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Factors associated to institutionalization and mortality over three years, in elderly people with a hip fracture—An observational study

Francisco Uriz-Otano [a], Jorge Pla-Vidal [b], Gregorio Tiberio-López [c], Vincenzo Malafarina [d,*]

[a] Department of Geriatrics, Hospital San Juan de Dios, Pamplona, Spain
[b] Department of Psychiatry and Medical Psychology, Clinic of the University of Navarra, Pamplona, Spain
[c] Department of Internal Medicine, Hospital Virgen Del Camino, Pamplona, Spain
[d] Department of Geriatrics, Clinica Los Manzanos, Grupo Viamed, Calle Hermanos Maristas, 26140 Lardero, Spain

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ABSTRACT

Objective: To identify the factors associated to institutionalization and mortality in elderly patients with hip fractures (HF).
Design: Thirty-six months observational study.
Setting: A post-acute rehabilitation ward.
Participants: subjects living in the community or in nursing-home, above the age of 65, with HF.
Measurements: The following were registered: comorbidity, intra-hospital complications, Barthel index, walking ability and Mini Mental State Examination, as well as blood samples upon admission and discharge. Destination upon discharge was recorded as well as mortality during hospital stay and over the three-year follow up.
Results: a total of 430 subjects were included in the study. Twenty-three patients (5.3%) died during their stay in hospital and 152 (35.3%) during follow up after discharge. Forty-five patients (10.5%) were institutionalized upon discharge. In adjusted analysis, the factors that predict intra-hospital mortality are higher comorbidity (OR, 1.46; 95%CI, 1.06–2.01), and the number of complications (OR, 1.71; 95%CI, 1.16–2.64).

Factors that predict mortality in the long term are age (HR 1.04; 95%CI, 1.01–1.06), comorbidity (HR 1.19, 95% CI, 1.09–1.30), the number of complications (HR 1.17, 95%CI, 1.05–1.31).

The factors that predicted new institutionalization were age (OR 1.04, 95%CI, 0.98–1.09), living alone (OR 3.95, 95%CI, 1.38–11.3), and length of hospital stay (OR 1.02 95%CI, 1.00–1.03).
Conclusions: Mortality 3 years after a hip fracture and institutionalization are associated to age, the loss of autonomy in walking, a worse cognitive status and living alone before the fracture. Identification of and, when possible, intervention upon these factors can improve care of elderly people with hip fractures.

1. Introduction

Hip fractures are the second cause of admission to hospital in people above the age of 65 and are frequently associated to the onset of disability, institutionalization and high mortality [1]. It has been calculated that, in Spain, the incidence of HF between the years 2000 and 2010 was of 62 and 100 cases per 100,000 inhabitants for men and women, respectively, between the ages of 65 and 69 and increased to 1330 y 2334, respectively, for people above the age of 85 [2].

Between fifteen and thirty percent of subjects living at home at the time of the fracture require institutionalization [3]. Advanced old age, higher comorbidity, dementia and decline of the ability to walk are the main risk factors for institutionalization following a hip fracture [3]. Hospital mortality ranges from 4 to 8%, increasing up to 30% a year, and remaining high over the long term, with a mortality of almost 50% after 3 years and of over 70% after 7 years [4].

Our hypothesis is that age, comorbidity, cognitive status and functional status prior to the fracture and upon discharge are the

* Corresponding author.
E-mail address: vmalafarina@gmail.com (V. Malafarina).

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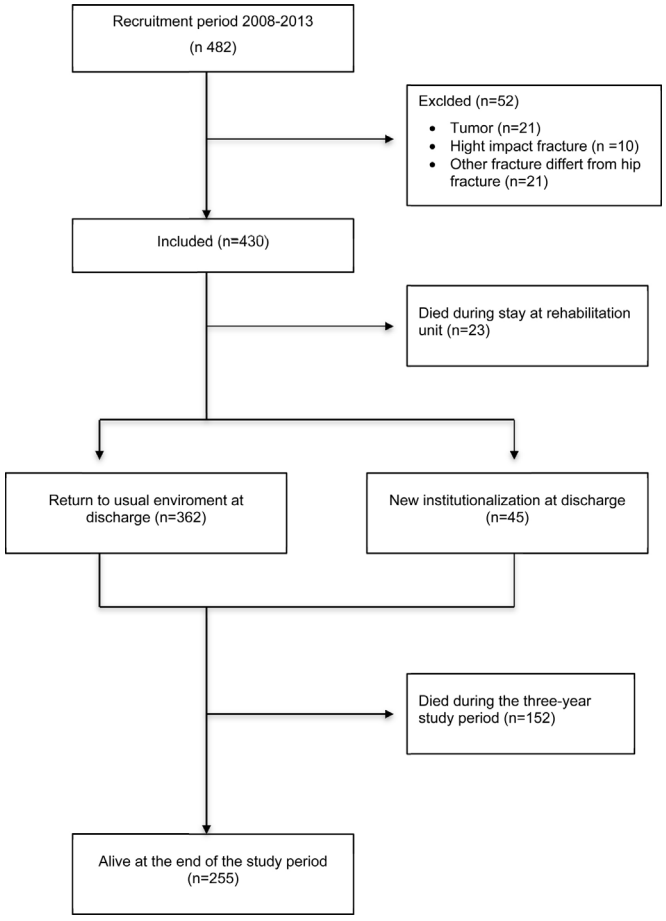

Fig. 1. Flow chart of the study population.

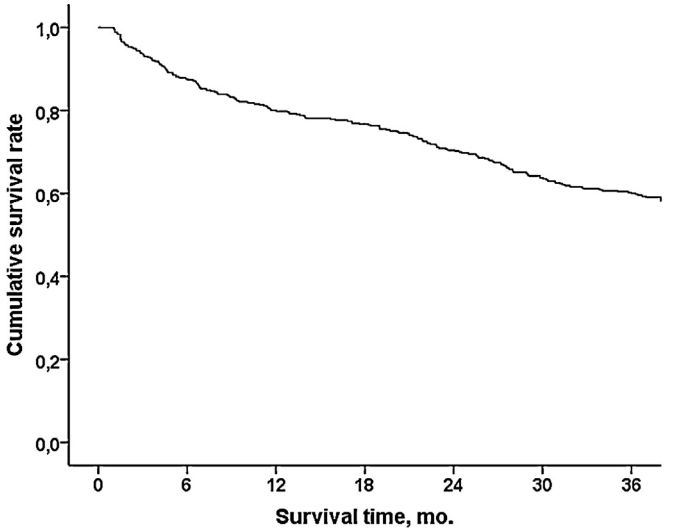

Fig. 2. Cumulative mortality during the study. The cumulative mortality, expressed with Kaplan Meier curve.

factors that have the most bearing on institutionalization and on mortality.

Therefore, the main aim of this piece of research is to gain knowledge of the factors that influence institutionalization and mortality in elderly people with hip fractures admitted to an orthogeriatrics rehabilitation unit.

2. Methods

2.1. Study sample

This was a single location observational prospective cohort study, in which all patients above 65 years of age with a low impact hip fracture, admitted to the rehabilitation unit of the San Juan de Dios hospital in Pamplona, between March 2008 and February 2013 were included. Patients with hip fractures were operated on at the trauma department of their local hospital in Pamplona. Following the operation, high clinical complexity patients (defined on the basis of higher comorbidity and the presence of complications) and patients partially responding to acute rehabilitation treatment were referred to the our post-acute rehabilitation unit at San Juan de Dios Hospital. Our unit has 20 beds post-acute rehabilitation. A geriatrician, a rehabilitating physician, nurses, physical therapists, licensed practical nurses and a social worker constitute the multidisciplinary team. Physical rehabilitation is carried out in the hospital gym. Patients perform strengthening exercises of the lower limbs, balance exercises and gait training, in sessions of 45 min a day, five days a week (Monday–Friday inclusive).

This study (19/2013) was approved by the Navarra Region Clinical Research Ethics Committee and was designed in conformity with the good clinical practice requirements of the European Union and the current revision of the Helsinki declaration.

2.2. Baseline characteristics and outcome variables

Variables for the study were compiled from patients' digitalized clinical history, from direct interviews with patients or – when patients were unable to answer questions – their relatives. We recorded demographic data (age, sex), usual place of residence and pharmacological history. Blood samples were taken upon admission and before discharge (always following 8 h fast) in order to study haemoglobin and protein concentration as well as kidney function. The presence of comorbidities was assessed with the Charlson index, considering comorbidity to be high for scores $\geq$3. We registered the date and type of fracture, the date of admission to acute trauma surgery unit and waiting time until surgery, the type of surgery and complications, as well as the length of stay in hospital. We recorded patients' destination upon discharge. When patients who previously lived at home were admitted to a care home we considered this a new institutionalization. We compared the characteristics of institutionalized patients to those of patients who were discharged to their usual environment.

We used the Mini Mental State Examination (MMSE) for the cognitive assessment, which sets scores between 0 and 30 points. A higher score indicates a better cognitive status.

Functional ability in Activities of Daily Living (ADL) was assessed using the Barthel Index (BI). The BI uses scores ranging from zero (totally dependent) to one hundred (completely independent). We considered patients had recovered ADL when, upon discharge from hospital, they had achieved the score they had before the fracture.

Walking ability at discharge was assessed with the Functional Ambulation Category (FAC) which classifies patients into 6 categories ranging from 0 – patients cannot walk – to 5-independent ambulation. We considered patients had recovered the ability to walk if they scored FAC $\geq$ 3 upon discharge.

2.3. Mortality

We compared the characteristics of patients who died in hospital to those who were discharged, and the characteristics of patients who died during follow-up and those who were alive at the end of the study period. Patients were included in the study until the date of their death, until 3 years had elapsed since discharge from our