

5-2019

Markers of Mineral Homeostasis and Bone Turnover in Patients with Acute Hip Fractures

Kathleen Estrada

Henry Ford Health System, KEstrad2@hfhs.org

Mahalakshi Honasoge

Henry Ford Health System, MHONASO1@hfhs.org

Arti Bhan

Henry Ford Health System, ABHAN2@hfhs.org

Sudhaker D Rao

Henry Ford Health System, srao1@hfhs.org

Follow this and additional works at: <https://scholarlycommons.henryford.com/merf2019clinres>

Recommended Citation

Estrada, Kathleen; Honasoge, Mahalakshi; Bhan, Arti; and Rao, Sudhaker D, "Markers of Mineral Homeostasis and Bone Turnover in Patients with Acute Hip Fractures" (2019). *Clinical Research*. 28.

<https://scholarlycommons.henryford.com/merf2019clinres/28>

This Poster is brought to you for free and open access by the Medical Education Research Forum 2019 at Henry Ford Health System Scholarly Commons. It has been accepted for inclusion in Clinical Research by an authorized administrator of Henry Ford Health System Scholarly Commons. For more information, please contact acabrer4@hfhs.org.

Markers of Mineral Homeostasis and Bone Turnover in Patients Presenting with Acute Hip Fractures

KATHLEEN ESTRADA, MD¹, MAHALAKSHMI HONASOGE, MD², ARTI BHAN, MBBS²,
SUDHAKER D. RAO, MB, BS, FACP, FACE²

HENRY FORD HEALTH SYSTEM, DETROIT, MICHIGAN¹, DIVISION OF
ENDOCRINOLOGY, DIABETES AND BONE & MINERAL DISORDERS

HENRY FORD HEALTH SYSTEM, DETROIT, MICHIGAN²



Introduction

- It is generally assumed that bone turnover increases after major fractures, particularly hip fractures. Very little data exists on bone turnover markers (BTM) after an acute hip fracture and whether BTM levels are related to vitamin D nutritional status and parathyroid function.
- Nuti et al (Clin Orthop Relat Res. 2004), compared women with and without hip fractures, and found that women with fractures had higher beta cross laps (CTX) and lower vitamin D levels compared to women without fractures. However, this study only had 74 women with fractures.
- Another study, the only one from the US, specifically addressed vitamin D nutritional status, but not bone turnover markers (Leboff et al JAMA, 1999)
- Further studies are needed in a larger cohort to assess the levels of BTM and mineral homeostasis in acute hip fractures.

AIM

- The aim of the study is to assess markers of mineral homeostasis and bone turnover in a larger population of patients with acute hip fractures.

Methods

- This is a retrospective cohort study of 162 patients who presented to the hospital with an acute hip fractures between January 1, 2011 and December 31, 2016. Data was collected on BMD testing, markers of mineral homeostasis including PTH and 25-OHD levels, serum CTX, a marker of bone resorption, and bone specific alkaline phosphatase (BSAP) a marker of bone formation.

Results

Table 1: Characteristics of Population

Characteristics	Mean \pm SD or n (%)
Age (years)	78.6 \pm 12.4
Gender	
Female	112 (69%)
Male	50 (31%)
Race	
Caucasian	72 (44%)
Other	90 (56%)
BMD Before Fracture	51 (31%)

Results

Table 2: Markers of Mineral Homeostasis & Bone Turnover

Markers	Mean \pm SD
25-OHD (ng/ml)	22.6 \pm 12.9
PTH (pg/ml)	61.1 \pm 37.9
CTX (mmol/mol)	481 \pm 241
BSAP (IU)	20.2 \pm 14.6

Results

Table 3: Vitamin D Nutritional Status

Vitamin D Status	% of Study Population
Deficiency <20mg/ml	44%
Insufficiency <30mg/ml	36%
Optimal >30mg/ml	20%

Results

Table 4: Bone Turnover Markers

CTX	Percent of Population	Mean BSAP
<300 mmol/mol	25%	13.4 ± 4.9 ug/L
>300 mmol/mol	20%	>22 ug/L
300-600 mmol/mol	55%	16.2 ± 7.9ug/L

Discussion

- Contrary to general assumption, about 25% have low bone turnover, defined as serum CTX<300), despite a major OP fracture. It is unclear if such patients should be treated with an antiresorptive agent at the time of fracture.
- Bone turnover does not appear to depend on the prevailing vitamin D nutrition or PTH levels. It is likely that such patients represent a small but significant minority of patients with “low bone turnover osteoporosis”
- Anabolic therapy might be a better option in these patients as an initial therapy, which may also help fracture healing
- In the other 75% of patients with higher bone turnover (CTX>300) antiresorptive therapy is reasonable.
- Further studies are needed to either confirm or refute our observations.

Conclusion

- Despite an acute major OP fracture, nearly 25% have low bone turnover and only 25% had PTH >70 pg/ml that was not related to vitamin D nutrition.
- Similarly, the higher bone turnover in 75% was not related to vitamin D nutrition or PTH level.
- Consideration of bone turnover marker CTX, may have implications for selection of therapy (antiresorptive Vs. anabolic therapy).

- The study was partly supported by the Fund for Henry Ford Hospital & NIH Grant AR062103

References

1. Nuti R. et al 2004. Vitamin D Status and bone turnover in women with acute hip fracture. *Clin Orthop Relat Res.* (422):208-13.
2. LeBoff MS, et al. 1999. Occult Vitamin D Deficiency in Postmenopausal US Women With Acute Hip Fracture. *JAMA.* 1999;281(16):1505-1511