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Pre- and perioperative predictors of changes in mobility and living arrangements after hip fracture—A population-based study

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ABSTRACT

Purpose of the research: Examining pre- and perioperative predictors of changes in mobility and living arrangements after hip fracture.
Materials and methods: Population-based prospective data were collected on 1027 hip fracture patients aged ≥65. The outcomes were decreased vs. same or improved mobility level and need for more supported vs. same or less supported living arrangements 1 year after hip fracture. The independent variables were age, gender, body mass index, American Society of Anesthesiologists score, diagnosis of memory disorder, mobility level and living arrangements, fracture type, delay to surgery and urinary catheter removal during acute hospitalization.
The principal results: Multivariate logistic regression analysis revealed the prefracture mobility level of walking outdoors (OR = 0.47, 95% CI 0.30–0.75) or indoors (OR = 0.25, 95% CI 0.09–0.72) assisted to be associated with a smaller decrease in mobility level. Non-independent mobility level (OR = 2.74, 95% CI 1.70–4.41) was associated with the need of more supported living arrangements. Living in assisted living accommodations (OR = 0.23, 95% CI 0.12–0.44) was associated with less need for more supported living arrangements. Removal of the urinary catheter showed a protective association on both decline in mobility level (OR = 0.45; 95% CI 0.29–0.70) and moving to a more supported living arrangement (OR = 0.49,95% CI 0.31–0.77.
Major conclusions: Worsening of mobility was significant for independent mobilizers. Prefracture impaired mobility was associated with the need of more supported living arrangements. Living in an assisted living accommodation protected against institutionalization. The findings emphasize the importance of a prompt removal of the urinary catheter after hip fracture.

1. Introduction

Hip fractures represent one of the most common injuries of the aged population worldwide. Increased mortality and morbidity after a hip fracture are well established (Abrahamsen, van Staa, & Ariely, 2009). Those who survive hip fracture may have disabilities of varied severity and duration, which are sometimes underestimated (Bertram, Norman, & Kemp, 2011; Boonen, Autie, & Barett, 2004). To reduce the resulting disability and long-term economic burden, it is important to identify those patients that are surviving but not recovering.

Several possible predictors of slower recovery or poorer functional and/or mobility outcome have been reported, including increased age (Butler, Forte, & Joglekar, 2011; Clayer & Bauze, 1989; Haentjens, Autier, & Barette, 2005; Hannan, Magaziner, & Wang, 2001; Hirose, Ide, & Yakushiji, 2010; Koval, Skovron, & Aharonoff, 1995; Kristensen, 2011), impaired cognitive function (Clayer & Bauze, 1989; Hirose et al., 2010; Kim, Moon, & Lim, 2012; Kristensen, 2011), lower functional level at discharge (Boonen et al., 2004; Haentjens et al., 2005), higher American Society of Anesthesiologists (ASA) score (Butler et al., 2011; Koval et al., 1995; Kristensen, 2011), inter- and/or subtrochanteric fracture (vs. femoral neck) (Butler et al., 2011; Kristensen, 2011), lower prefracture function (Butler et al., 2011; Hannan et al., 2001; Kristensen, 2011), and living in a long term facility of care (LTCF) at the time of the fracture (Haentjens et al., 2005; Hannan et al.,

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2001). The need for more supported living arrangements after hip fracture is associated with increased age (Koval, Skovron, & Polatsch, 1996; Martinez-Reig, Ahmad, & Duque, 2012; Parker & Palmer, 1995; Semel, Gray, & Ahn, 2010; Vochteloo, van Vliet-Koppert, & Maier, 2012), prefracture disability in activities of daily living or mobility (Koval et al., 1996; Martinez-Reig et al., 2012; Parker & Palmer, 1995; Semel et al., 2010; Vochteloo et al., 2012), lack of social support (Martinez-Reig et al., 2012; Semel et al., 2010; Vochteloo et al., 2012), intertrochanteric fracture (Parker & Palmer, 1995), lower cognitive function or other comorbidities (Martinez-Reig, 2012; Parker & Palmer, 1995; Vochteloo, 2012), and longer delay to surgery (Al-Ani, Samuelsson, & Tidermark, 2008). Improved recovery is associated with postoperative access to rehabilitation resources (Clayer & Bauze, 1989; Pioli, Frondini, & Lauretani, 2012). Even though the adverse clinical effects of urinary catheterization are well known (Holroyd-Leduc, Sen, & Bertentha, 2007; Hooton, Bradley, & Cardenas, 2010; Kamel, 2005; Maki & Tambyah, 2001; Ranhoff, Rozzini, & Sabatini, 2006), little is known about the effect of prompt urinary catheter removal on patients' daily functioning after hospitalization.

The aim of the present study was to identify potential predictors of a maintained or worsened mobility level and living arrangements at 1 year after hip fracture in consecutively enrolled older hip fracture patients. Variables included several patient related factors, delay to surgery after admission and removal of an indwelling urinary catheter during acute hospitalization.

2. Methods

2.1. Study population

Prospective population-based data were collected on 1027 consecutive patients aged 65 and over suffering their first hip fracture between September 2007 and November 2012, in the Hospital District of Southern Ostrobothnia, Finland. 10 patients (1.0%) refused to participate in the study. Pathologic and periprosthetic fractures were excluded. Seinäjoki Central Hospital is the only hospital providing acute surgical care in the Hospital District Southern Ostrobothnia, which has a population of 199,000.

2.2. Data collection and predictor variables

During hospitalization, the patient medical records were used to collect data regarding age, sex, body mass index (BMI), fracture type, ASA score, removal or non-removal of urinary catheter before discharge from acute hospital care, and delay to surgery. Data on a possible diagnosis of memory disorder, prefracture mobility level, and living arrangements were collected from a nurse-performed interview of the patient or his/her caregiver. Categorization of the predictor variables is shown in the Tables.

2.3. Outcome variables

Prefracture mobility was originally categorized as the ability to walk outdoors unassisted, ability to walk outdoors assisted, ability to walk assisted but only indoors, or inability to walk. Living arrangements were categorized as living independently in own home, living in own home with organized home care, living in an assisted living accommodation, and living in an institution. Follow-up data on mobility and living arrangements were elicited 1 year after the hip fracture via a nurse-performed telephone interview of the patients or his/her representative, e.g., caregiver or nurse at the home or care facility. The outcome measures of mobility and living arrangements were defined as decreased vs. same or improved mobility and more supported vs. same or less supported living arrangements, respectively. For analyses of the change in mobility from the prefracture level, living arrangements were dichotomized to home or other than home, and patients unable to walk were excluded ($n = 23$). For analyses of changes in living arrangements, the prefracture mobility level was dichotomized to unassisted or assisted, and patients living in an institution were excluded ($n = 112$).

2.4. Statistical analyses

The distribution of the predictor variables in case numbers and percentages or medians with interquartile ranges according to the outcome variables of mobility and living arrangement 1 year after the hip fracture, respectively, were calculated. Statistical analyses were performed by the Mann–Whitney test, Pearson chi-Square test, or Fisher's exact test for univariate variables. Multivariate analyses were performed by logistic regression analysis using each of the variables of the univariate analyses as independent variables and changes in the mobility level or living arrangements after the fracture at 1-year follow-up as the dependent variables. Statistical analyses were performed using SPSS for Windows 20.0 (IBM SPSS: IBM Corp, Armonk, NY). A p value of less than 0.05 was considered significant.

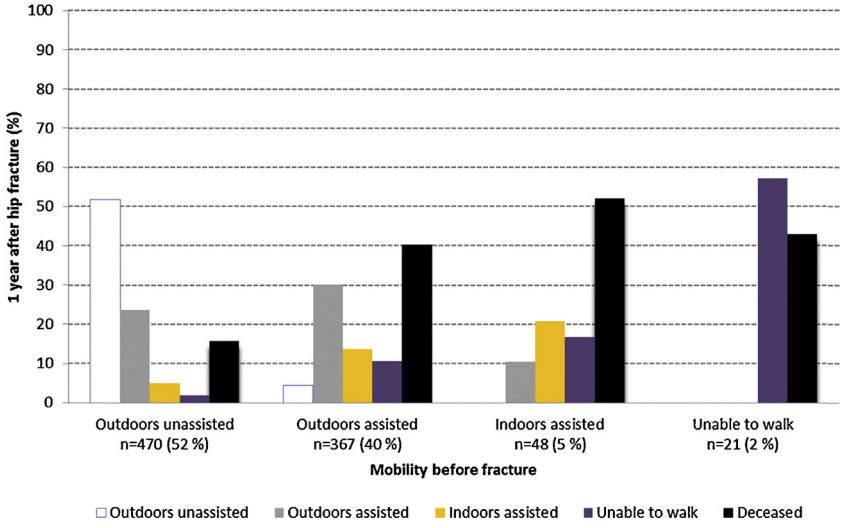

Fig. 1. Changes in mobility level 1 year after hip fracture ($n = 906$, 89% of the study population).