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Review Article

Effects of Geriatric Team Rehabilitation After Hip Fracture: Meta-Analysis of Randomized Controlled Trials

Peter Nordström MD, PhD [a,*], Karl-Gunnar Thorngren MD, PhD [b], Ami Hommel PhD [b], Lena Ziden PhD [c], Sten Anttila PhD [d]

[a] *Department of Community Medicine and Rehabilitation, Geriatrics, Umeå University, Umeå, Sweden*
[b] *Department of Clinical Sciences, Orthopedics, Lund University, Lund, Sweden*
[c] *Department of Clinical Neuroscience and Rehabilitation, the Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden*
[d] *Swedish Agency for Health Technology Assessment and Assessment of Social Services, Stockholm, Sweden*

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A B S T R A C T

Objective: Systematic rehabilitation by geriatric interdisciplinary teams has been associated with favorable outcomes in frail older patients. The aim of the present meta-analysis was to evaluate the effects of interdisciplinary geriatric team rehabilitation in older patients with hip fracture.

Design, setting, and participants: Randomized controlled trials involving participants sustaining hip fractures at the age of 65 years or older were included. Included trials evaluated effects of interdisciplinary geriatric team rehabilitation compared with usual postoperative care and reported on at least one of the following outcomes: activities of daily living (ADLs), physical function, mobility, depression, cognitive function, discharge to home, quality of life, influence on relatives, complications, and survival. Seven studies of at least moderate quality with a total of 1763 participants were included.

Measures: Data were combined using a random-effects model. The GRADE system (1–4, where 4 is highest level of evidence) was used to rate the quality of the estimates.

Results: Outcomes were grouped into 4 categories, each of which was reported on in at least 4 studies: ADL/physical function, mobility, living in one's own home, and survival. Interdisciplinary geriatric team rehabilitation increased ADL/physical function (standardized mean difference [SMD], 0.32; 95% confidence interval [CI], 0.17–0.47) and mobility (SMD, 0.32; 95% CI, 0.12–0.52) compared with conventional care. In contrast, interdisciplinary geriatric team rehabilitation did not increase the chance of living in one's own home after discharge (risk ratio [RR], 1.07; 95% CI, 0.99–1.16) or survival (RR, 1.02; 95% CI, 0.99–1.06) compared with conventional care. All results were rated as GRADE 3.

Conclusion: Systematic rehabilitation by geriatric interdisciplinary teams increases physical function and mobility significantly compared with conventional care in patients with hip fracture. In contrast, the chance of being discharged to one's own home and survival are not influenced.

Osteoporosis is estimated to affect 200 million women worldwide, resulting in 9 million fractures annually,[1] with a burden and cost comparable to those of myocardial infarction.[2] With the global growth of the older population, fracture-related poor health is expected to increase.[3]

The most severe fragility fracture is hip fracture, with a mortality rate of 25% in the first year.[4] This high rate has been consistent in recent decades, suggesting that care after hip fracture has not improved.[5] In contrast, the risk of death after diagnoses such as cardiovascular disease and stroke has decreased.[6,7] Hip fracture is also associated with increased morbidity,[8] reduced self-dependency, pain and fear, and reduced quality of life.[9,10] Thus, the detection and management of risk factors for morbidity and mortality after hip fracture, and the identification of optimal rehabilitation strategies, are of importance.

The authors declare no conflicts of interest.

* Address correspondence to Peter Nordström, MD, PhD, Department of Community Medicine and Rehabilitation, Geriatrics, Umeå University, Tallvägen 11, Umeå 90187, Sweden.

E-mail address: peter.nordstrom@germed.umu.se (P. Nordström).

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In modern geriatric medicine, comprehensive geriatric assessment (CGA) is a cornerstone of rehabilitation. In CGA, interdisciplinary teams systematically evaluate frail older adults with the goal of assessing and optimizing medical, psychosocial, and physical capacities, including plans for early discharge.[11] In previous meta-analyses of controlled trials, CGA has been shown to improve functional outcomes and decrease the risk of discharge to nursing homes among general geriatric patients.[12,13] In contrast, the meta-analysis by Handoll and colleagues[14] revealed no significant benefit of multidisciplinary rehabilitation in patients with hip fracture. Given the publication of additional studies since the previous meta-analyses were conducted, the aim of the present meta-analysis was to evaluate whether multidimensional rehabilitation by interdisciplinary geriatric teams has any benefit compared with conventional care in patients with hip fracture.

Methods

Inclusion Criteria

All studies included in this review were randomized controlled trials involving participants with hip fracture aged ≥65 years. The required intervention was interdisciplinary geriatric team rehabilitation, compared with usual postoperative care. Included studies reported on at least 1 of the following outcomes: degree of independence in activities of daily living (ADLs), physical function, mobility, depression, cognitive function, discharge to one's own home, quality of life, influence on relatives, complications, and survival.

Search Methods, Data Collection, and Analysis

The selection process had 3 phases. First, articles included in a 2009 Cochrane review[14] that met our inclusion criteria were retrieved. Second, a complementary literature search of 5 electronic databases (CINAHL, Cochrane Library, EMBASE, PubMed, and PsycINFO) was conducted in 2014 (Appendix A). References were assessed on abstracts and additional articles meeting the inclusion criteria were retrieved. These articles were assessed, and a final set of included articles was identified. Third, a final literature search was conducted in late autumn of 2017 (but did not result in the identification of additional articles). The methodological quality of studies was appraised using a checklist modified from the PEDro scale (www.pedro.org.au).

Statistical Analyses

Baseline characteristics were expressed as means and SDs unless otherwise indicated. Continuous outcomes are expressed as mean differences, and as standardized mean differences (SMDs) when synthesized. Conversion to continuous outcomes was based on the method described by Whitehead et al.[15] Binary outcomes were expressed as risk differences, and as risk ratios (RRs) when synthesized. Meta-analyses were based on inverse variances for continuous outcomes and the Mantel-Haenszel method for binary outcomes.[16] In both cases, we used the DerSimonian and Laird random-effects models,[16] as clinical heterogeneity prevails when the studies included are not strict replications. We assumed that each study had a unique parameter effect, meaning that the estimator captured the expected average of effects in the included studies.[15] Funnel plots were used to visually evaluate the risk of publication bias. The strength of evidence of each synthesized outcome was based on the GRADE system (www.gradeworkinggroup.org). Pairs of assessors performed all evaluations independently, with final decisions made by discussion among all authors. *P* values $< .05$ were considered to be significant. The Review Manager statistical package (version 5.2 for PC; The Nordic Cochrane Centre, The Cochrane Collaboration, Copenhagen, Denmark, 2014) was used to fit the statistical models and to illustrate the results graphically.

Results

Study Selection

In total, we screened 315 abstracts, from which we selected and examined 54 full-length articles (Figure 1). Of these articles, 39 were excluded due to irrelevant design (n = 10), intervention (n = 15), population (n = 13), and outcome (n = 1; Appendix B). The remaining 17 articles describing 7 unique studies were included in the meta-analysis; all were judged to be of at least moderate quality. These 7 studies included a total of 1763 individuals who sustained hip fractures at 65 years of age or later.

Characteristics of Included Studies

The age of the participants and type of hip fracture were similar in the 7 studies (Table 1). Assessment teams were also similar, each including a physiotherapist and nurse (n = 7) and most including a geriatrician (n = 6) and occupational therapist (n = 5). Interventions included home visitation and in-home rehabilitation in all studies for which such information was reported (n = 4). In contrast, the lengths of the intervention programs varied, ranging from 6 days[21] to a mean of 34 days.[18]

Intervention Effects

Outcomes were grouped into 4 categories, each reported on in at least 4 included studies: ADL/physical function, mobility, living in one's own home, and survival. The interventions significantly improved ADL function and mobility in 2 studies and the chance of living in one's own home after discharge in 1 study.

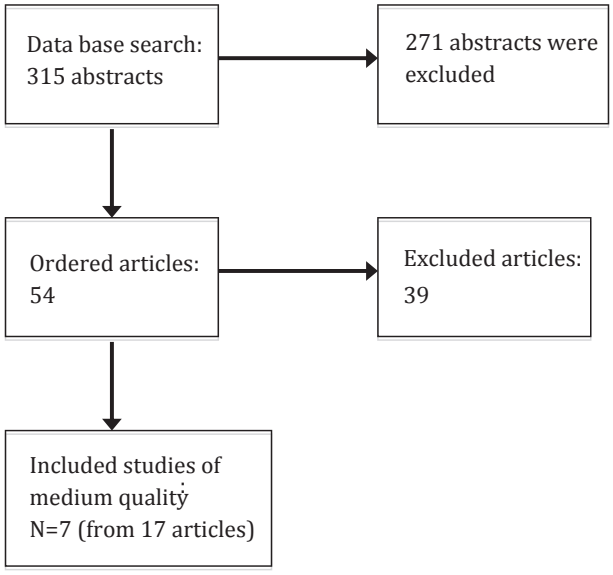

Fig. 1. Flow chart of study selection. First, we included articles from Handoll et al.[14] Second, we performed a search of 5 electronic databases (CINAHL, Cochrane Library, EMBASE, PubMed, and PsycINFO) using the prespecified criteria.