Year-Long Home Exercise Program After Hip Fracture Is Feasible But May Lack Benefit

Orwig DL, Hochberg M, Yu-Yahiro J, et al. Delivery and outcomes of a yearlong home exercise program after hip fracture. Arch Intern Med 2011;171:323–31.

Study Overview

Objective. To test the feasibility and efficacy of a year-long home-based exercise program in older women after hip fracture.

Design. Randomized controlled trial.

Setting and participants. 180 community-dwelling older women aged 65 and older who were admitted to 1 of the 3 hospitals in the Baltimore Hip Studies (BHS) network within 72 hours of a hip fracture. Patients were recruited between 1998 and 2004 within 15 days of the fracture. Patients with pathologic fractures; cardiovascular, neurologic, and respiratory diseases that could interfere with exercising independently at home; and conditions that increased risk of falling while exercising independently were excluded. Participants had to be cognitively intact. Participants also had to complete at least 80% of the baseline survey to be randomized. Patients were randomized to Exercise Plus or usual care.

Intervention. The Exercise Plus program included an exercise component initiated by exercise trainers at the participant's postacute discharge location, and a motivational component to help optimize program adherence. Participants had trainer-supervised sessions 3 times per week during the first 2 months and then 2 times per week for 2 months, followed by once a week and once every other week for a maximum of 56 supervised sessions throughout the year. These sessions include aerobic stepping exercise, strengthening program using Thera-Band products and stretching exercises with 20- to 30-minute warm-up and cool-down periods. Participants were expected to perform at least 3 days a week of aerobic exercise and 2 days a week of strength training. Usual care included hospital stays and 2 to 4 weeks of rehabilitation.

Main outcome measures. The primary outcome was bone mineral density at the contralateral femur. Secondary outcomes included total lean body mass and fat mass measured using whole-body dual energy x-ray absorptiometry (DEXA); physical activity measured using the Yale Physical Activity Scale; hours spent exercising and calories expended per week; 6-minute walk test (maximal distance walked in 6 minutes); lower extremity performance using the Lower Extremity Gain Scale that evaluated performance of lower-extremity tasks considered important for patients with hip fracture; a single chair rise time and timed walk; grip strength;

Outcomes Research in Review Section Editors

Jason P. Block, MD, MPH
Brigham and Women's Hospital
Boston, MA

Asaf Bitton, MD, MPH
Brigham and Women's Hospital
Boston, MA

Ula Hwang, MD, MPH
Mount Sinai School of Medicine
New York, NY

Maya Vijayaraghavan, MD
University of California, San Diego
San Diego, CA

Melanie Jay, MD, MS
NYU School of Medicine
New York, NY

William Hung, MD, MPH
Mount Sinai School of Medicine
New York, NY

functional status including activities of daily living and instrumental activities of daily living with scales modified for use in hip fracture patients; Geriatric Depression Scale; and Short-Form Health Survey (SF-36). Outcomes were measured at 2, 6, and 12 months.

Main results. 82% of the participants randomized to the Exercise Plus program received follow-up visits by an exercise trainer, whereas 18% refused. The mean number of visits received by participants randomized to exercise was 36; among those agreeing to visits in the Exercise Plus program, they received a mean of 79% visits over the year. The proportion of participants in the intervention group with adverse events including falls, hospital admissions, and death, was not different from controls. The mean reported time engaged in exercise was higher among participants in the intervention group compared with controls, by 0.59 hours per week at 2 months (95% CI, 0.15–1.33), 0.77 hours at 6 months (95% CI, 0.03–1.50) and 0.68 hours at 12 months (95% CI, 0.05–1.41). Participants in the intervention group also expended more kilocalories in exercise activities compared with controls (169.9 kcals per week at 12 months after fracture [95% CI, 31.9–371.6]). For the primary outcome of bone mineral density, there was no statistically significant difference between intervention and control group. Also for secondary outcomes, there was no difference in fat mass, physical performance tests, including gait, grip and chair rise, functional status, SF-36, or geriatric depressions scale between intervention and control groups.

Conclusion. Although the exercise program is feasible and safe, it offers no benefit in physical performance, functional, and health status except increases in exercise time and energy expenditure from exercise.

Commentary

Hip fracture affects more than 320,000 older adults annually in the United States, and incidence is expected to increase as the population ages [1]. Older adults suffering from hip fractures often experience devastating outcomes of function loss, institutionalization, and death. Rehabilitation is a mainstay of treatment after hip fracture. Although incorporating supervised rehabilitation exercises in hip fracture care is the current standard of care, the role of a prolonged exercise program on hip fracture outcomes is not clear. In this study, a year-long exercise program was tested for its feasibility and efficacy for patients who suffered hip fractures.

Although the program was found to be feasible with good adherence and few adverse effects, the overall effect of the intervention was somewhat disappointing, particularly considering that this is a time-intensive program with good adherence. The study investigators suggested that the participants in the study may have been functioning at too high a level to benefit from the program. As reflected in the overall survival rate, the study population may not be representative of hip fracture patients in general. In addition, there are multiple factors and care elements both prior to hip fracture repair and after that may contribute to recovery [2]. These elements, such as timing of surgery, anesthesia, pain control, and early mobilization after repair, may need to be standardized in order for the effect of other modalities such as this program to be determined.

Prior studies of rehabilitation and exercise programs after hip fracture varied greatly in terms of the program elements, length, intensity, location of delivery, and other aspects. A prior study found that extended outpatient rehabilitation for 6 months may improve physical function and quality of life compared with home exercise [3]. Thus, the effects of the Exercise Plus program may be limited because it was a low-intensity home-based program. In a high-functioning group of hip fracture patients such as those in the study population, home-based exercise, though convenient, may not be the best way to maximize functional recovery. Further studies need to delineate how programs can be tailored to patients based on their tolerance of exercise after hip fracture so that patient recovery can be maximized.

Applications for Clinical Practice

Recovery from hip fracture is often prolonged, and continued exercise for a prolonged period after hip fracture may further improve patient outcomes if tolerated. This study has highlighted the feasibility of a home-based program of 12 months' duration and the effect of increasing exercise time and energy expenditure. However, it failed to demonstrate any further benefits. Although there may be a role for extended exercise programs after hip fracture, further studies need to demonstrate in whom it may be best used. In view of the likely costs and lack of benefit of the program,

the study results do not support the overall adoption of the Exercise Plus program in hip fracture patients.

–Review by William Hung, MD, MPH

References

1. National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention. Hip fracture among older adults. Atlanta: Centers for Disease Control and Prevention; 2008. Accessed at www.cdc.gov/ncipc/factsheets/adulthipfx.htm.
2. Hung WW, Morrison RS. Hip fracture: a complex illness among complex patients. Ann Intern Med 2011;155:267–8.
3. Binder EF, Brown M, Sinacore DR, et al. Effects of extended outpatient rehabilitation after hip fracture. JAMA 2004;292:837–46.

Copyright 2011 by Turner White Communications Inc., Wayne, PA. All rights reserved.