0.836, p=0.01). The Garvan AUC for 'any Garvan' fractures was 0.721 (95% CI 0.693-0.749) and FRAX AUC for MOFs was 0.708 (95% CI 0.675-0.741).

Conclusion(s): In conclusion, in our cohort, FRAX® estimated quite well hip fractures but underestimated MOFs, while Garvan overestimated hip fracture risk, but showed a good estimation of 'any Garvan' fractures. Both models had a good discriminatory value for hip fractures but only a moderate discriminatory ability for MOFs or 'any Garvan' fractures.

doi:10.1016/j.bonr.2021.100976

P150

The use of bisphosphonates to treat osteoporosis in patients with Lysinuric Protein Intolerance

Jos Draaisma, Anne Dittrich, Maaike de Vries
Radboudumc Amalia Children's hospital, Pediatrics, Nijmegen, Netherlands

Background/Introduction: Lysinuric Protein Intolerance (LPI) is an autosomal metabolic disorder. Patients present with failure to thrive, cytopenia, acute encephalopathy or developmental disability. Long term complications includes also low bone mineral density. In general the treatment is focused on the prevention of hyperammonemia. There are no guidelines for the prevention and therapy of osteoporosis in these patients.

Purpose: To propose the use of bisphosphonates for osteoporosis in patients with LPI.

Methods: Clinical description of a patient and review of literature.

Results: This 8-year old girl was born to non-consanguineous parents. She had a uneventful clinical course until the age of 6 years. Since than she had multiple fractures including multiple vertebral fractures at different occasions due to mild trauma. Further investigation led to the genetically confirmed diagnosis LPI. The lumbar Z-score was -3.7. She was treated with intravenous pamidronate and supplemental calcium and vitamin D. No further fractures occurred. After one year the z-score increased to -1.9, after two year -1.3.

In a cohort study performed in France 80% of the patients with LPI was diagnosed with osteopenia. In a series of 29 patients in Finland, 69% of patients had one or more fractures , mostly in childhood. The exact mechanism of the osteoporosis in LPI is still not fully understood. An increased level of hydroxyproline in serum and urine was shown, suggesting an increased activity of osteoclasts, and decreased collagen synthesis in children and adolescents. The normal initial therapy of patients with LPI (a protein-restricted diet and supplemental L-citrulline) does not change the signs of low bone mineral density.

Conclusion(s): Bisphosphonates can be used to treat osteoporosis in patients with LPI.

doi:10.1016/j.bonr.2021.100977

P152

Increasing the use of anti-osteoporosis medication in patients who use glucocortcoids remains a challenge

Janneke Witteveen[a], Pé Mullenders[b], Saskia Boonzajer Flaes[b], Iris Groeneveld[b], Willem Lems[c]
[a]*Medical Center Leeuwarden, Internal Medicine, Leeuwarden, Netherlands*
[b]*National Health Care Institute, Health care, Diemen, Netherlands*
[c]*Amsterdam University Medical Center, Department of Rheumatology and Immunology, Amsterdam, Netherlands*

Background/Introduction: One of the objectives of the Appropriate Care program ('Zinnige Zorg') of the National Health Care Institute of the Netherlands is to ensure appropriate care for patients with osteoporosis in the Netherlands, together with the involved parties.

Purpose: The aim was to identify the number of patients who receive anti-osteoporosis medication next to glucocorticoids.

Methods: To define appropriate care we used the current multidisciplinary Dutch osteoporosis guideline. We used the data of the Medicine and Aids Information project (GIP database), which contains extramural medication prescriptions of all Dutch citizens, to identify patients who have used glucocorticoids, prednisolone equivalent of >7,5 mg per day, continuously for more than 3 months. The GIP data are provided by the health insurance companies. Using the GIP database we also identified patients who used anti-osteoporosis medication.

Results: In 2016 26.265 patients received a first prescription for glucocorticoids, prednisolone equivalent of >7,5 mg per day, of which 15.175 patients for prednisolone equivalent of >15 mg per day. Within 3 months 7.038 (27%) of the 26.265 patients who use >7,5 mg per day prednisolone equivalent and 5.162 (34%) of the 15.175 patients who use >15 mg per day prednisolone equivalent also use anti-osteoporosis medication. Within 2 years 9.265 (35%) of the 26.265 patients who use >7,5 mg per day prednisolone equivalent and 6.775 (45%) of the 15.175 patients who use >15 mg per day prednisolone equivalent also use anti-osteoporosis medication.

Conclusion(s): The number of patients who receive a prescription for anti-osteoporosis medication next to glucocorticoids is low in the Netherlands, despite the development of the 2011 guideline and the medical pharmaceutical decision rules for glucocorticoids used by pharmacists. Together with prescribers and pharmacist we need to explore new ways to increase the number of patients that receive anti-osteoporosis medication next to glucocorticoids.

doi:10.1016/j.bonr.2021.100978

P153

The effect of food supplement with calcium and vitamin D3 on calcium homeostasis and falls incidence in patients with high fracture risk undergoing medical rehabilitation

Larisa Marchenkova, Vasileva Valeria
National Medical Research Center of Rehabilitation and Balneology-Rehabilitation department for somatic patients, Rehabilitation department for somatic patients, Moscow, Russia C.I.S.

Background/Introduction: Fall preventing and nutritional status improving are important for patients with high fracture risk undergoing physical rehabilitation.

Purpose: To evaluate the effect of long-term calcium and vitamin D3 intake on calcium homeostasis and fall's rate in patients with high fracture risk starting rehabilitation course.

Methods: The study enrolled 119 men and women aged 50-80 y.o. with high absolute fracture probability by FRAX who started medical rehabilitation. 41 patients have been receiving antiresorptive therapy already comprised group 1, other patients were randomized into groups 2 (n=39) and 3 (control, n=39). In groups 1 and 2, a food supplement containing calcium citrate 1000 mg and vitamin D3 600 IU was prescribed for 12 months. All patients undergo laboratory examination, food calcium intake and fall assessment at baseline, in 6 and 12 months.

Results: Daily calcium intake in the study sample (n=119) was 782.9±243.4 mg. Vitamin D deficiency was detected in 38.4% of the examined. An increase in 25(OH)D level was noted in groups 1 and 2 after 6 and 12 months ($p<0.01$). Patients in group 1 showed an increase in serum osteocalcin and calcium levels after 6 and 12 months ($p<0.05$). In group 3, there was an increase of PTH level after 6 ($p<0.05$) and 12 months ($p<0.01$), CTx and alkaline phosphatase after 12 months ($p<0.05$). In group 1, there was a decrease in proportion off fallen at least once patients after 6 months ($p = 0.026$) and in the total falls cases after 12 months ($p = 0.027$). Group 2 showed a decrease in fallen patients number after 6 and 12 months ($p=0.0034$) and in total falls number after 6 months ($p=0.0142$).

Conclusion(s): Prescription of dietary supplements containing calcium and vitamin D3 should be recommended as a part of complex rehabilitation of patients with high fracture risk.

doi:10.1016/j.bonr.2021.100979

P155

Effect of flavanols on bone turnover markers in individuals with type 2 diabetes – a 3-month randomized placebo-controlled FLAVA trial

Komal Waqas[a], Mardin Rashid[b], Bram Eerden[b], Kirsten Berk[c], M. Carola Zillikens[a]
[a]*Erasmus University Medical Center, Bone Centre- Department of Endocrinology and Internal Medicine, Rotterdam, Netherlands*
[b]*Erasmus University Medical Center, Department of Internal Medicine, Rotterdam, Netherlands*
[c]*Erasmus University Medical Center, Department of Dietetics, Rotterdam, Netherlands*

Background/Introduction: Subjects with type 2 diabetes mellitus (T2DM) have increased fracture risk with higher bone mineral density, possibly related to increased advanced glycation end-products (AGEs) accumulation. Studies showed reduced AGEs formation and improved bone health when treated with flavanols but not in subjects with T2DM.

Purpose: To study the effect of flavanols supplementation on bone turnover markers (BTMs) in participants with T2DM.

Methods: 83 individuals with T2DM, aged 40-85years, with microalbuminuria were enrolled from 4 trial centers in Rotterdam into a randomized, double-blind, placebo-controlled trial with renal vascular health as primary outcome. Participants were randomized (1:1) to receive 200mg of monomeric and oligomeric flavanols (MOFs) or placebo for 3 months. Serum alkaline phosphatase (ALP), type I collagen crosslinked beta C-telopeptide (β-CTx) and type I procollagen-N-propeptide (P1NP) were measured at baseline and 3 months. ANCOVA was performed on rank transformed BTMs at 3months as outcome adjusting for baseline BTMs, group, age, sex and BMI.

Results: Baseline characteristics did not differ between the two arms. The adjusted mean change in BTMs at 3months was not different between placebo vs. MOFs arm: AP -0.059 (-0.262 – 0.145) vs. 0.060 (-0.135 – 0.356), p=0.41; β-CTx 0.013 (-0.205 – 0.231) vs. 0.100 (-0.109 – 0.310), p=0.53 and P1NP 0.091 (-0.080 – 0.262) vs. 0.030 (-0.134 – 0.195), p=0.61. Within group difference in the MOFs arm from baseline to 3 months did not show a significant change: ALP 80(56-140) to 80(47-152) U/L, β-CTx 0.18 (0.08-0.58) to 0.19 (0.07-0.71) μg/ml and P1NP 36 (16-110) to 38 (16-112) μg/ml. We also observed no within-group changes in the placebo arm.

Conclusion(s): Supplementation with 200mg flavanols during three months in individuals with T2DM did not result in changes in BTMs. Bone AGEs may not change in 3months, future studies are needed to show whether long term supplementation may positively affect BTMs in individuals with T2DM.

doi:10.1016/j.bonr.2021.100980

P156

Successive anti-osteoporosis treatment after denosumab in the years 2011 till 2017

Janneke Witteveen[a], Saskia Boonzajer Flaes[b], Pé Mullenders[b], Harry van den Broek[c], Willem Lems[d], Iris Groeneveld[b]
[a]*Medical Center Leeuwarden, Department of Internal Medicine, Leeuwarden, Netherlands*
[b]*National Health Care Institute, Department of Health Care, Diemen, Netherlands*
[c]*Osteoporosis Patient Association, Board, Den Haag, Netherlands*
[d]*Amsterdam University Medical Center, Department of Rheumatology and Immunology, Amsterdam, Netherlands*

Background/Introduction: One of the objectives of the Appropriate Care program ('Zinnige Zorg') of the National Health Care Institute of the Netherlands is to ensure appropriate care for patients with osteoporosis in the Netherlands, together with the involved parties.

Purpose: The aim was to identify the number of patients who discontinued denosumab without successive anti-osteoporosis medication, and were therefore at risk of a rebound effect.

Methods: We used the data of the Medicine and Aids Information Project (GIP database), which contains extramural medication prescriptions of all Dutch citizens, to identify patients who use anti-osteoporosis medication. The GIP data are provided by the health insurance companies. We defined successive therapy as a prescription for another anti-osteoporosis medication within 9 months of the last denosumab prescription. For the analysis of successive therapy we have excluded patients who died within 2 years of stopping denosumab.

Results: Between 2011 and 2017, the number of patients who started with denosumab for the treatment of osteoporosis tripled from 1.598 to 4.600. Between 2011 and 2016, the number of patients that stopped denosumab without successive anti-osteoporosis medication steeply increased from 158 to 1.692. In 2016, 83% of the 2.043 patients that stopped using denosumab did not receive successive anti-osteoporosis medication. Of the 351 (17%) patients who did, 85% received oral bisphosphonates, 11% received teriparatide and 4% received zoledronic acid.

Conclusion(s): The number of patients who stopped denosumab without successive treatment steeply increased between 2011 and 2016. Therefore, a growing number of patients became at risk of a rebound effect. In 2019 the Royal Dutch Pharmacists Association together with the Dutch Association for Endocrinology and the Osteoporosis Patient Association have written a warning letter to prescribers and users of denosumab. We shall evaluate the effect during the coming years.

doi:10.1016/j.bonr.2021.100981

P157

Longterm outcomes of rheumatoid arthritis patients with severe osteoporosis treated with either Teriparatide or antiresorptive treatment – an observational study

Barbara Hauser[a,b], Kathryn Berg[b], Justine Lambert[b], Stuart H. Ralston[a,b]
[a]*Nhs Lothian, Rheumatology, Edinburgh, United Kingdom*
[b]*Rheumatology and Bone Disease Unit- Centre for Genomic and Experimental Medicine- MRC institute of Genetics and Molecular Medicine, University of Edinburgh, Edinburgh, United Kingdom*

Background/Introduction: Patients with Rheumatoid Arthritis (RA) are at increased risk of fragility fractures compared with the general population.

Purpose: The aim of this study was to compare the efficacy of Teriparatide (TPTD) with anti-resorptive treatment (ART) in RA patients with severe spinal Osteoporosis (OP).

Methods: Observational study of postmenopausal women with RA and severe OP. Patients with a history of two vertebral fractures or a spinal BMD Tscore < -4 were offered either TPTD or either oral or parenteral ART. DEXA re-evaluation was usually performed after 2