News Release

Title

In-Hospital Fall Risk Prediction by Objective Measurement of Lower Extremity Function in a High-Risk Population

Key Points

- Lower extremity dysfunction was a factor that increased the risk of falls during hospitalization in patients admitted to a ward with high incidence rates of falls.
- The risk of falling was 8.8 times greater in patients with severely impaired lower extremity function than in patients with normal lower extremity function.
- Objective assessment of lower extremity function is important for predicting the clinical course of patients at high risk for falls after admission.

Summary

Prof. Yoshimasa Nagao in Department of Patient Safety, Nagoya University Hospital, Dr. Takahiro Imaizumi (corresponding author) in Department of Advanced Medicine, Dr. Yusuke Suzuki in Department of Community Healthcare and Geriatrics, Prof. Yoshihiro Nishida and Mr. Shinya Tanaka (first author) in Department of Rehabilitation, Prof. Masahisa Katsuno in Department of Neurology of the same University, and their colleagues revealed the relationship between lower extremity function and in-hospital falls in high-risk population.

Approximately one third of community-dwelling older adults experience falls each year, and injuries related to falls are major causes of mortality, morbidity, and disability in this population. The guidelines for falls prevention recommend assessment of standing balance, gait speed, and muscle strength to determine the level of risk.

In the present study, lower physical function was associated with higher incidence of in-hospital falls, and fall rates tended to be higher in patients with poor lower limb muscle strength and standing balance regardless of walking ability. Physical function was complementary to previously identified risk factors for prediction of fall risk. These observations suggested that SPPB may be useful for stratification of fall risk in a high-risk population. It is important to accurately assess physical performance because it can be targeted for treatment with various interventions, including nutritional recommendations and exercise therapy. The results of this study may contribute to the

development of risk stratification and intervention methods to improve the clinical course of patients at high risk of in-hospital falls.

The study has been published online in the scientific journal “Journal of the American Medical Directors Association” on August 23, 2023. This work was supported by the Research funding from the Aichi Society for Physical Therapy to promote research, and the Japan Society for the Promotion of Science Grant-in-Aid.

Research Background

Approximately one third of community-dwelling older adults experience falls each year, and injuries related to falls are major causes of mortality, morbidity, and disability in this population. The most recent guidelines for falls prevention recommend that all hospitalized older adults or younger adults identified by health care professionals as at risk of falls should be provided with personalized single or multi-disciplinary fall prevention strategies.

Fall risk can be predicted most consistently by physical dysfunction, along with medications, cognitive decline, and cardiovascular dysfunction. Lower extremity function in older adults is commonly assessed using the Short Physical Performance Battery (SPPB), which includes tests of standing balance, gait speed, and lower limb muscle strength. Capable of predicting a range of outcomes including the risks of falls, frailty, and mortality among primary care patients, and assisted living or nursing home residents. The research group investigated whether SPPB can predict in-hospital falls in a high-risk population.

Research Results

The study population consisted of 1,200 consecutive patients with a median age of 74 years (50.8% men) admitted to a ward with high incidence rates of falls, primarily in the departments of geriatrics and neurology, in Nagoya University hospital between January 2019 and December 2021. SPPB was measured after treatment in the acute phase, and the cohort was divided into five groups according to SPPB score: 0, unable to perform SPPB (28%); 1–3, severe disability (22%); 4–6, moderate disability (14%); 7–9, mild disability (14%); 10–12, normal (22%). As the primary end point of the study, the incidence of in-hospital falls was examined prospectively based on data from mandatory standardized incident report forms and electronic patient records.

A total of 101 patients experienced falls (8.4%), including 15 injurious falls (1.2%), over a median length of hospital stay of 15 days. SPPB score ≤ 6 points was associated with increased rate of in-hospital falls, and the rate exceeded

10% with SPPB score ≤ 3 points.

The fall rate tended to be higher with low scores of lower limb muscle strength and standing balance, independent of the walk score. Lower SPPB score also showed significant associations with higher in-hospital injurious falls, lower activities of daily living at discharge, higher rates of hospital-acquired disability, longer length of hospital stay, lower rates of discharge home, and higher in-hospital mortality rate. In comparison to patients with normal function (SPPB score: 10–12), the risks of falls were significantly higher in patients with moderate disability (SPPB score: 4–6; 4.66 times higher), severe disability (SPPB score: 1–3; 8.78 times higher), and those unable to perform SPPB (SPPB score: 0; 6.20 times higher) (Figure 1). In addition, the SPPB was complementary to previously identified risk factors for prediction of fall risk. These observations suggested that SPPB may be useful for stratification of fall risk in patients at high risk of in-hospital falls.

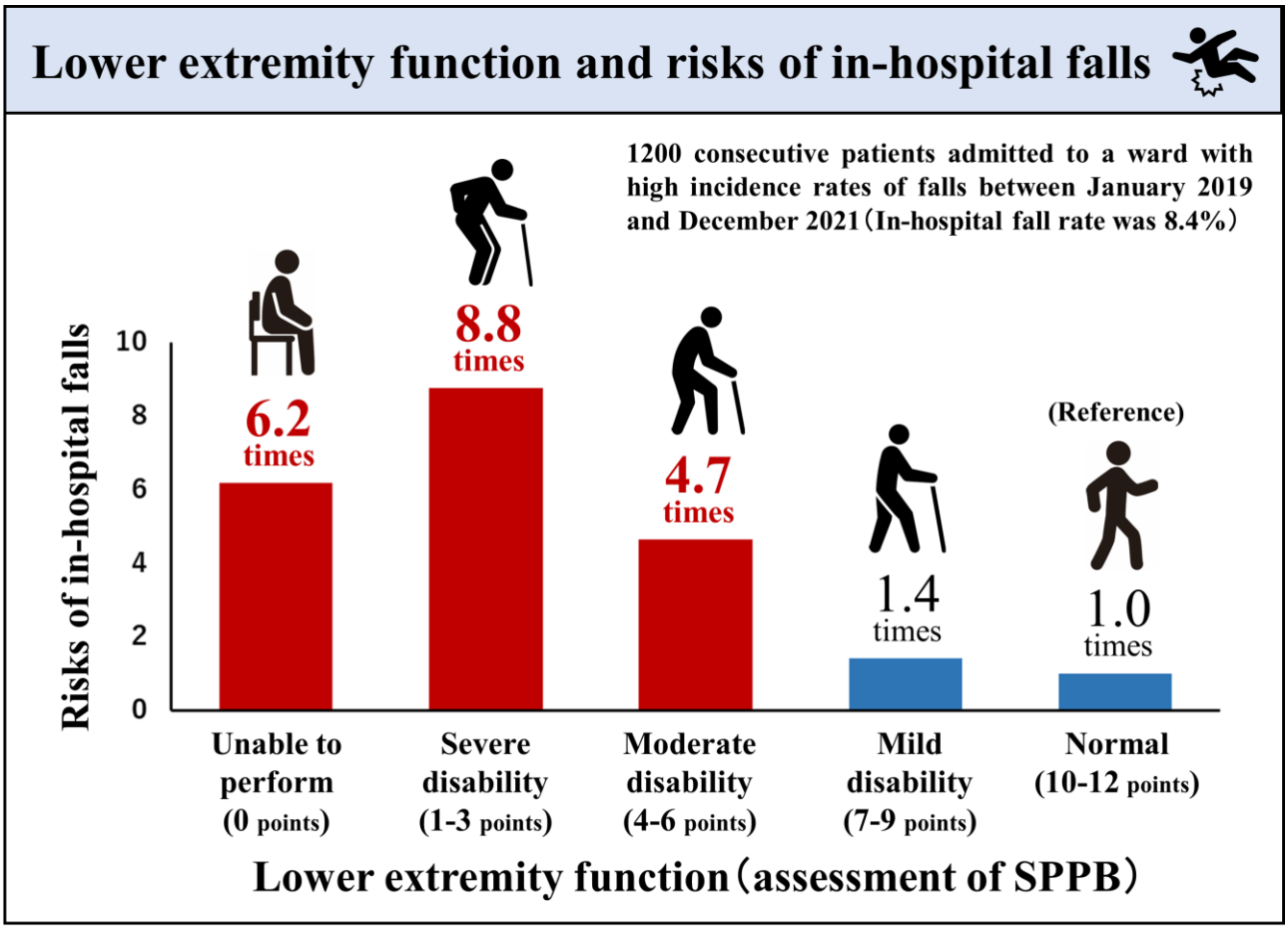

Figure 1. Association between lower extremity function and in-hospital falls. Poorer physical performance is associated with higher in-hospital falls in patients at high-risk of falls.

Research Summary and Future Perspective

Our results showed that poorer physical performance is shown to be associated with higher in-hospital falls in high-risk population. The results presented here support use of the SPPB for screening in hospital settings to reduce the risk of in-hospital falls. Physical performance status may allow more accurate prediction of prognosis and facilitate targeted interventions in these patients. It is unclear whether improvements in physical function can reduce risk of in-hospital falls. Therefore, further studies are required to facilitate future clinical decision making in high-risk populations.

Publication

Journal of the American Medical Directors Association
In-Hospital Fall Risk Prediction by Objective Measurement of Lower Extremity Function in a High-Risk Population

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DOI: 10.1016/j.jamda.2023.07.020

Japanese ver.
https://www.med.nagoya-u.ac.jp/medical J/research/pdf/Jou 230905.pdf