual scores are summed to create a composite score. The sensitivity and specificity of these assessment tools are 80% or higher.[1] However, because these assessments require considerable time due to the multiple tasks, they are not frequently used in clinical practice.[14] Single tasks, such as TUGT, FRT, 6-minute walk test, FSST, 10-m walking speed, and knee extension strength on the affected side, allow to be easily and rapidly assessed, but their validity in fall prediction is lower.[7,12] Assessment tools for fall prediction should be able to predict falls accurately as well as be quick and easy to administer.

One-leg standing time is an easy and quick balance assessment measurement. A prior cohort study reported that a decrease in one-leg standing time was associated with falling in the elderly.[15] However, no report has validated the effectiveness of one-leg standing time for predicting falls in stroke patients.

Therefore, the purpose of the present study was to investigate the predictive accuracy of one-leg standing time at hospital discharge on falls in stroke patients.

Methods

Participants

The participants were 65 patients with hemiplegia from stroke who underwent rehabilitation at Koseinenkin Kochi Rehabilitation Hospital between years 2010 and 2012 (Fig 1).

The following were the inclusion criteria: (1) diagnosis of brain infarction or hemorrhage; (2) independent with walking at discharge (walking item score in the functional independence measure, 6 or higher)[16]; (3) Mini-Mental State Examination score of 24 or higher at discharge[17]; (4) return to their homes after discharge from the facility; and (5) able to investigate their fall status 1 year after discharge. The subjects were selected from medical records by an employee of the hospital not associated with this study.

All the subjects were hospitalized at the facility within 3 months after the onset of stroke and underwent continuous physical and occupational therapies for 40-60 minutes a day, 5 days a week, for 2-3 months after

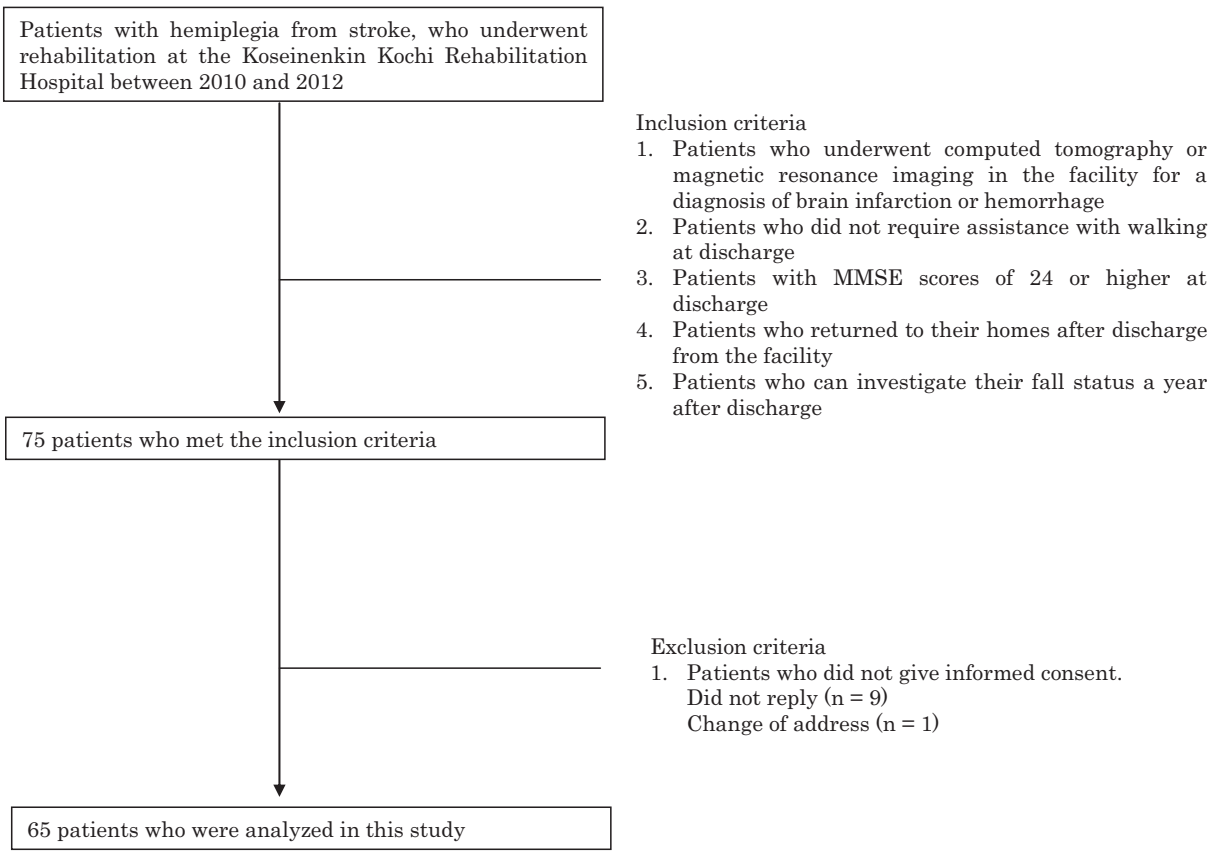

Figure 1. *Procedure of selection of participants. Abbreviation: MMSE, Mini-Mental State Examination.*

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