Rate of Mortality with Hip Fracture and its Prognostic Factors in an elderly Japanese population

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Abstract

The purpose of this study was to clarify the survival rates and prognostic factors in elderly Japanese patients with hip fractures. This study investigated the outcome of 256 patients aged 60 years and older with surgically treated hip fractures. Information including age, gender, duration of hospitalization, place of residence before fracture and at discharge, and level of mobility before fracture and at discharge was obtained from patient records. The survival of the patients after discharge was determined by mail surveys supplemented with telephone inquiries.

The observed survival rates were significantly lower than the expected survival rates (p<0.001, by Mantel Haenszel test). The short-term mortality rates were 6% for six months and 12.7% for one year, which were lower than previously reported rates in Western countries. Significantly higher hazard ratios (HR) for mortality adjusted for age and gender were observed in patients who had lived in places other than their own home before fracture (HR=2.67 (1.63-4.3)), were discharged to places other than their own home (Nursing home HR=2.25 (1.24-4.1)) or to a non-orthopedic unit (HR=5.95 (3.12-11.34)), those requiring full-time assistance for mobility at discharge (HR=5.71 (3.59-9.01)), and those who had stayed in a hospital for fewer than 40 days (HR=2.20 (1.38-3.51)). After adjusting for the effects of all the potential prognostic factors, discharge to places other than their own home and the lowest level of mobility at discharge remained significant factors causing adverse effects on survival.

Therefore, to improve the prognosis, patients should be allowed to recover to a level at which they can ambulate with some assistance, enabling them return to their own homes.

Key words: Hip fracture, Mortality, Prognosis factor, Elderly, Japanese

Introduction

Hip fracture is known to be one of the leading risks for becoming bedridden in elderly people1, and the medical costs for the treatment of this fracture are already enormous2. It is reported that the incidence of hip fracture in Japan has increased 1.5 fold in the last 5 years3, and 170,000 people per year are forecasted to have a hip fracture within 20 years4. The extent of problems caused by this fracture will increase in the twenty-first century. The prevention of hip fracture is an urgent problem in our society.

Several studies have indicated that the prognosis for hip fracture among elderly people is unfavorable5,10. Most of these, however, were derived from Caucasian populations. The prognosis for hip fracture and prognostic factors in Japanese patients may be different from those reported in Caucasians, because the incidence of this fracture has been reported to be very different between these two populations10. However, it is not fully known to what extent hip fracture worsens the prognosis of patients in comparison with people of the general population, or which factors independently affect the prognosis. To answer these questions, we investigated the survival of patients with surgically treated hip fractures, as well as their characteristics during hospitalization and at discharge.
Study Method

Subjects
The subjects were selected according to inpatient lists of the Fukui Red Cross Hospital, which is located in a city in central Japan with a population of about 260,000. As a general hospital with 600 beds, it serves as a core facility for medical care in the area. The total number of admissions to the hospital between 1988 and 1994 was 4,690 (annual mean: 670). Of these, 286 (annual mean: 40.8) were patients admitted to the orthopedic unit with hip fractures. One hundred ninety-one (67%) of 286 patients were referred by local doctors, and the remainder were self-referred. All hip fracture patients were admitted for surgical treatment.

Data Collection

1) Demographic data and medical history
The following data were obtained from the clinical and nursing records of the 283 subjects: age, gender, marital status, place of residence before fracture, place of residence after discharge from the orthopedic unit, date of fracture, fracture type, date of admission, date of surgery, date of discharge, preoperative period, duration of hospitalization, preoperative laboratory values, medical history of disease, hobbies and levels of mobility before fracture and at discharge.

Age was defined as the age upon admission. The preoperative period was defined as the number of days from the date of fracture to the date of surgery. The duration of hospitalization was specified as the period from the date of admission in the orthopedic unit to the date of discharge from the unit. Preoperative laboratory values included hemoglobin and serum total protein, which were obtained before surgery. The past history of disease included cerebrovascular disease, cardiovascular disease and carcinoma. Kishi’s evaluation criteria for ambulatory ability were used to classify the levels of mobility. The levels of mobility before fracture and at discharge were re-categorized into two (Level 1 vs. Levels 2-4) and three groups (Level 1 and 2 vs. Level 3 vs. Level 4), respectively, because of the small sample size of patients in each level.

The preoperative period was divided into two levels, 0-4 days and 5 days or more, according to the classification of Kenzora et al. In a standard rehabilitation program for patients with surgically treated hip fractures, patients were encouraged to walk with a cane about 40 days after surgery and were regarded as being healed in 12 weeks. Therefore, we divided the duration of hospitalization into 3 levels: 40 days or less, 40 to 90 days, and more than 90 days of hospitalization. The levels of mobility before fracture and at discharge were re-categorized into two (Level 1 vs. Levels 2-4) and three groups (Level 1 and 2 vs. Level 3 vs. Level 4), respectively, because of the small sample size of patients in each level.

2) Survival status survey
The survey was conducted in June, 1995. A questionnaire was sent to each subject. The subject, or a family member of the subject if he/she had died, was asked to answer the questionnaire and to send it back by mail. The questionnaire assessed survival status of the subject as of June 30, 1995, level of mobility (Level 1 to 4) at the time of survey, and current place of residence. The purpose of the study was explained on the cover page of the questionnaire. Informed consent was regarded as having been obtained when the subject returned the questionnaire. The survival period, from the date of surgery to the date of death or to June 30, 1995, was calculated according to the questionnaire response. Supplementary telephone inquiries were made when questionnaire items were left unanswered or when answers were contradictory.

3) Survival analysis
Survival curves for each of the 16 factors were estimated for each category using the Kaplan-Meier method. The differences in the survival curves between categories for each factor were examined with the Log rank test. For each factor that showed significant difference in the survival curves between categories, the presence of proportionality in a hazard ratio over the survival time was confirmed. Then, the hazard ratios and their 95% confidence intervals were calculated using Cox’s proportional hazards model. The significance of the hazard ratio was examined by Wald’s chi-square test. Statistical analyses were done using the Statistical Analysis System (SAS) for Windows (Release 6.11, SAS Institute Inc, Cary NC, USA).

Results

Baseline characteristics of the subjects
From 283 patients enrolled from the in-patient lists, 7 with pathological fractures (other than osteoporosis) and 16 with recurrent fractures were excluded; the remaining 263 patients served as the subjects for the survival survey. Of these, 256 (61 males and 195 females) completed the questionnaire and a response rate of 97.3% was attained. The basic characteristics of the subjects are shown in Table 1. The mean age was 78.8 years (SD 8.5, range 60 to 98) for all subjects, 76.9 years for males and 78.9 years for females. The median observational period was 3.2 years, the range being 0.5 to 7.5 years.

Comparison of the observed and expected survival rates
One hundred seventy-one patients survived in this study.