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Original Article

Improvement in the rate of inadequate pharmaceutical treatment by orthopaedic surgeons for the prevention of a second fracture over the last 10 years

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ABSTRACT

Background: We have previously reported that the low rate of osteoporosis patients treated with anti-osteoporotic drugs following surgical treatment for the first fragility fractures by orthopaedic surgeons during 3 years from 2000 to 2003 was only 13.1%. Ten years have now passed our previous study, and we hypothesized that the rate of appropriate pharmacologic treatment for the prevention of secondary fractures has improved.

Methods: We studied 730 osteoporosis patients (102 men and 628 women; average age of 78 years, range 33–102 years) who underwent surgical treatment for fragility fractures, during 3-year period from 2010 to 2012. The 730 cases consisted of 489 hip fractures and 241 distal radius fractures. All patients were admitted and underwent surgical intervention in hospitals. Variables were examined to ascertain whether pharmaceutical treatment was performed after discharge. Based on these data, we compared results for patients in the present study with those from our previous study.

Results: The rate of treatment with anti-osteoporosis medication in the present (16.2%) was slightly but significantly improved from that in our previous study (13.1%). The rate of pharmaceutical treatment following hip fractures increased significantly, while that following distal radius fractures showed no significant change. Regarding the categories of anti-osteoporotic drugs prescribed to the patients, the rate of treatment with bisphosphonate as a higher evidenced drug for the prevention of fractures in the present study was significantly higher than that in our previous study.

Conclusion: We demonstrated that the rate of pharmacologic treatment by orthopaedic surgeons and the rate of more effective anti-osteoporotic drugs prescribed to the patients following surgical intervention for the first fragility fracture in the present study were improved in comparison with those of 10 years ago.

1. Introduction

Osteoporosis is a silent disease that often remains asymptomatic and undetected. However, it is recognized as an important public health problem as fragility fractures in osteoporosis patients are significantly associated with increased morbidity and mortality [1]. Treatment with anti-osteoporosis drugs is essential for patients after their initial fractures as the first fracture is the highest risk factor for a second fracture [2,3]. However, a number of studies have indicated that patients with osteoporotic fractures receive inadequate pharmacological treatment for osteoporosis [4–9]. Based on an investigation of Japanese patients, Hagino et al. [10] recently demonstrated that most patients sustaining a hip fracture receive no pharmaceutical treatment for the prevention of a second fracture.

Iba et al. [11], previously, investigated the rate of osteoporosis patients receiving anti-osteoporotic drugs following fractures of

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hip, distal radius or proximal humerus from orthopaedic surgeons in the four central hospitals in regional cities in Hokkaido prefecture. All patients were admitted and underwent surgical treatment in those hospitals during the 3-year period from 2000 to 2003. The study has also shown that the rate of pharmacologic intervention to prevent secondary fractures after surgical treatment was remarkably low [11]. More than 10 years have now passed since our previous study, and several national and international evidence-based clinical practice guidelines for the prevention of osteoporotic fractures have been established. In addition, a number of anti-osteoporosis agents have been extensively studied and indicated as effective options for medical treatment. We, therefore, hypothesized that more physicians might have now come to recognize that appropriate pharmacologic treatment is necessary for osteoporosis patients with primary fractures with a greater focus on the issue of prevention of secondary fractures during the 10 or more years. The aim of this study was to investigate the rate of treatment with anti-osteoporosis drugs for post-operative patients with osteoporotic fractures of the hip and distal radius, and confirm whether the inadequacies associated with the pharmaceutical treatment for prevention of the second fractures have improved or not in comparison to those observed in our study 10 years ago. We found that the rate of cases treated with bisphosphonate, selective estrogen receptor modulator and bisphosphonate plus vitamin D3 in the present study was significantly increased compared to those in our previous study.

2. Materials and methods

During the 3-year period from January 2010 through December 2012, 730 osteoporosis patients were treated with surgery for fragility fractures in 2 hospitals that function as base hospitals in regional cities in Hokkaido prefecture in Japan for the treatment of trauma patients, and there were no physicians specializing in osteoporosis treatment. These hospitals were the same hospitals as those in the previous study [11]. Fragility fracture, including those of the hip and distal radius, was defined as a non-traumatic bone fracture caused by slight external force to a bone [12]. Data on patient demographics and treatment were collected from medical records. All of the patients were admitted to the hospitals and underwent surgical treatment for the fractures. Enrolled patients consisted of 102 men and 628 women (ratio, 1:6.2), with an average age of 78 years (range 33–102 years), which were not significantly different from those in the previous study [11]. Mean hospitalization period was 37 days (5–115 days). The two fracture sites were hip in 489 (average age; 80 years) and distal radius in 241 patients (average age; 70 years). This study was approved by the Institutional Review Board in the Hospital (No. 24-5012). The patients were informed that data from the case would be submitted for publication, and gave their consent. In accordance with the previous study [11], variables were examined to ascertain whether osteoporosis patients were medicated with anti-osteoporotic drugs after discharge from the hospitals. We divided the patients into 4 groups: those not medicated pre- or post-fracture (no treatment group), those who took the same medicine pre- and post-fracture (no change group), and those receiving medication pre-fracture but whose drug prescription was changed post-fracture (change group), those not medicated pre-fracture and prescribed a new medication post-fracture (new treatment group). We also investigated the types of anti-osteoporotic drugs prescribed for these patients for comparison with those in the previous study [11]. The data obtained in the present study were compared to those from the previous study of 10 years ago [11]. With regard to those patients sustaining a distal radius fracture, we also investigated the rate of patients who was examined for bone mineral density (BMD). In addition, we investigated whether the patients were transferred to other medical care facilities or allowed to return home after discharge.

Differences in rates between the present study and our previous study were evaluated using χ^2 test and Fisher's exact test. Characteristic cells in the cross table were identified as those −2 below or +2 above the adjusted standardized residual values indicated roughly as z scores.

3. Results

All patients with hip or distal radius fracture were admitted to hospitals for surgical treatment. In 489 patients with hip fracture, osteosynthesis was performed in 338 cases and hemiarthroplasty in 151 cases. Two hundred and forty one patients with distal radius fracture underwent osteosynthesis, with a locking plate used in 237 cases and pinning in 4 cases.

Six hundred and twelve patients (83.8%) did not receive any anti-osteoporotic medication (no treatment group) and 118 patients (16.2%) were prescribed medications for the treatment of osteoporosis after discharge from hospital. Fifty one (7.0%) of these 118 patients received the same drugs after the fracture as they did before the fracture (no change group), 4 (0.6%) were given a different drug for osteoporosis (change group), and 63 (8.6%) began taking anti-osteoporotic drugs after the fracture (new treatment group) (Table 1). Of the 118 patients who received medication for osteoporosis, monotreatment with bisphosphonates (BP), such as alendronate, risedronate or minodoronate, was noted for 37 patients (31.4%); selective estrogen receptor modulator (SERM) for 11 patients (9.3%); alfacalcidol, calcitriol or eldecalcitol (VD3) for 32 patients (27.1%); BP with VD3 for 28 patients (23.7%); and Others, including vitamin K, calcitonin or monotreatment with calcium, for 10 patients (8.5%) (Table 2). Regarding the 489 hip fractures, 408 patients (83.4%) were in the no treatment group, 34 (7.0%) were in the no change group, 3 (0.6%) were in the change group, and 44 patients (9.0%) were in the new treatment group (Table 3). Of the 241 patients with a distal radius fracture, 204 (84.6%) were in the no treatment group, 17 (7.1%) were in the no change group, 1 (0.4%) was in the change group, and 19 patients (7.9%) were in the new treatment group (Table 3).

A comparison with the data from the previous study [11], which included 299 cases with hip fractures and 97 cases with distal radius fractures over a 3-year period from April 2000 through March 2003, showed that the rate of treatment with anti-osteoporosis medication in the present and our previous study

Table 1
Rate of treatment with anti-osteoporotic medication following fragility fractures.

Group	Rate of medication (%)	
	Present[a]	Previous
No-treatment	612 (83.8)	344 (86.9)
No-change	51 (7.0)	29 (7.3)
Change	4 (0.6)[#]	7 (1.8)
New-treatment	63 (8.6)[##]	16 (4.0)
Total	730 (100.0)	396 (100.0)

Present, the present study; previous, our previous study (Ref. [11]).
No-treatment, no medication at pre- or post-fracture; no-change, the same medication at pre- and post-fracture; change, receiving medication at pre-fracture and prescribed a new drug at post-fracture; new-treatment, no medication at pre-fracture and a new medication at post-fracture.
[#]The proportion of patients in the change group was significantly decreased and [##] that in the new-treatment group was significantly increased in the present study compared to the values in our previous study based on adjusted residual analysis.
[a] Rate of medication in the present study was significantly different from that in our previous study (χ^2 test, $p = 0.008$).

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