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# Recurrent hip fracture prevention with osteoporosis management

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## Abstract

**Background:** Osteoporosis is a major public health threat, and hip fracture is a serious consequence of osteoporosis. A patient with an osteoporosis-related hip fracture has an increased risk for a second hip fracture. The effect of osteoporosis management on the risk of recurrent hip fracture was evaluated in this study.

**Methods:** 58 hip fracture patients older than 50yr and BMD $\leq$ 2.5 were discharged from hospital with Ca-Vitamin D- Alendronate prescriptions, and followed up for 4 years to determine the rate of recurrent hip fractures. Rate of second hip fractures was compared with 58 hip fractures in the control group (without osteoporosis treatment) which were also followed for 4 years.

**Results:** 72% of patients continued treatment for 2 years. There were no second hip fractures in the critical first 12 months in the treated group. Overall second hip fractures in osteoporosis treated and control groups were 3.4% and 8.6% ($p<0.03$), respectively.

**Conclusion:** Management of hip fractures in the elderly should include bone mineral density determination and osteoporosis treatment to prevent further fractures.

**Keywords:** Second hip fracture, Osteoporosis management, Prevention

## Introduction

Osteoporosis is a condition in which Bone Mineral Density (BMD) is $\leq$ 2.5 SD below young adults with Dual X-ray Absorptiometry (DXA) T score. Low bone mass limits of $\leq$ and $\geq$ 2.5 is termed osteopenia[1]. Osteoporosis is a major public health threat for an estimated 55% of people with 50 years of age and older. Hip fracture is a common and serious consequence of osteoporosis. Even a small increase in lifespan will lead to a large increase in the rate of hip fractures. The total number of hip fractures worldwide was estimated to be 1.7 million in 1990, and is projected to climb to 6.3 million in 2050 [2,3,4]. The number of men and women with disabilities directly related to these fractures is reaching epidemic proportions. Approximately 50% of women who sustain a hip fracture lose the ability to walk normally and complications directly related to the fracture cause a 20% increase in mortality during six months after the fracture. Patients presenting with an osteoporotic related hip fracture are at increased risk of second hip fracture [5]. The life time risk of sustaining

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an osteoporotic fracture has been estimated at 50%, compared with 9% for breast cancer, and 31% for coronary artery disease [6]. Numerous studies improved osteoporosis treatment following hip fracture in orthopedic departments [7,8,9].This study was undertaken to access the efficacy of osteoporosis treatment, and recurrent hip fracture prevention in patients with a history of hip fracture.

## Methods

This clinical trial study was performed in Urumia Shahid Motahhari Hospital, the main orthopedic center of Western Azerbaijan province with 800,000 population. Since April 2002 patients older than 50 years admitted with a hip fracture underwent fracture treatment followed by management for osteoporosis, BMD measurement and treatment with Ca 1000 mg, Vit D 800 units, and Alendronate sodium10 mg/day for 2 years [10,11]. Excluding criteria were: acute medical complications requiring intensive care, long term steroid therapy, paralytic and bed ridden patients, high energy trauma, normal BMD and previous osteoporosis treatment. 76 patients were followed up for 48 months. Continuity of ordered treatment and evidence of second hip fractures were present in 58 surviving patients. 58 accessible previous hip fracture patients, admitted before April 2002 with mentioned criteria were matched as the control group. Second hip fractures were detected in their first 4 years of follow-up, and compared with the study group by Fischer's exact and chi-square tests. Most of our older than 80 years old patients died in both groups.

| | Intervention group | Control group |
|---|---|---|
| Patients | 58 | 58 |
| Follow up | 40-55 months | Until 48 months |
| Trochanteric fracture | 41 | 39 |
| Femoral neck fracture | 17 | 19 |
| Internal fixation | 47 | 43 |
| Prosthesis | 10 | 12 |
| Traction | 1 | 3 |

Table1. Baseline data of patients participating in the study

## Results

Both groups contained 60% men and 40% women. The mean and SD ages of patients in osteoporosis managed and control groups were not statistically different (62 ±9.1yr. and 61±7.9yr.). Osteoporosis treatment was continued for 24, 12, and 6 months in 72, 20, and 8 percent of patients. Mechanism of fractures was a fall in all patients. Femoral shaft and other especially osteoporotic related vertebral and wrist fractures were not considered in this study. Per year and site of second hip fractures are presented in Table 2.

There were no recurrent hip fractures in the first critical 12 months in the intervention group. Comparing the 4 year second hip fractures in osteoporosis treated and control groups (3.4% and 8.6%), a significant reduction ($p<0.03$) was determined.

## Conclusion

Old individuals with hip fractures almost

| Recurrent hip fracture | Intervention group | Control group |
|---|---|---|
| First yr | Non | 2 |
| Second yr | 1 | Non |
| Third yr | Non | 2 |
| Fourth yr | 1 | 1 |
| Trochanteric | 1 | 5 |
| Femoral neck | Non | Non |
| Prosthetic | 1 | Non |
| Female | 1 | 3 |
| Male | 1 | 2 |
| Ipsilateral | 1 | 1 |
| Other side | 1 | 4 |

Table 2. Distribution of recurrent hip fractures in osteoporosis managed and control patients

always have osteoporosis[12]. Patients who suffer a hip fracture can lose a significant amount of bone mineral density in the contralateral femoral neck during the first 12 months after the fracture. The frequency of recurrent hip fracture is also high in this population, with reported rates ranging from 5.2% in the first year to as high as 10.3% over 3 years [13, 14]. Other studies have shown that cases of hip fracture have a 2.3% annual risk of second hip fracture [15]. The mean intervals between the first and second hip fractures varies between 1 and 7 years but the majority of second hip fractures occur within a few years of the first hip fracture [16]. Most recurrent hip fractures are contralateral [17].

There is also evidence that treatment of osteoporosis with bisphosphates such as Alendronate can produce a 42- 47% risk reduction for first hip fracture (from 3.2% to 1.9%) [18, 19].

Our study revealed that bone resorption especially during the first year in elderly patients with a hip fracture can be inhibited by bisphosphate treatment and the risk rate of second hip fracture is reduced. Treated patients did not develop a recurrent hip fracture in the first 12 months after hip fracture and mean per year risk of second hip fracture was reduced from 2.1% to 0.8% in 4 years follow up.

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