

Meeting abstract

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## Institutional structures and processes of care associated with the length of hospital stay in elderly patients with hip fractures

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### Introduction

Some of the most feared complications of falls are hip fractures. Of those who sustain hip fractures, up to 20% become non-ambulatory, and only 14-21% recover their ability to carry out instrumental activities of daily living. In Japan, the incidence of hip fracture is estimated as 120,000 persons per year, and the number of elderly patients with hip fractures is increasing.

The LOS (length of hospital stay) in elderly patients with hip fractures is generally long. While many studies have revealed that patient characteristics are closely associated with longer hospitalization, little is known about hospital structures and processes of care associated with LOS. The objective of this study is to identify institutional factors and processes of care associated with LOS in elderly patients with hip fractures.

### Methods

We analyzed administrative data provided by 67 hospitals participating in the Quality Indicator/Improvement Project (QIP). The study included 2,134 patients with hip fractures who were 60 years of age or older, underwent surgical treatment, and were discharged from the hospitals between April 2007 and March 2008. We excluded patients whose lengths of stay were longer than 150 days.

First, we conducted a patient-level multiple linear regression analysis to identify patient-risk factors associated with LOS. Using this model, we calculated the risk-adjusted mean LOS for each hospital. Secondly, we categorized patients into two groups according to discharge

destination: home or other facilities. We conducted a multiple linear regression analysis to identify institutional factors and processes of care associated with risk-adjusted mean LOS in each subgroup (discharge to home or discharge to other facilities).

In this analysis, the dependent variable was the risk-adjusted mean LOS of hip fracture in each hospital. Explanatory variables included the following:

- Surgical procedure (hip replacement or internal fixation)
- Timing of operation (within 48 hours or later)
- Timing of rehabilitation (within two days after operation or later)
- Frequency of rehabilitation (rehabilitation was provided for more than 80% of total LOS or less than 80%)
- Number of acute care beds >400 or  $\leq$ 400)
- Inpatient volume per physician per year (>150 or  $\leq$ 150)
- Case volume of physical therapist (PT) per year (>2000 or  $\leq$ 2000)
- Number of medical social workers (MSW) per bed (>1 or  $\leq$ 1)

- Hospital ownership (a local government hospital, private hospital, or public hospital)
- Presence of sub-acute care beds in the hospital

### Results

In the patient-level analysis, we found that age, complication, and previous hospitalization were significantly associated with LOS. We also took into account the results of a hospital-level regression analysis. In both groups (discharge to home and discharge to other facilities), timing of rehabilitation was significantly associated with LOS. However, timing of operation, and frequency of rehabilitation, were significant predictors of longer LOS only among patients discharged to home.

The number of beds, case volume per physician and PT, hospital ownership, and the presence of sub-acute care beds in the hospital were significantly associated with LOS in both groups. The number of MSW per bed was a significant predictor of shorter LOS only among patients discharged to other facilities.

### Conclusion

In this study, we examined institutional structures and processes of care associated with LOS in elderly patients with hip fractures. Our results suggest that early and intensive rehabilitation can decrease LOS of patients who were discharged to their homes through a rapid recovery of activity of daily life (ADL). Institutional structures such as hospital bed size, case volume per physician and PT, and number of MSW were strong predictors of shorter LOS. In conclusion, in addition to patient characteristics, LOS in elderly patients with hip fractures was significantly affected by institutional structures and processes of care.

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