



Analysis of mortality after hip fracture on patient, hospital, and regional level in Germany

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Abstract

Background

Among numerous studies analyzing mortality as worst consequence after hip fracture, the majority focused on patient level and fewer on hospital and regional level. Comprehensive knowledge about contributing factors on all levels might help to reveal relevant inequalities, which would encourage prevention and further improvements in care. This study aimed at investigating variation of mortality after hip fracture on patient, hospital, and regional level in Germany.

Methods

We performed a retrospective cohort study on hip fracture patients aged 65 and older using statutory health insurance claims data from Jan. 2009 through Dec. 2012 and additional information from the Federal Statistical Office Germany. Regions were classified based on two-digit postal code. We applied a multilevel Cox proportional hazards model with random intercepts on hospital and regional level to investigate the risk factors for mortality within 6 and 12 months after hip fracture.

Results

The dataset contained information on 123,119 hip fracture patients in 1,014 hospitals in 95 German regions. Within 6/12 months, 20.9%/27.6% of the patients died. On patient level, male sex, increasing age, increased pre-fracture care level, and increasing comorbidity were associated with an increased hazard of mortality. Hospitals with increasing hip fracture volume or with ortho-geriatric co-management and regions with increased population density were associated with a decreased hazard. Variation was largest on patient level and rather modest on hospital and regional level.

Conclusion

The identification of patient-related risk factors enables prognosticating mortality after hip fracture. After adjusting for those, variation seemed to be attributable rather to hospitals than to regions.

Keywords

Cohort study, Cox proportional hazard model, frailty model, Germany, hip fractures, multilevel analysis, regional variation

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