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Introduction: Denosumab, a fully human monoclonal antibody to RANK-ligand, has been shown to increase bone mineral density (BMD) and reduce the risk of fracture in postmenopausal women with osteoporosis. Cessation of denosumab is associated with rises in bone remodelling, reductions in BMD and an increased risk of fracture. The primary objective of this study is to evaluate the efficacy of low dose denosumab (30mg/6 months) in preventing bone loss in postmenopausal women with osteoporosis switching from 60mg to 30mg every 6 months. We report the effects of low dose denosumab for up to 2 years in patients previously treated with denosumab for >=3 years as well as <3 years.

Methods: Following informed consent, postmenopausal women with osteoporosis who had been on denosumab 60mg every 6 months were switched to receive 30mg of denosumab every 6 months. Patients with an additional skeletal disorder, prior fragility fracture, or on oral steroids (daily in the past 12 months) were excluded. The primary endpoint was the percent change in BMD at the lumbar spine (LS), total hip (TH), femoral neck (FN) and 1/3 radius (1/3R) at 12 and 24 months. Secondary outcomes were adverse effects and fracture. Results: 127 patients were included in the study. 44 patients had received 60 mg for 3 years or longer before transitioning to 30mg and 83 patients switched before completing 3 years on full dose therapy. Patients on less than 3yrs of 60mg therapy before the switch showed a significant improvement in BMD at LS (+2.00%, 95% CI 0.49% to 3.51%, n = 55, p-value = 0.01) 1 year post transition. There were no significant changes at the FN, TH or 1/3 radial sites 1 year post transition compared to baseline. At 2 years post transition (n=35) significant changes were noticed at LS (+4.65%, 95% CI 2.29% to 7.01%, p value <0.001), FN (+ 4.87%, 95% CI 1.46% to 8.28%, p value = 0.006) and 1/3 radial sites (+4.95%, 95% CI 0.73% to 9.17%, p value = 0.02). No significant changes were noted at TH. Similar results were seen with prior denosumab therapy for <3yrs. No fractures were observed in this observational study. Conclusions: Switching from 60mg of denosumab to 30 mg every 6 months was not associated with reductions in BMD and may be a valuable treatment option in patients who have completed long term denosumab therapy.

Bone and Mineral Metabolism
FRACTURE PREVENTION AND TREATMENT
A Hospitalist-Led Fracture Liaison Service Improves Care of Hip Fracture Patients
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Background: Osteoporosis care traditionally falls to outpatient primary care providers despite the fact that over 300,000 elderly patients are hospitalized yearly with hip fractures in the United States. Internal medicine hospitalists are often involved in the co-management of their care on surgical teams and are skillful in osteoporosis recognition and management. Objective: A hospitalist-led Fracture Liaison Service (FLS) was established to provide improved care of hospitalized patients with hip fractures. Methods: A retrospective evaluation of inpatient and post-discharge management of patients admitted with low-impact hip fractures was performed before (8/17-2/18) and after (8/19 - 2/20) launch of the hospitalist Fracture Liaison Service (H-FLS). Results: Eighty-nine patients were admitted with a hip fracture in post-launch period compared to 73 admitted prior. 74% vs 11% of eligible patients (based on adequate renal function and vitamin D stores) were discharged with anti-osteoporosis medications (p<0.001), 82% vs 38% were discharged with vitamin D/calcium supplements (p<0.001), 22% vs 5% underwent a DXA scan after discharge (p<0.05) and 65% vs 0% were referred to outpatient osteoporosis-specific care at discharge (p<0.001). Conclusion: A hospitalist-led FLS is a unique approach to osteoporosis care that significantly improved quality metrics for elderly patients with osteoporotic hip fractures including initiation of anti-osteoporosis medication and bone density imaging. Outpatient follow-up data are needed to evaluate adherence to this initial management over time.

Bone and Mineral Metabolism
FRACTURE PREVENTION AND TREATMENT
An Observational Study to Assess the Safety and Efficacy on Quality of Life and Patient Satisfaction WithRaloxifene/Cholecalciferol Combination Therapy in Postmenopausal Women Requiring Prevention or Treatment for Osteoporosis
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Background: Preventing bone loss is an important concern for women during post-menopausal period. Menopause significantly speeds bone loss and increases the risk for osteoporosis. The aim of this study was to investigate the effectiveness on quality of life (QOL), patient satisfaction in postmenopausal women receiving raloxifene/cholecalciferol combination therapy. In addition, we analyzed adverse events to assess the safety profile of this drug. Methods: This study is a multicenter, prospective, non-interventional observational study of women receiving raloxifene/cholecalciferol combination therapy to treat or prevent postmenopausal osteoporosis. Data have been collected from patients receiving routine clinical practice at 99 hospitals (local clinics and general hospitals) in South Korea. Patients were followed for more than 6 months to evaluate changes in, and QOL (EQ-5D-5L), patient satisfaction with efficacy and convenience (questionsnaire), and safety. This study has been approved by Institutional Review Board and is in compliance with clinical research ethics regulations. Results: A total of 3,907 subjects with an average age of 67.68 ± 9.34 (Mean ± SD) were enrolled from November 2017 to July 2020. QOL was significantly improved from 0.77 ± 0.15 to 0.80 ± 0.12, 0.82 ±
Bone and Mineral Metabolism

FRACUTURE PREVENTION AND TREATMENT

Aromatase Inhibitor Induced Bone Loss: Do International Guidelines Accurately Stratify Fracture Risk and Selection of Anti-Osteoporosis Treatment?

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Introduction: Aromatase inhibitors (AI) are used for adjunctive treatment of estrogen receptor-positive (ER+) breast cancer. Aromatase converts androgens to estrogens in the ovaries and peripheral tissues such as adipose, liver, muscle, and breast. In breast, estrogens increase cell proliferation in both normal and ER+ malignant tissue. AIs globally suppress estrogen production, and thereby can decrease tumor progression. However, in bone, estrogens suppress osteoclast activity and decrease bone resorption so AI use results in increased bone resorption and decreased bone mineral density (BMD). Several guidelines exist to direct management of AI-associated bone loss, but it is unclear whether adherence to these guidelines translates to decreased fracture risk. The International Osteoporosis Foundation (IOF) et al 2017 guidelines for the prevention of osteoporotic fractures in patients treated with AI recommended BMD measurement at the onset of AI use and use of anti-osteoporosis therapy (anti-OP) in those who met T-score and clinical risk factor (CRF) criteria. Hypothesis: We explored application of these guidelines and whether they were able to stratify patients according to risk, initiation of treatment, and fracture outcomes. Methods: 1517 charts were extracted from the electronic medical record (EMR) of a tertiary academic medical center based on history of breast cancer and use of AIs between 2008 and 2017. Charts were retrospectively analyzed to determine baseline BMD, osteoporosis risk factors, duration of AI use, duration of anti-OP therapy, and fractures. The IOF criteria were applied to each patient to determine applicability of anti-OP therapy. Fracture rates were compared using chi square test or Fisher’s exact test. Results: 1517 patients were included in the analysis. Regardless of whether criteria were met for treatment based on baseline BMD and CRF, the fracture rate was significantly higher in the treated versus the untreated group, 13.78% (CI: 9.56–18.99) versus 2.24% (p < 0.0001, CI: 1.51–3.21). Similarly, among those that met criteria, the fracture rate was significantly higher in the treated versus the untreated group, 10.24% (CI: 5.56–16.87) versus 2.61% (p = 0.0005, CI: 1.20–4.89). There was no significant difference in fractures between those who did versus did not meet treatment criteria, 4.66% (CI: 2.94–6.97) versus 3.64% (p = 0.34, CI 2.59–4.96). Conclusions: This retrospective EMR analysis of 1517 breast cancer patients on AIs between 2008 and 2017 observed a higher fracture incidence in patients who received anti-OP treatment compared to those who did not, regardless of meeting criteria for treatment per the IOF guidelines. It is possible that patients who initiated anti-OP therapy had additional CRFs not captured in the EMR and not factored into our analyses.

References:

Kim et al., Expert Opin Drug Safety 2019; 18: 1001–8. Takeuchi et al., Menopause 2015; 22: 1134–7. Xu et al., Osteoporos Int 2011; 22: 559–65.

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FRACUTURE PREVENTION AND TREATMENT

Biomechanical Computed Tomography Captures Older Men at High Risk of Hip Fracture Despite Low Fracture Risk Calculation by FRAX

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Background: Biomechanical computed tomography (BCT) can be applied to hip-containing CT scans to estimate femoral bone strength using finite-element analysis and to measure DXA-equivalent femoral neck (FN) BMD. Current guidelines recommend osteoporosis pharmacotherapy initiation in men with BMD T-score ≤ -2.5 or T-score between -1.0 and -2.5 with 10-year hip fracture risk ≥ 3% by FRAX. Estimated femoral strength by BCT is associated with incident hip fractures in men, independent of BMD, and can be used in conjunction with clinical risk factors for consideration of therapy initiation per the International Society of Clinical Dosimetry.

Aim: To determine how many men are at increased risk of fractures with fragile bone strength (≤ 3500N) despite normal-to-low BMD (T-score > -2.5) and low 10-year hip fracture risk (< 3%).

Methods: 625 men age ≥ 65 with hip-containing CT scans were randomly selected for BCT analysis out of 4209 scans performed from 2017 to 2019 at a single academic hospital. Scans were excluded if an intact femur was not imaged. BCT was performed for 557 men after accounting for un-processable scans. Electronic health records were retrospectively reviewed by investigators blinded to BCT results. 10-year hip fracture risks were calculated by FRAX applied to each patient to determine applicability of anti-OP therapy. Fracture rates were compared using chi square test or Fisher’s exact test. Results: 1517 patients were included in the analysis. Regardless of whether criteria were met for treatment based on baseline BMD and CRF, the fracture rate was significantly higher in the treated versus the untreated group, 13.78% (CI: 9.56–18.99) versus 2.24% (p < 0.0001, CI: 1.51–3.21). Similarly, among those that met criteria, the fracture rate was significantly higher in the treated versus the untreated group, 10.24% (CI: 5.56–16.87) versus 2.61% (p = 0.0005, CI: 1.20–4.89). There was no significant difference in fractures between those who did versus did not meet treatment criteria, 4.66% (CI: 2.94–6.97) versus 3.64% (p = 0.34, CI 2.59–4.96). Conclusions: This retrospective EMR analysis of 1517 breast cancer patients on AIs between 2008 and 2017 observed a higher fracture incidence in patients who received anti-OP treatment compared to those who did not, regardless of meeting criteria for treatment per the IOF guidelines. It is possible that patients who initiated anti-OP therapy had additional CRFs not captured in the EMR and not factored into our analyses.