



Original article

Trends in post osteoporotic hip fracture care from 2010 to 2014 in a private hospital in Malaysia



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ABSTRACT

Objective: Following an osteoporotic fracture, pharmacological treatment is recommended to increase bone mineral density and prevent future fractures. However, the rate of starting treatment after an osteoporotic hip fracture remains low. The objective of this study was to survey the treatment rate following a low-trauma hip fracture at a tertiary private hospital in Malaysia over a period of 5 years.

Methods: The computerised hospital discharge records were searched using the terms “hip,” “femur,” “femoral,” “trochanteric,” “fracture,” or “total hip replacement” for all patients over the age of 50, admitted between 2010 and 2014. The medical charts were obtained and manually searched for demographic data and treatment information. Hip operations done for non-low-trauma-related fracture and arthritis were excluded.

Results: Three hundred seventy patients over the age of 50 years were admitted with a hip fracture, of which 258 (69.7%) were low trauma, presumed osteoporotic, hip fractures. The median age was 79.0 years (interquartile range [IQR], 12.0). Following a hip fracture, 36.8% (95 of 258) of the patients received treatment, but out of these, 24.2% (23 of 95) were on calcium/vitamin D only. The median duration of treatment was 1 month (IQR, 2.5). In 2010, 56.7% of the patients received treatment, significantly more than subsequent years 2011–2014, where approximately only 30% received treatment.

Conclusions: Following a low-trauma hip fracture, approximately 72% of patients were not started on active antiosteoporosis therapy. Of those who were, the median duration of treatment was 1 month. This represents a missed opportunity for the prevention of future fractures.

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1. Introduction

Osteoporosis is defined as a skeletal disorder characterized by compromised bone strength predisposing a person to an increased risk of fracture [1]. Typical osteoporosis fractures occur in the wrist, spine and hip. All osteoporosis fractures, especially at the hip, substantially increase the risk of death in the near term and are a major cause of morbidity in the elderly [2]. One-year mortality rates

have ranged from 12% to 37% with approximately 50% of patients unable to regain their ability to live independently [2]. In addition, since a prior fracture is a well-established risk factor for future fracture [3], it is therefore recommended that after a fragility fracture, all patients be assessed and treated for osteoporosis [4,5].

However, rates of treatment following a hip fracture are widely variable; but generally rather poor. An Italian study has shown 78% of patients receiving pharmacological treatment and 68.7% given calcium and vitamin D (CaD) after a hip fracture [6]. Conversely, other studies have shown treatment rates as low as 6% in Belgium [7], 7.2%–13% in USA [8,9], 15% in the Netherlands [10], 25% in Spain [8] to 39% in Finland [11]. In the limited number of studies with Asian patients, it was found that 33% of patients were given medication for osteoporosis after hospitalisation for a hip fracture

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[12] and 39% of patients from Korea filled more than one prescription for medication for osteoporosis after a hip fracture [8].

The objective of this study was to survey the postdischarge low-trauma hip fracture treatment rate at an urban tertiary care private hospital in Malaysia.

2. Methods

This was a retrospective study based on medical record review. The computerized hospital discharge records were searched using the terms “hip,” “femur,” “femoral,” “trochanteric,” “fracture,” or “total hip replacement” for all patients over the age of 50, admitted between the years of 2010–2014. The medical records were obtained and manually searched for information on patients' demographics and their pharmacological treatment for osteoporosis. Patients who had hip operations for traumatic fractures or for arthritis were excluded.

Ethical approval for the study was obtained from the Independent Ethics Committee, Ramsay Sime Darby Healthcare (Ethics Committee reference 201211.5) and the Ethics Committee Universiti Putra Malaysia (JKEUPM) (JKEUPM reference No. FPSK [EXP16-Medic]U036).

Statistical analysis was performed using IBM SPSS Statistics ver. 22.0 (IBM Co., Armonk, NY, USA). The analysis of variance (1-way analysis of variance) was used to examine the differences in age and body mass index, and the 2-tailed Student t-test was used to assess any differences between those given treatment and those who were not, between the years 2010–2014.

3. Results

From 1 January 2010 to 31 December 2014, there were 370 patients over the age of 50 with hip fractures/operations. After excluding patients who had procedures for trauma (non-low-trauma) or arthritis, there was 258 (69.7%) presumed osteoporotic fractures.

There were 193 female (74.8%) and 65 male patients (25.2%). The median age was 79.0 years (interquartile range [IQR], 12.0 years). There were 20 Malays (7.8%), 200 Chinese (77.5%), 31 Indians (12.0%), and 7 other races (2.7%). There were 35 patients (12.6%) who were noted to have had a previous low-trauma fracture, of whom 4 received medication. Of these, 3 patients received a bisphosphonate with calcium (duration of treatment 1 month, 1 year, and 2 years) and the other patient received CaD alone (duration of treatment not known).

The number of patients who were treated or not treated in each year is shown in Table 1. Significantly more patients were treated in 2010 compared to the later years; however, there was no difference in the number of patients treated in the years 2011–2014 (chi-square, $P > 0.05$ for comparisons between all years 2011–2014 [data not shown]). Overall, 95 of 258 (36.8%) received treatment after their hip fracture, but out of these, 23 of 95 (24.2%) were

prescribed calcium/vitamin D only, leaving 72 of 95 (75.8%) given active osteoporosis treatment. Thus overall, 72 of 258 (27.9%) of the total osteoporotic hip fracture population given active osteoporosis therapy.

Table 2 shows the various types of treatment given in each year of the study. Forty-seven of 95 patients (49.5%) received calcium/CaD/vitamin D together with active osteoporosis medication. The most commonly prescribed antiosteoporosis medication was the bisphosphonates with 37 prescriptions (38.9%), both on its own or in combination. Of these, 17 patients were given intravenous (IV) zoledronate. Overall mean duration of treatment was 3.35 ± 4.44 months, median, 1.0 months (IQR, 2.5 months). Excluding those who had IV zoledronate, the mean duration of treatment was 1.26 ± 1.28 months, median, 1.0 months (IQR, 0.81 month).

Table 3 shows the types of hip fracture, the operations performed and the outcome. Although the majority of hip fractures were at the femoral neck, there were 15 of 258 femoral shaft fractures (5.8%), which would have included any possible atypical fractures. However, none of these femoral shaft fractures were reported as atypical fractures by the radiologists. None of the patients with femoral shaft fractures had been on bisphosphonates. Median duration of hospital stay was 7 days (IQR, 4 days). At 3 months, only 26 patients (10.1%) returned for a follow-up visit, with consecutive reduction in patient follow-up at 6 months and 12 months with 9 (3.5%) and 3 patients (1.2%), respectively.

4. Discussion

This study was conducted at a private hospital with 393 beds in an urban area. The hospital has a busy Accident and Emergency Department and would be the main hospital for anyone seeking private medical care in the area. Furthermore, it also would receive patients from smaller private hospitals that may not have the facilities for more complicated cases. We studied 5 consecutive years from 2010 to 2014 so as to ensure that the results had validity and found that the numbers were broadly similar. Thus, we would suggest that the results are representative of the hospital admissions.

In general, studies have shown that there is a low rate of starting treatment after an osteoporotic hip fracture [7–10]. A large prospective, observational cohort of women from Canada, Australia, Europe, and United States showed that only 17% started antiosteoporosis medication after an incident fracture [13]. Even within the same country, studies have shown different rates e.g., one Italian study showed treatment rates of 78% [6], but another had a treatment rate of only 33.9% [14]. Rates of treatment following low-trauma fractures in the United States have showed different results, but they have been generally lower than 30%. Kim et al. [8] found that 11% of US Medicare patients received after hip fracture treatment but a slightly higher rate of 13% from a US commercial health insurer. Gillespie and Morin [9] studying a private insurance medical and pharmacy claims database showed that only 7.2% received osteoporosis medication at 6 months after a hip fracture [9]. A study from a Pennsylvania Medicare medication database showed that between 2002 and 2004, 31% of patients received treatment after a hip fracture [15].

There have not been many studies in Asian populations. A Korean study examining their Health Insurance Review and Assessment Service database showed that 3 months after a hip fracture, 39% of patients had been prescribed antiosteoporotic medication [8]. Kung et al. [12] looked at treatment received following a low-trauma hip fracture in 6 Asian countries—mainland China and Hong Kong, Singapore, South Korea, Malaysia, Taiwan, and Thailand. Rates of treatment varied from over 60% at 6 months in South Korea and Thailand to below 20% in mainland

Table 1

Comparison of the proportion of patients who were treated and not treated from 2010 to 2014.

Year	Treated	Not treated	P-value
2010 (n = 60)	34 (56.7)	26 (43.3)	—
2011 (n = 58)	17 (29.3)	41 (70.7)	0.003
2012 (n = 53)	17 (32.1)	36 (67.9)	0.009
2013 (n = 44)	14 (31.8)	30 (68.2)	0.012
2014 (n = 43)	13 (30.2)	30 (69.8)	0.008

Values are presented as number (%).

* $P < 0.05$, statistically significant differences compared to 2010. Chi-square test.

Table 2
Pharmacological treatment of post-low trauma hip fracture.

Treatment & duration	Year				
	2010 (n = 60)	2011 (n = 58)	2012 (n = 53)	2013 (n = 44)	2014 (n = 43)
No treatment	26 (43.3)	41 (70.7)	36 (67.9)	30 (68.2)	30 (69.8)
Calcium only	4 (6.7)	2 (3.4)	1 (1.9)	3 (6.8)	1 (2.3)
Calcium + vitamin D	4 (6.7)	0 (0)	0 (0)	2 (4.5)	5 (11.6)
Vitamin D	1 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)
Calcium + bisphosphonate	1 (1.7)	1 (1.7)	0 (0)	1 (2.3)	0 (0)
Calcium + strontium	3 (5.0)	0 (0)	0 (0)	0 (0)	0 (0)
Calcium + denosumab	0 (0)	0 (0)	0 (0)	0 (0)	1 (2.3)
Calcium + teriparatide	0 (0)	2 (3.4)	0 (0)	1 (2.3)	0 (0)
Calcium + vitamin D + bisphosphonate	5 (8.3)	4 (6.9)	7 (13.2)	3 (6.8)	3 (7.0)
Calcium + vitamin D + strontium	5 (8.3)	2 (3.4)	0 (0)	0 (0)	0 (0)
Calcium + vitamin D + teriparatide	1 (1.7)	1 (1.7)	1 (1.9)	1 (2.3)	0 (0)
Calcium + vitamin D + bisphosphonate + strontium	3 (5.0)	0 (0)	0 (0)	0 (0)	0 (0)
Calcium + vitamin D + bisphosphonate + teriparatide	0 (0)	0 (0)	1 (1.9)	0 (0)	0 (0)
Bisphosphonate	2 (3.3)	1 (1.7)	3 (5.7)	1 (2.3)	1 (2.3)
Strontium	2 (3.3)	3 (5.2)	4 (7.5)	2 (4.5)	0 (0)
Teriparatide	0 (0)	1 (1.7)	0 (0)	0 (0)	0 (0)
Not known	3 (5.0)	0 (0)	0 (0)	0 (0)	0 (0)
Duration of treatment, mo	3.53 ± 4.62	2.37 ± 3.86	3.05 ± 4.30	4.30 ± 5.35	3.68 ± 4.30
Median duration of treatment, mo	1.00	0.63	1.00	1.00	2.00
Duration of treatment excluding IV zoledronate, mo	1.22 ± 1.16	1.00 ± 0.97	1.26 ± 1.38	0.88 ± 0.36	2.02 ± 2.02
Median duration of treatment excluding IV zoledronate, mo	1.00	0.88	1.00	1.00	1.00

Values are presented as number (%) or mean ± 1 standard deviation unless otherwise indicated.
IV, intravenous.

Table 3
Hip fracture data and outcome.

Variable	Year				
	2010 (n = 60)	2011 (n = 58)	2012 (n = 53)	2013 (n = 44)	2014 (n = 43)
Site of fracture					
Femoral neck	31 (51.7)	37 (63.8)	34 (64.2)	27 (61.4)	32 (74.4)
Intertrochanteric	20 (33.3)	13 (22.4)	14 (26.4)	11 (25.0)	10 (23.5)
Subtrochanteric	4 (6.7)	3 (5.2)	3 (5.7)	3 (6.8)	0 (0)
Femoral shaft	5 (8.3)	4 (6.9)	2 (3.8)	3 (6.8)	1 (2.3)
Not known	0 (0)	1 (1.7)	0 (0)	0 (0)	0 (0)
Operation performed					
THR	12 (20.0)	12 (37.9)	22 (41.5)	9 (20.5)	12 (27.9)
Hemi-arthroplasty	16 (26.7)	14 (24.1)	10 (18.9)	11 (25.0)	15 (34.9)
Plate	7 (11.7)	4 (6.9)	3 (5.7)	7 (15.9)	2 (3.8)
Rod	1 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)
Gamma nail	2 (3.3)	5 (8.6)	1 (1.9)	3 (6.8)	4 (9.3)
DHS	22 (36.7)	22 (37.9)	16 (30.2)	13 (29.5)	10 (23.5)
Combination	0 (0)	1 (1.7)	0 (0)	1 (2.2)	0 (0)
No operation	0 (0)	0 (0)	1 (1.9)	0 (0)	0 (0)
Mobility on discharge					
Walking without aid	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walking with stick	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Walking with frame	40 (66.7)	35 (60.3)	42 (79.2)	34 (77.3)	30 (69.8)
Using wheelchair	16 (26.7)	22 (37.9)	11 (20.8)	10 (22.7)	12 (27.9)
Bed-bound	1 (1.7)	0 (0)	0 (0)	0 (0)	1 (2.3)
Died	1 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)
Data missing	2 (3.3)	1 (1.7)	0 (0)	0 (0)	0 (0)

Values are presented as number (%).

THR, total hip replacement; DHS, dynamic hip screw.

China, Hong Kong, and Singapore. As part of that study, there were 72 patients from university/academic centres in Malaysia, where 44.4% were treated with antiosteoporosis treatment following a hip fracture at 6 months [12]. Comparatively, our study showed only slightly less patients (36.8%) being treated after a hip fracture in a private hospital. This is comparable to overall study result of Kung et al. [12] of 33.3% receiving treatment. Thus, our study confirms that treatment following an osteoporotic hip fracture remains low in Malaysia.

Our study showed that more patients were treated following a hip fracture in 2010 (56.7%) compared to the subsequent years

2011–2014 (approximately 30%). Similarly, a study looking at a commercial health insurance database covering people across the United States found a reduction in the number of people treated following a low-energy hip, vertebral or wrist fracture between 2000 and 2009 [16]. In women, 23.8% received treatment during 2001–2002 compared to 15.9% during 2007–2009. For men, over the same period, the numbers treated were 10.6% and 8.5%, respectively [16]. In contrast, a study looking at treatment after a hip fracture from a Pennsylvania Medicare medication database showed that treatment rates increased from 7% in 1995 to 31% in 2002 and remained stable until the end of the study in 2004 [15].

One other possible reason for a declining rate of treatment in 2010 compared to subsequent years could be due to the increasing reports of the association of atypical femoral fractures with bisphosphonate use. One of the initial case series came from Singapore, a neighbouring country to Malaysia, where the authors found that 9 out of 13 cases of low-energy subtrochanteric fractures had been on alendronate, an amino-bisphosphonate, for a median of 5 years prior to the fracture [17]. More reports followed until in 2010, the American Society of Bone and Mineral Research published its first task force report on atypical fractures which suggested that the risk of these fractures increased with increasing duration of bisphosphonate use [18]. Unfortunately, the effect of such reports was to reduce the use of antiosteoporosis medication generally, with many doctors reluctant to even start medication. In Malaysia, the pharmaceutical industry sales tracking data showed that purchases of antiosteoporotic drugs fell during that period with an estimated 34,000 patient-years treatment in 2012, reducing to approximately 30,000 patient-years treatment in 2015 (Data from IMS Health Malaysia (www.quintileIMS.com), personal communication). This would suggest that our data is just reflecting the trend throughout the country.

CaD supplementation is recommended as adjunctive therapy together with active antiosteoporosis medication as the clinical trials for osteoporosis therapies have all included these 2 supplements [19]. CaD supplementation in the older population have been shown in meta-analyses to have a modest effect on the reduction of fracture risk [20,21] but it is not recommended as the sole treatment in patients with established osteoporosis [5]. Interestingly, it has been shown that CaD supplementation after a hip fracture has an effect in reducing mortality at 1 year, similar to that of taking antiosteoporosis medication, and in combination (CaD and osteoporosis therapies), the reduction in mortality is greater. A study from Finland showed that the unadjusted 1-year mortality hazard ratio (HR) for those taking CaD supplementation was 0.74 (95% confidence interval [CI], 0.61–0.81), which was similar to the reduction in those taking antiosteoporosis medication HR 0.79 (95% CI, 0.67–0.93). In combination, the 1-year mortality HR was further significantly reduced to 0.62 (95% CI, 0.5–0.76) [22].

In our study, almost 50% of patients on antiosteoporosis medication were on concomitant calcium/CaD/vitamin D but 24.2% were just given these supplements alone. Previous studies have shown similar treatment knowledge gaps. A study from 2 hospitals in Finland showed that 14% of their patients following a hip fracture received CaD only [11]. In a pharmacy and discharge database study after hip fracture from US, 6.6% of patients received CaD alone, 7.3% received antiosteoporosis therapy and only 2% received both [23].

For the 36.8% of patients that started treatment in this study, the median duration of treatment was disappointing, only 1.0 months, because there would be no benefit from taking treatment for such a short period of time. This may be due to the low level of follow-up with only 10.1% returning for a 3-month follow-up appointment. Other studies have similarly shown that the persistence rate for taking osteoporosis medication at 1 year is low, varying from 34% [24] to 43% [25].

Subtrochanteric and femoral shaft fractures constitute 4%–10% of all femur fractures [26]. Within those fractures, a subset would be the atypical femoral fractures that have been associated with bisphosphonate therapy. In our sample, we had 5.8% of femoral shaft fractures, which is not higher than the previously reported number. In addition, all those patients with femoral shaft fractures had not been exposed to bisphosphonates prior to their fracture. Thus, within this small sample, we did not observe bisphosphonate-related femoral shaft fractures.

To improve the treatment of patients following a fracture, it had been shown 10 years ago that having a dedicated staff or “case

manager” to counsel and follow-up patients improved the number of patients receiving treatment after a hip fracture; 6 months after the hip fracture, 51% of patients in the intervention group were receiving bisphosphonate therapy compared with 22% of patients in the control group (adjusted odds ratio, 4.7; 95% CI, 2.4–8.9; $P < 0.001$) [27]. More recently, both the International Osteoporosis Foundation [28] and the American Society of Bone Mineral Research [29] recommend a coordinator-based model of care known as a Fracture Liaison Service (FLS) as the model of choice to be adopted by all hospitals and outpatient facilities that are treating fragility fracture patients for prevention of secondary fractures following the first fracture. FLS programs have been shown to be cost-effective and cost-saving for the prevention of secondary fractures [30]. This study's results would add to the evidence supporting the need to establish such a FLS program in the hospital to increase the treatment rate following an osteoporotic hip fracture.

There are some weaknesses in this study which may limit the interpretation of the results. Firstly, the numbers are small as it was single center review, as compared to previous other studies that looked at prescription database data. However, as there are very few data from Asian countries, we feel that these results are relevant in documenting suboptimal post osteoporotic hip fracture care. In addition, it was a retrospective case note review, which may have not fully documented the information required. Nevertheless, as the numbers were fairly similar throughout the 5 years of the study, the information should have some validity. There was also a preponderance of one ethnic group in our study, the Chinese, which is likely due to the fact that hospital is situated in an urban area that has more ethnic Chinese residents. Thus, these results may not be generalizable to the rest of the Malaysian population that has an ethnic Malay majority.

5. Conclusions

In conclusion, following a hip fracture, approximately 72% of patients were not prescribed active antiosteoporosis therapy. Of those who were, the median duration of treatment was one month. There was a reduction in patients getting treated from 2011–2014 compared to 2010. Despite the availability of proven effective active antiosteoporosis therapies, patients with osteoporotic hip fractures are not prescribed these medications, and even when initiated on such therapies, do not remain on therapy. This represents a missed opportunity for the prevention of future fractures.

Conflicts of interest

No potential conflict of interest relevant to this article was reported.

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