Secondary Prevention Of Hip Fractures Among Hospitalized Elderly: Are We Doing Enough?

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Abstract

Background: Older individuals with hip fractures almost always have osteoporosis. Such individuals are at increased risk of suffering other osteoporotic fractures including recurrent hip fractures. The management of such patients should include assessing bone mineral density and treating osteoporosis.

Objective: To investigate if elderly (> 65 years) patients with hip fractures were assessed and treated for osteoporosis.

Methods: A retrospective chart review of all elderly patients who underwent hip fracture surgery at a university teaching hospital during the calendar years 1997 to 1999.

Results: A total of 95 subjects were identified (29% males and 71% females). Subjects' age ranged from 65 to 96 years with a mean (+SD) 81+7 years. Femoral neck fractures were the most common (51%), followed by intertrochanteric (43%), and subtrochanteric fractures (3%). Two subjects (2%) had fractures at multiple sites. The most common cause of a hip fracture was a fall (87%). Other causes included road traffic accidents (6%), as well as other trauma (4%). One subject had a spontaneous hip fracture. A history of previous hip fractures was obtained in 8% of subjects. Osteoporosis was diagnosed in 17% of subjects prior to admission. On admission, 9% of subjects were receiving calcium, 3% were receiving vitamin D, none were receiving alendronate, and one subject was receiving calcitonin. About 3% of female subjects were receiving estrogen on admission. On discharge, 11% of subjects were prescribed calcium, 6% were prescribed vitamin D, none were prescribed alendronate, and 2% were on calcitonin. None of the female subjects were discharged on estrogen. During hospitalization, 88% of subjects who were admitted to non-medical services were seen by either a geriatric of a general internal medicine consult. Obtaining a medical and/or geriatric consult did not have apparent effect on the frequency of treating osteoporosis in this high risk group of subjects.

Conclusion: Older adults with hip fractures are not adequately treated for osteoporosis. This places them at increased risk of other osteoporotic fractures including recurrent hip fractures.

INTRODUCTION

In the U.S., about half a million 50,000 hip fractures occur each year.[1] Hip fractures are an important cause of mortality and morbidity among older adults. About 20% of patients with hip fractures die within a year, with most of the deaths occurring within the first 6 months after a fracture.[2] Among survivors, 30 to 50% never regain their pre-fracture functional status.[3] Miller[4] reported that 15 to 20% of individuals who had a hip fracture remained in a nursing home for at least a year, and 50% were never able to walk again. Of those who returned home, 25 to 35% had to rely on other persons and/or assistive devices for mobility. A 6-year follow-up study of 185 patients who had experienced a hip fracture showed that only 9% were able to walk on their own.[5] Healthcare expenditure attributable to hip fractures is substantial. In the U.S., hip fractures consumed $8.8 billion of the total health budget in 1995.[6]

Individuals who had a hip fracture are at increased risk of suffering other osteoporotic fractures including recurrent hip fractures. In a study from Sweden, 39 men with hip fractures

subsequently had 56% more osteoporotic fractures (including hip fractures) compared to a control group.[7] In a large population-based study in Rochester, Minnesota in the U.S., men with hip fractures had a 3.2-fold increase in the risk of a second hip fracture compared to those without previous fractures.[8] Of participants of the Baltimore Longitudinal Study on Aging with a first hip fracture, 7.3% had a second hip fracture during a 7-year follow-up period.[9]

The management of patients with hip fracture should include assessing bone mineral density and treating osteoporoiss.[10] In a prior study conducted in a community teaching hospital,[11] we reported that elderly hospitalized patients with hip fractures were not adequately treated for osteoporosis. In this study, the authors studied a cohort of elderly patients with hip fracture from a university teaching hospital to investigate if this observation still holds true in a more academic clinical setting.

METHODS

The medical records of all consecutive admissions of elderly (> 65 years old) patients with a principal International Classification of Diseases (ICD)-9 diagnosis of a hip fracture during the period from January 1st, 1997 through December 31st, 1999 to Saint Louis University hospital were reviewed. A total of 95 subjects were identified. Data was abstracted by trained research assistants. Abstractors obtained demographic data including age, sex, race, place of residence prior to admission, and length of hospital stay. The admitting service and whether patients were seen by a medical or geriatric consult during hospitalization were also recorded. Hip fracture site and cause of the fracture as well as history of prior hip fractures were also obtained. Information about previous history of osteoporosis and whether subjects were using calcium, vitamin D, aldendronate, estrogen and/or calcitonin on admission was also collected. Additional information obtained included whether osteoporosis was diagnosed; whether subjects were prescribed calcium, vitamin D, aldendronate, estrogen and/or calcitonin during hospitalization and on discharge; and whether there was a note to indicate that a patient was advised to take calcium or vitamin D supplements on discharge. Medical records were also reviewed to determine if bone mineral density assessments were performed during hospitalization or were scheduled as outpatient tests. The study was approved by the Institutional Review Board of Saint Louis University School of Medicine.

Descriptive statistics were used to describe population demographics. The Mann-Whitney test was used to compare the medians between two groups. The Kruskal-Wallis test was used to compare the medians between three or more groups. Post-hoc comparisons after a significant Kruskal-Wallis test were performed using Mann-Whitney test. The chi-square test was used to examine significance of contingency tables. The Spearman rank correlation was used to measure degree of association between two continuous variables. Significance was defined as $p<0.05$ for two tailed tests. All analysis was performed using Satistica computer program (Stat Soft).[12]

RESULTS

A total of 145 patients were admitted to Saint Louis University Hospital with a primary ICD-9 diagnosis of a Hip fractures during the 3-year study duration. Medical records could be identified for 142 of the subjects. Among these, 95 subjects (67%) were 65 years or older. Only this group was included in the analysis. Table 1 lists the demographic characteristics of subjects.

Figure 1

Table 1: Characteristics of 95 study subjects

Characteristic	Number (Percent) or Mean ± SD (Range)
Sex	
Male	28 (29)
Female sex	67 (71)
Race	
White	66 (69)
African American	27 (28)
Others	2 (2)
Place of residence at time of fracture	
Home	72 (76)
Skilled nursing facility	18 (19)
Hospital	5 (5)
Admitting service	
Orthopedics	67 (71)
General surgery	14 (15)
Medicine/Geriatrics	12 (13)
Intensive care unit	2 (2)
Age (year)	81±7 (65-96)

Most patients (51%) had a femoral neck fracture, while 43% had an intertrochanteric fracture, 3% had a subtrochanteric fracture, and 2% fractured their hips at more than one site. A fall was the most common cause of hip fractures (87%); other causes included road traffic accidents (6%) as well as other trauma (4%). One patient had a spontaneous hip fracture. Prior history of hip fractures was obtained in 8% of subject. Thirteen percent of subject also had other fractures most notably pelvic fractures (4%). Seventeen percent of subjects carried the diagnosis of osteoporosis on admission.

Table 2 shows the number of subjects who were prescribed calcium, vitamin D, estrogen, calcitonin and/or alendronate on admission and on discharge. None of the subjects had a

bone density assessment as an inpatient procedure or were scheduled to have it as an outpatient procedure. During the hospitalization period, 88% of subjects who were admitted to non-medical services were seen by a medical and/or a geriatric medicine consult. Obtaining a medical and/or a geriatric medicine consult had no apparent affect on the frequency of assessing for or treating osteoporosis in study subjects.

Figure 2

Table 2: Frequency of using calcium, vitamin D, alendronate, calcitonin, and estrogen in 95 study subjects at admission and discharge.

Medication	Admission	Discharge	P value
	Number (Percent)		
Calcium	9 (9)	10 (11)	.8
Vitamin D	3 (3)	6 (6)	.3
Alendronate	0 (0)	0 (0)	
Calcitonin	1 (1)	2 (2)	.6
Estrogen*	2 (3)	0 (0)	.2

*Frequency calculated among female subjects

DISCUSSION

Older Individuals with hip fractures almost always have osteoporosis.[13] Such persons are at increased risk of other osteoporotic fractures including recurrent hip fractures. Medications such as calcium,[14,15,16] vitamin D[15,16], alendroante[17,18] and estrogen [19,20] have been shown to protect against hip as well other osteoporotic fractures. Calcitonin is another medication that has been shown to protect against vertebral but not hip fractures.[21] Raloxifene use was not investigated in this study, as it was a newly approved drug at the time the study was conducted and, subsequently, its use pattern may not have necessarily represented the treatment of osteoporosis. Parathyroid hormone and risedronate were not investigated since they were not yet approved for clinical use in the U.S. at the time this study was conducted.

Results from this study demonstrate that the rate of utilization of these medications was low among older adults with hip fractures who were treated at a university teaching hospital. In addition, obtaining medical and/or a geriatric consult did not affect the rate of utilization of these medications. The results from this study should be interpreted within the context of several limitations. First, the results were based on data abstracted from medical records, which may have been biased by possible underreporting of calcium and vitamin D supplement use. In addition, the study was conducted in a single university teaching hospital, and the results may not necessarily reflect practice patterns at other university teaching hospitals. The frequency of estrogen use may have been negatively influenced by the increased concern of deep venous thrombosis in patients post hip fracture surgery.

Findings from this study indicate a pressing need to develop strategies to address osteoporosis management among older adults with hip fractures. Educating orthopedic surgeons, geriatricians and general internists about the high prevalence of osteoporosis among older patients with hip fractures and the availability of effective therapies is important to the success of this endeavor. In addition to measures to decrease bone loss, strategies to decrease the risk of falls should be taken in all patients who sustain a hip fracture. Furthermore, the use of hip protectors should be considered in those who continue to fall. Medical and geriatric consult physicians should address osteoporosis assessment and prevention of future fractures as part of their consultation.[22] Some institutions have recently developed units or services that employ a multidisciplinary approach to the management of patients with hip fractures and there are currently several studies underway to assess the impact of this approach on patients' outcomes, including the initiation of measures aimed at preventing future hip fractures.[23] In addition, evidence-based guidelines may help busy clinicians who prefer to follow algorithms. Several organizations have created guidelines on the management of osteoporosis, but these contain little specific advice on the management of patients with hip fractures.[24,25,26] Incorporating information technology in clinical practice may help improve the utilization of therapy to treat osteoporosis in patients with hip fractures as it did with our ability to provide other routine preventive services.[27] Using computer programs to flag or insert alerts for starting calcium and vitamin D (± a bisphosphonate) in patients with hip fractures may also be helpful.

CONCLUSION

Despite strong evidence indicating that the occurrence of a hip fracture increases the risk of other osteoporotic fractures including recurrent hip fractures, older patients hip fractures are not adequately treated for osteoporosis.

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