

Quick and easy arm test accurately identifies markers of frailty in older adults facing surgery

May 4 2016



A novel wearable arm device, which uses sensors found in cell phones, can rapidly and accurately identify physiological frailty in older adults. Credit: Baylor College of Medicine

A simple arm test that employs a novel wearable technology can rapidly and accurately identify physiological frailty in older adults, according to study results published online in the *Journal of the American College of Surgeons* in advance of print publication.

Older adults undergo 35.3 percent of inpatient procedures and 32.1

percent of outpatient procedures in the United States, according to the National Hospital Discharge Survey. As the population continues to age, and the rate of surgical procedures in [older adults](#) is likely to increase, accurate tools to assess risk of adverse outcomes are more necessary than ever. Frailty—a condition characterized by weight loss, weakness, and lack of physical resiliency—is how a physician tells whether an aging patient is healthy and could probably recover from an operation.

Although frailty is one indicator of postoperative complications and disability, a quick and simple frailty assessment tool is not yet available for trauma settings. The aim of this study was to find out if a biotechnology-based test was a reliable and practical tool when used on bed-bound trauma patients.

Researchers at Baylor College of Medicine, Houston, and University of Arizona, Tucson, developed a 20-second upper arm extension test (called upper extremity frailty: UEF system) to assess biomarkers of frailty such as slowness of motion, weakness, and exhaustion. The research team previously validated this novel wearable technology, which uses sensors found in cell phones in community-dwelling older adults.

"This test provides valuable information to help trauma surgeons decide whether a patient can tolerate an operation, how long they should keep a patient in the hospital, how they should manage the discharge process, specifically, whether the patient should go home or to a nursing facility," said study investigator Bijan Najafi, PhD, professor of surgery and director of the Interdisciplinary Consortium on Advanced Motion Performance (iCAMP) at Baylor College of Medicine.

The study involved 101 patients, 65 years and older, who had been admitted to the hospital due to traumatic falls. Frailty was measured using the Trauma-Specific Frailty Index (TSFI), a questionnaire that is considered the gold standard for assessing this disabling condition. (The

downside of the TSFI is that it is a subjective and time-consuming tool that is difficult to use for routine care in busy hospitals). The patients then performed the 20-second arm extension test while wearing the UEF system. The agreement between UEF score and TSFI was quantified using the Pearson Correlation test, which yields a correlation score (r-value) with a range from -1.0 to 1.0, whereby the value closer to one equals perfect agreement with the TSFI, meaning that both measures are exactly the same.

The data showed a high agreement ($r=0.72$; an r value greater than 0.7 is considered to be high agreement) between the TSFI score and UEF system. The second research goal was to evaluate the traditional patient who cannot undergo the standard walking test, by using this technology as an alternative measure. The timed walking test (gait assessment) involves instructing a patient to stand from a chair, walk 10 feet, then return to the chair and sit. In the study, 57 percent of the patients were not able to walk at the time the measurements were taken.

"The study demonstrated that we can get the similar results as gait assessment by testing the kinematic and kinetic of the upper arm and [elbow flexion](#) extension," Dr. Najafi said. "This finding is very valuable because gait assessment is often not practical in a busy hospital setting. Even if patients can stand up and walk, usually there is often no adequate space in a hospital that can be used for gait assessment without distraction. Therefore, having an alternate modality that can deliver similar results could be very important for the evaluation of frailty, moving ability and the prediction of adverse events."

The researchers also performed the test to predict the moving ability of patients before admission to the hospital. The data showed significant correlations between UEF markers and the number of falls patients had within a prior year. The highest correlation was seen for elbow flexion slowness ($r=0.41$; this value shows the correlation is significant).

"Despite the fact that the test is very simple and convenient, we have demonstrated very promising results compared to other conventional tests that have been used," Dr. Najafi said. "We are using bio sensors in an innovative way. There is a big gap in the medical field for this type of tool, and we hope to close this gap."

The researchers recently received a National Institutes of Health grant to continue this study in a larger hospital population.

In addition to Dr. Najafi, other study coauthors include Nima Toosizadeh, PhD; Bellal Joseph, MD, FACS; Michelle R. Heusser, BSc; Tahereh Orouji Jokar, MD; Jane Mohler, PhD; and Herb A. Phelan, MD, FACS.

Partial support for this study was provided by the NIH/National Institute for Biomedical Imaging and Bioengineering (award number 1R25EB012973), National Institute on Aging (5R44AG050338-02) and the Flinn Foundation (award number 1907).

More information: Nima Toosizadeh et al, Assessing Upper-Extremity Motion: An Innovative, Objective Method to Identify Frailty in Older Bed-Bound Trauma Patients, *Journal of the American College of Surgeons* (2016). [DOI: 10.1016/j.jamcollsurg.2016.03.030](https://doi.org/10.1016/j.jamcollsurg.2016.03.030)

Provided by American College of Surgeons

Citation: Quick and easy arm test accurately identifies markers of frailty in older adults facing surgery (2016, May 4) retrieved 25 April 2024 from <https://medicalxpress.com/news/2016-05-quick-easy-arm-accurately-markers.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private

study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.