CLINICAL RESEARCH STUDY

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Use of Osteoporosis Medications after Hospitalization for Hip Fracture: A Cross-national Study

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ABSTRACT

BACKGROUND: Although current osteoporosis management guidelines recommend use of pharmacologic treatment after hip fracture, the care of such patients has been suboptimal. The objective of this cross-national study was to quantify the use of and adherence to osteoporosis medication after hip fracture in 3 countries with different healthcare systems—the United States, Korea, and Spain.

METHODS: In 3 cohorts of patients aged ≥65 years hospitalized for hip fracture, we calculated the proportion receiving ≥1 osteoporosis drug after discharge. Adherence to osteoporosis treatment was measured as the proportion of days covered (PDC) during the first year after the hip fracture.

RESULTS: We identified 86,202 patients with a hip fracture: 4704 (US Medicare), 6700 (US commercial), 57,631 (Korea), and 17,167 (Spain). The mean age was 77-83 years, and 74%-78% were women. In the year before the index hip fracture, 16%-18% were taking an osteoporosis medication. Within 3 months after the index hip fracture, 11% (US Medicare), 13% (US commercial), 39% (Korea), and 25% (Spain) of patients filled ≥1 prescription for osteoporosis medication. For those who filled ≥1 prescriptions for an osteoporosis medication, the mean PDC in the year after the fracture was 0.70 (US Medicare), 0.67 (US commercial), 0.43 (Korea), and 0.66 (Spain).

CONCLUSIONS: Regardless of differences in healthcare delivery systems and medication reimbursement plans, the use of osteoporosis medications for the secondary prevention of osteoporotic fracture was low. Adherence to osteoporosis treatment was also suboptimal, with the PDC <0.70 in all 3 countries.

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Osteoporosis is a common and generally undertreated problem, particularly in the elderly.[1,2] It represents a major public health problem because of the disability, morbidity, mortality, and cost to which it contributes. Hip fractures are the worst consequences of osteoporosis: the 1-year mortality of such patients is nearly 30%, and it often leads to major morbidity, including significant functional loss.[3,4] The economic burden related to hip fractures is also very high, with the estimated treatment cost over $10 billion per year in the United States alone.[5-7] The condition

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has similarly high impacts on the healthcare systems of other countries.

Patients who suffer their first hip fracture are at greater risk of recurrent osteoporotic fractures. In these patients, medications such as bisphosphonates can reduce the risk of recurrent osteoporotic fracture and improve survival.[8-12] A previous meta-analysis of 11 randomized clinical trials of alendronate showed clinically important and statistically significant reductions in vertebral, nonvertebral, hip, and wrist fractures for secondary prevention.[13] In a randomized, controlled trial, intravenous zoledronic acid within 3 months after surgical repair of a hip fracture also reduced a risk of recurrent clinical fracture by 35% and mortality by 28%.[8] Current guidelines, therefore, recommend use of such pharmacologic treatment after hip fracture.[14,15] However, the care of patients after hip fracture has been suboptimal, because less than one-third of patients suffering a hip fracture do not receive subsequent osteoporosis treatment.[16-18] In 2012 the American Society for Bone and Mineral Research Task Force on Secondary Fracture Prevention emphasized the importance of secondary prevention of fragility fracture and proposed an international collaborative work using a Fracture Liaison Service to improve secondary fracture prevention.[19] Because access to healthcare is different in each country, the quality of post-fracture care may vary as well, but little is known how patterns of under-treatment vary from country to country, particularly those with very different healthcare delivery and reimbursement systems.

CLINICAL SIGNIFICANCE

- Only 11% (US Medicare), 39% (Korea), and 25% (Spain) of patients filled a prescription for osteoporosis medication within 3 months after their first hip fracture.
- The use of osteoporosis medication after hip fracture did not increase over time.
- Adherence to osteoporosis medication was suboptimal in the United States, Korea, and Spain.

The objectives of this study were (1) to examine the use of osteoporosis medications after hip fracture; (2) to evaluate the adherence to osteoporosis medications after hip fracture; and (3) to assess time trends in the use of these medications after fracture, with different healthcare systems in the United States, South Korea, and Spain.

METHODS

Data Sources

The study investigators in the United States, South Korea, and Spain simultaneously conducted a retrospective cohort study using a study protocol developed by all participating investigators. For the United States, 2 separate cohorts were constructed using the claims data from a US government-sponsored health insurance plan ("US Medicare," 2005-2008) as well as a commercial health insurer ("US commercial," 2003-2012). The Korean cohort ("Korea," 2007-2011) was based on complete filled prescription data from the Health Insurance Review and Assessment Service (HIRA) database, which includes the entire Korean population. The Valencia cohort ("Spain," 2007-2012) was constructed using the claims and electronic medical records data from the Valencia Health Agency. **Appendix 1** (available online) describes the data sources in detail.

Study Cohorts

We identified all patients aged ≥65 years who had a hospitalization for hip fracture, according to a diagnosis code as well as a procedure code for surgical treatment of the fracture, and who had 365 days of continuous health plan eligibility beforehand, to ensure adequate ascertainment of baseline characteristics. The admission date for the initial hip fracture hospitalization was defined as the index date. Patients with a diagnosis of trauma or fractures at multiple sites at the index date and those with a diagnosis of malignancy in the 365 days before the index date were excluded. To ensure that all patients had at least 6 months of follow-up after the fracture, patients with <6 months of data after the index date were excluded. Each patient was followed from the index date to the first occurrence of insurance disenrollment, administrative end of the study, or death.

Osteoporosis Medications

The osteoporosis medications studied included alendronate, risedronate, ibandronate, etidronate, zoledronic acid, raloxifene, calcitonin, parathyroid hormone, and denosumab. Zoledronic acid, parathyroid hormone, and denosumab were not covered by HIRA for the Korean cohort. For the Valencia cohort, strontium ranelate was added, but data on zoledronic acid (only administered within the hospital in Spain) was not available because of lack of in-hospital medication claims data.

Outcomes

The primary outcome was the proportion of patients who filled at least 1 prescription for any osteoporosis medication any time during the first 3 and 6 months after the index date. Secondary outcomes were (1) the proportion of patients who filled at least 1 prescription for a specific category of osteoporosis medication (ie, oral or intravenous bisphosphonates, raloxifene, and others) any time within 3 and 6 months after the index date; and (2) the level of adherence to osteoporosis medications during the first 6 months and 1 year after the index hip fracture among those who filled at least 1 prescription for an osteoporosis medication. In addition, we assessed the proportion of patients who had