

Colecalciferol initiation post minimal trauma fracture

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Introduction

Colecalciferol is important for bone health because it helps facilitate absorption of calcium, regulates calcium levels in the blood and supports growth and maintenance of the skeleton [1-4].

Colecalciferol deficiency is common in Australia with over 30% of adults having a mild, moderate or even severe deficiency [1, 2]. Low measurement of serum 25-hydroxyvitamin D (25(OH)D) levels can increase the risk of falls and bone fracture in older people [3]. Falls and fractures have a large human and socioeconomic cost [2]. Thus, colecalciferol supplementation offers a strategy to reduce falls and fractures. Additionally, studies have shown that colecalciferol supplementation can improve muscle strength and function [2].

Despite availability of evidence based treatments, colecalciferol initiation rates of osteoporosis post minimal trauma fracture continue to be suboptimal [4]. The International Osteoporosis Foundation (IOF) recommends colecalciferol supplementation at 800 to 1000 units per day for falls and fracture prevention in adults aged 60 and older [5].

This tertiary hospital audit site does not currently have a reliable process for the initiation of colecalciferol therapy post minimal trauma fracture and anecdotal reports from clinical pharmacists suggest inconsistent practices for initiation between hospital units. Many patients are referred to their general practitioner for follow up, and some patients receive no instructions.

Aim

To determine the proportion of patients admitted to a major tertiary teaching hospital in Australia aged 50 years and older with a confirmed neck of femur or vertebral minimal trauma fracture, who are commenced on colecalciferol supplementation by discharge, and to describe the doses prescribed.

Methods

A sub-analysis of a retrospective audit of electronic medical files for patients admitted with a minimal trauma fracture of the hip or vertebra between 1st January 2016 and 30th June 2016 was conducted.

Data was obtained through the use of electronic systems, including scanned medical records using electronic contents manager (ECM), pathology results system via clinical information systems (CIS) and the prescription dispensing system. Data was collected in two sections using a data collection tool: the first section investigated patients who did not meet exclusion criteria; the second section referred to patient parameters such as diagnosis and date of admission.

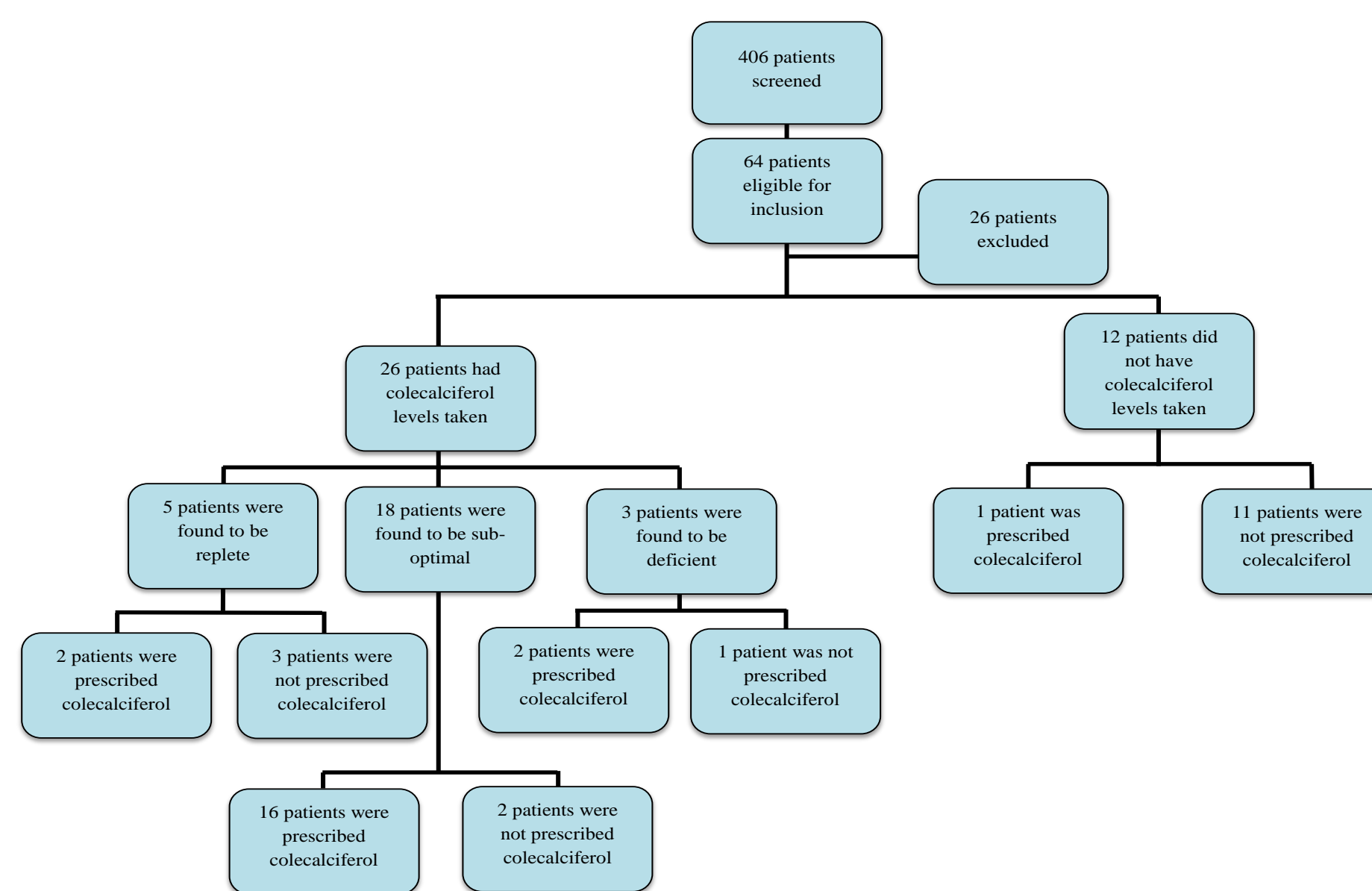
These patients were screened and excluded if one or more of the following criteria applied:

- non-minimal trauma fracture;
- less than 50 years of age during admission;
- pre-admission osteoporosis prevention therapy;
- palliative;
- died during admission.

Results

Four hundred and seven discharge episodes were identified between the 1st of January 2016 and the 30th of June 2016 including one readmission. Thus a total of 406 patients were screened for a fracture of the hip or vertebrae. Of the patients screened, 64 patients were eligible for inclusion in the analysis (Figure 1).

Figure 1. Treatment Initiation flowchart



There was an approximately even division between recruitment of hip fracture patients to vertebral fracture patients with a median age of 80 years (Table 1).

Table 1. Patient characteristics

Patient Characteristics (n=64)		
Age	Median	80 (53-94 years)
Sex	Male	21 (33%)*
	Female	43 (67%)
Fracture Type	Hip	37 (58%)
	Vertebral	27 (42%)
Osteoporosis related therapy before admission	Calcium	0 (0%)
	Colecalciferol	18 (28%)
	Both	6 (9%)

* Percentages rounded up to the nearest percentage value

Of the remaining patients, 26 had a serum 25-hydroxyvitamin D level taken during their admission; of these patients, five were found to be replete, eighteen patients were found to have a sub-optimal level, and three patients were found to be deficient (Table 2).

Table 2 Colecalciferol initiation in males and females

	Male	Female	Total
Colecalciferol levels taken during admission	12	14	26
Replete (55 - 108nmol/L)*	2	3	5
Prescribed	2	0	2
Not Prescribed	0	3	3
Suboptimal (25 - 54nmol/L)	8	10	18
Prescribed	7	9	16
Not Prescribed	1	1	2
Deficient (<25nmol/L)	2	1	3
Prescribed	1	1	2
Not Prescribed	1	0	1
Colecalciferol levels not taken during admission	5	7	12
Prescribed	0	1	1
Not Prescribed	5	6	11

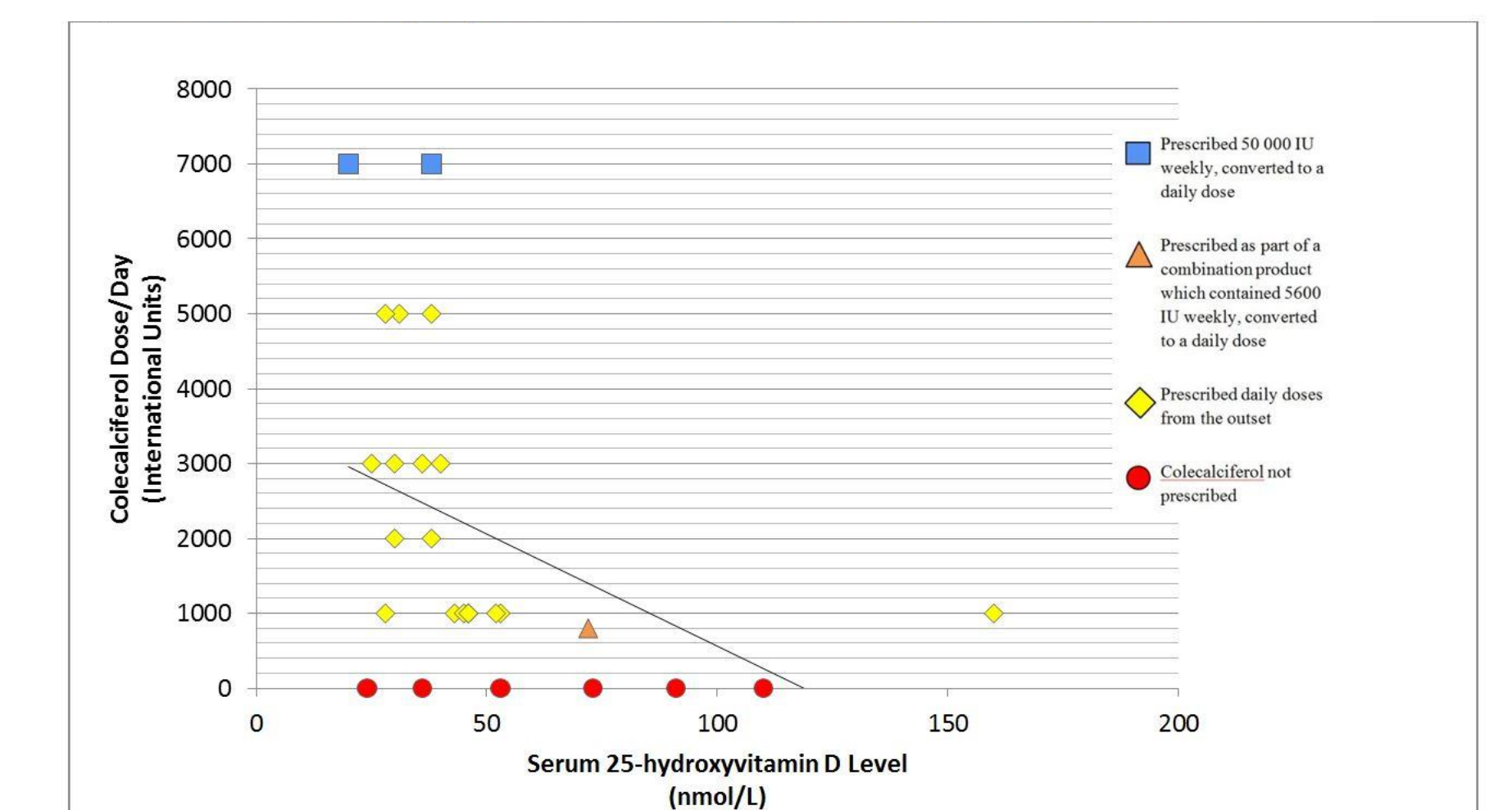
* Parameters for colecalciferol reference ranges as defined by the clinical results viewer

Doses of colecalciferol varied with prescriptions ranging from daily doses of 1000 units (9 patients), 2000 units (2 patients), 3000 units (4 patients), 5000 units (3 patients); doses of 50,000 units weekly (2 patients); and as part of a combination pack, which was equivalent to a 5600 units weekly (1 patient).

Although there were variations in prescribing practices with regards to colecalciferol based solely on serum concentrations, there was an overall trend of higher daily doses of colecalciferol prescribed to patients with lower serum levels in comparison to those who had higher serum levels (Figure 2).

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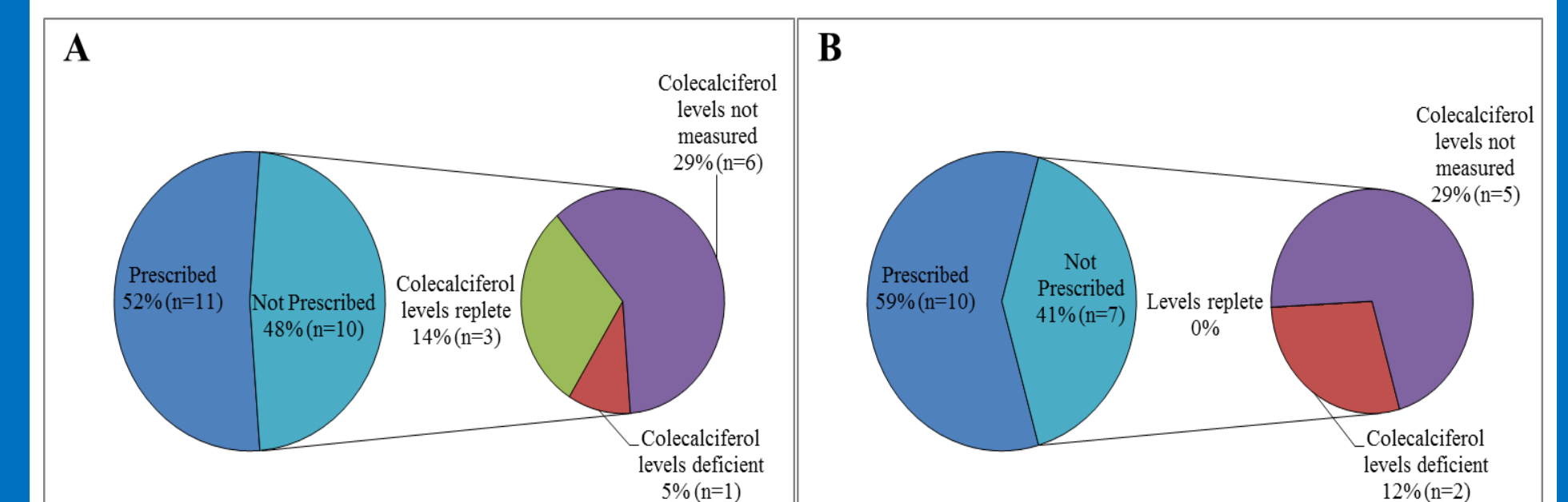
Figure 2. Effect of colecalciferol levels on prescriptions of colecalciferol with trend line



NB: Various dosing regimens for colecalciferol were used – the doses prescribed weekly or monthly were converted to a dose per day to allow for comparison between doses; these doses, once converted, were rounded to the nearest thousand

A marginally higher proportion of males were prescribed colecalciferol on discharge when compared to females (Figure 3) with 59% of males and 52% of females being prescribed colecalciferol.

Figure 3. Proportion of colecalciferol initiation in the (A) male and (B) female study population



Conclusion

Whilst over half of patients presenting to this hospital with a minimal trauma fracture were commenced on colecalciferol therapy, there still remains a proportion of patients who did not have levels taken nor receive colecalciferol therapy. This represents a missed opportunity for intervention that may place patients at a higher risk of subsequent fracture; therefore effective strategies should be implemented to address this treatment gap in the future.

Patients who had a level taken during admission had a greater likelihood of colecalciferol initiation. Most prescriptions were consistent with national recommendations and international guidelines. Gender had little to no influence on the probability of colecalciferol prescription.

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