

Osteoporosis Intervention by New Zealand Orthopaedic Departments in  
Patients with Fragility Fractures:  
A multi-centre audit

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### **Abstract**

#### *Background*

Osteoporosis is common in elderly patients admitted to Orthopaedic Units with fractures, placing a large burden on healthcare expenditure. Orthopaedic units can identify patients who require bone density assessment and possible treatment. Previous surveys of orthopaedic surgeons have shown a wide variance in their perceived role in this.

#### *Method*

A retrospective note review of 305 patients aged over 55 years with a fragility fracture, who were admitted under the orthopaedic service of 8 New Zealand hospitals. Notes from a subsequent rehabilitation unit admission were also reviewed if available.

#### *Results*

The mean age was 80.6 years (range 55-104). 77% were female. The most common fracture was of the hip (61.6%). 236 patients (77.4%) were not taking osteoporosis medication at time of admission, 2.5% of these had a Bone Mineral Density assessment ordered and 11.9% were started on osteoporosis treatment, giving an overall intervention rate (investigation or treatment) of 14.4%. A visiting orthogeriatric service initiated this treatment in 82.1% of cases. Osteoporosis was listed on the discharge summary in 31.8% of patients who were taking osteoporosis treatment on admission and in only 10.7% of patients who were started on treatment.

#### *Conclusions*

Management of osteoporosis is largely ignored by New Zealand orthopaedic units. This is similar to published data from other countries. Hospitals with the highest rates of osteoporosis intervention had an orthogeriatric service. When the orthopaedic service initiated treatment it was not optimal. Osteoporosis was not noted in most orthopaedic unit documentation.

### **Introduction**

Osteoporosis is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, with an increased fracture susceptibility. The definition of a fragility fracture is not clear cut, but generally accepted as an injury resulting from a low energy mechanism that would not otherwise be expected to cause a fracture<sup>1</sup>.

Osteoporosis is common in elderly patients admitted with fractures. Fragility fractures present a significant burden on the health system<sup>2,3,4</sup>. In New Zealand and Australia about 11% of men and 27% of women aged 60 years or more are osteoporotic. Overseas data shows that up to 80-90% of fractures in patients aged 60 to 74 years can be attributed to osteoporosis. This figure rises to up to 95% for patients aged 75 years or older<sup>5</sup>. The lifetime risk for having an osteoporotic fracture after 50 years of age is 42% in women and 27% in men<sup>6</sup>.

Orthopaedic surgeons are in a position to identify osteoporosis early. A fracture of the distal radius can be regarded as a "sentinel" fracture<sup>7,8</sup>. Treatment initiated at this stage can help prevent more serious fractures later<sup>9</sup>.

International evidence shows that there is minimal investigation and management of osteoporosis by orthopaedic units for patients with fragility fractures<sup>10,11,12,13,14</sup>. This is despite several countries having their own treatment guidelines<sup>15,16,17</sup>. In our literature search we could find no multi-centre review of osteoporosis management by New Zealand orthopaedic surgeons.

This study is one arm of a larger international study examining the same topic in several different countries. This is run by the Bone and Joint Decade Trust.

## **Method**

Ethical approval for the study was obtained from the New Zealand Multi Region Ethics Committee. Nine hospitals in New Zealand were contacted through the head of each hospital's orthopaedic and coding departments. Eight of the hospitals were able to participate within the time frame of the study. Requests were sent to each hospital for at least 50 patients admitted from 1/11/05 onwards. Inclusion criteria were: age >55 years and admission under the orthopaedic service with fractures of the hip, vertebrae, proximal humerus, distal radius or ankle. Fractures were identified from the ICD10 diagnosis codes. We defined a fragility fracture as being due to a force equivalent to a fall from a standing height. The ICD10 codes were kept as generic as possible to minimise missed patients. Exclusion criteria were high velocity trauma, pathological fractures and patients who died.

Patient lists were obtained through the coding departments of each hospital. The notes were gathered by the respective Clinical Records departments. The notes were reviewed on site by the chief investigator (HSC). The data headings collected are listed in Table 1. Data was recorded onto a database program (Access 2003 – Microsoft Corporation). If the patient had more than one fracture the first listed on the coding sheet was used as the reference injury. The notes for any subsequent admission to a rehabilitation unit were also reviewed if they were available.

## Results

Requests were sent for lists of at least 50 consecutive patients from each hospital. After the removal of patients who met exclusion criteria and those whose records were incorrectly coded or not available, a total of 305 patients were recorded. The breakdown of mean age and proportion of males to females by hospital is shown in Table 2. The mean number of patients per hospital was 38 (range 28 – 47). The mean age was 77.4 years for females (55-104) and 75.5 years (56 -97) for males.

The most common fracture was that of the hip (61.8%), followed by distal radius (18%) and ankle fractures (15.4%).

69 patients (22.6%) were taking some form of osteoporosis treatment at the time of admission. 38 (55.1%) were not taking a bisphosphonate. None had a bisphosphonate added.

236 patients (77.4%) were not taking osteoporosis medication on admission. 6 (2.5%) had a bone mineral density (BMD) assessment (DEXA scan) organised. In 3 of the 6 patients there was no mention of who was to follow up the results. 28 (11.9%) were started on medication (Table 3), in 23 of the 28 (82.1%) this was done by a visiting orthogeriatric service. All but 4 of those patients had a hip fracture. Only the orthogeriatricians prescribed any bisphosphonates. Middlemore and Palmerston North were the only two units to have documented input from an orthogeriatric service.

The intervention rates in the sub groups of patients either aged over 75 or under 75 with a history of a previous fracture, are given in Table 4. 47 patients had a distal radius fracture, none were referred for a BMD assessment and 3 (6.4%) had treatment started, all by the orthogeriatricians.

99 patients (32.4%) were discharged to a rehabilitation unit. Notes were available for 65. Of these patients 31 (47.7%) had investigation or treatment started during their rehab admission. If orthopaedic and available rehabilitation unit admissions are combined the intervention rate increases to 27.7% (65 patients).

Osteoporosis was mentioned on the discharge summary in 20 (30%) of the patients already taking osteoporosis treatment and 3 (10.7%) of the patients started on medication during their admission.

## Discussion

The Osteoporosis New Zealand Treatment Guidelines<sup>15</sup> for management of postmenopausal osteoporosis recommend that any postmenopausal woman with a history of a minimal trauma fracture should be referred for BMD assessment. If the resulting t score is  $\leq -2.5$  the patient should be commenced on a bisphosphonate as well as calcium + vitamin D

supplementation. There is good evidence for the effectiveness of both calcium + vitamin D<sup>18,19</sup> and the bisphosphonate alendronate<sup>20,21</sup>. Given the known morbidity and mortality caused by a fracture in the elderly patient treatment benefits are deemed to outweigh the drawbacks no matter what the age of the patient.

The results of our study show that even when intervention did occur these guidelines were not followed. The Pharmaceutical Management Agency of New Zealand (PHARMAC) will fund the bisphosphonate alendronate without the requirement for a BMD assessment in patients >75 years or with a history of a previous fracture<sup>22</sup>. Almost two thirds of the study patients met these criteria but less than 10% of them were prescribed a bisphosphonate. These criteria were also met by 5 of the 6 patients who had a BMD assessment ordered and all patients started on treatment by an orthopaedic team, but none were prescribed a bisphosphonate.

The units that performed the best had input from an orthogeriatric service. However this service generally dealt with hip fracture patients, not those with fractures requiring short admissions. For these patients the only opportunity to address osteoporosis lay with the surgeons.

There is some improvement in the intervention rate when the contributions of rehabilitation units are included, but most patients in our study spent their entire hospital stay under the orthopaedic unit. Again the only opportunity lay with the surgeons.

The results of this study are on par with, or slightly below the reported results from overseas. Elliot-Gibson et al (2004)<sup>23</sup> conducted a meta-analysis of patterns of osteoporosis management after a fragility fracture. They found that treatment rates after a fracture were very low across all studies. The median treatment rate with calcium and vitamin D was 18%. Treatment rates with bisphosphonates ranged from 0.5% to 38%, but only three studies reported a rate greater than 10%.

Patients with fractures such as of the distal radius often have short admissions and a relatively brief period of outpatient follow up. One can argue that this is not an ideal scenario to manage long term medication such as bisphosphonates. However it should not stop the surgeon from "getting the ball rolling." Dreinhöfer et al<sup>24</sup> surveyed surgeons internationally and found that although only 6% of NZ surgeons felt they should be responsible for treating osteoporosis, 50% felt that the orthopaedic surgeon should be responsible for the initiation of assessment of osteoporosis in patients with fragility fractures. Nearly 80% said they would refer a patient suspected of having osteoporosis to an osteoporosis specialist or a general practitioner. The rate of BMD assessment for our study was 2.5%. This would suggest that the perceived responsibilities described above have yet to convert into clinical practice.

The reporting of osteoporosis as a diagnosis on the discharge summary was very low. There were even several cases where osteoporosis

was listed on admission but not on the discharge. This document will often be the sole record a patient's general practitioner will receive about that patient's hospital stay and that doctor will be responsible for continuing any medications that were commenced in hospital. Discharge summaries are usually prepared by the most junior members of the surgical team and they may not be informed of the importance of osteoporosis as an orthopaedic diagnosis.

### **Limitations**

Because it is a retrospective note review the accuracy of information may be limited by a lack of documentation. Osteoporosis may have been addressed on a ward round but unless it is documented this cannot be proven.

### **Conclusion**

Osteoporosis is an important disease that affects a large proportion of an orthopaedic surgeon's patients. Currently the rates of its recognition and intervention by New Zealand orthopaedic surgeons are very low. The best performing orthopaedic units have a visiting orthogeriatric service. More education needs to be directed at both junior and senior staff regarding the importance of the disease and the current methods for its treatment.

Table 1. Data collected from patient notes

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Age	Level of mobility – pre and post discharge
Gender	Medications on admission
Fracture and Mechanism of injury	Medications on discharge
History of previous fractures	Ordering of bone mineral density scans
Medical co-morbidities	Listing of osteoporosis as a diagnosis on the discharge summary
Living situation – pre and post discharge	Presence of any planned follow up

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Table 2. Patient demographics by hospital

<i>Hospital</i>	<i>Number of pts</i>	<i>Mean age in years (range)</i>	<i>Females (%)</i>	<i>Males (%)</i>
North Shore	39	71.3 (55 – 94)	26 (66.7)	13 (33.3)
Middlemore	29	66.4 (57 – 85)	20 (69)	9 (31.0)
Waikato	47	82.6 (55 – 97)	42 (89.4)	5 (12.5)
Palmerston North	28	74.2 (57 – 94)	19 (67.9)	9 (32.1)
Hutt	44	78.6 (56 – 95)	36 (81.8)	8 (18.2)
Wellington	36	83.3 (57 – 95)	29 (80.6)	7 (19.4)
Christchurch	39	71.1 (56 – 96)	27 (69.2)	12 (30.8)
Dunedin	43	83.7 (59 – 104)	36 (83.7)	7 (16.3)
<b>OVERALL</b>	<b>305</b>	<b>80.6 (55 – 104)</b>	<b>235 (77%)</b>	<b>70 (23%)</b>

Table 3. Osteoporosis intervention in patients not on osteoporosis therapy at admission

<i>Hospital</i>	<i>n patients</i>	<i>Investigated</i>	<i>Commenced on treatment</i>	<i>Total</i>	<i>Overall intervention rate</i>
North Shore	25	0	1	1	4.0%
Middlemore	25	0	14	14	56.0%
Waikato	38	1	1	2	5.3%
Palmerston North	23	1	9	10	43.5%
Hutt	34	2	1	3	8.8%
Wellington	28	0	0	0	0.0%
Christchurch	29	1	1	2	6.9%
Dunedin	34	1	1	2	5.9%
<b>OVERALL</b>	<b>236</b>	<b>6</b>	<b>28</b>	<b>34</b>	<b>14.4%</b>

Table 4. Overall osteoporosis intervention in patient sub-groups

<i>Sub group</i>	<i>Number not on treatment on admission</i>	<i>Referred for BMD scan (%)</i>	<i>Started on treatment (%)</i>	<i>Started on a bisphosphonate (%)</i>
Age >75 years	140	3 (2.1)	22 (15.7)	14 (10.2)
Age <75 + previous fracture	15	0	2 (13.3)	1 (6.7)
TOTAL	155	3 (1.9)	24 (15.5)	15 (9.7)

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