MO542 BONE MINERAL DENSITY, BONE MICRO-ARCHITECTURE EVOLUTION AFTER KIDNEY TRANSPLANTATION: A PROSPECTIVE COHORT STUDY

Antoine Bouquegneau[1], Olivier Malaise[2], Laurence Seidel[3], Catherine Bonvoisin[4], Laurent Weekers[4], François Jouret[4], Etienne Cavalier[5] and Pierre Delanaye[4]

[1]CHU De Liège, Division of Nephrology-Dialysis-Transplantation, Liege, Belgium, [2]CHU De Liège, Division of Rhumatology, Liege, Belgium, [3]CHU De Liège, Division of Biostatistics SIME, Liege, Belgium, [1]CHU De Liège, Division of Nephrology-Dialysis-Transplantation, Liege, Belgium and [5]CHU De Liège, Division of Clinical Chemistry, Liege, Belgium

BACKGROUND AND AIMS: Bone loss and mineral abnormalities are frequent in kidney transplant recipients (KTRs) and associated with a high risk of fracture, cardiovascular mortality and an increase in health care costs. In daily clinics, the detection of bone abnormalities after transplantation includes bone biomarkers and imaging technique [Dual Energy X-ray (DEXA)] to assess respectively the bone turnover and the bone mineral density (BMD), but with limitations. The high-resolution peripheral quantitative computed tomography (HR-pQCT) provides additional noninvasive information on bone microarchitecture and BMD with a better distinction between cortical and trabecular areas. The goal of our study is to evaluate the evolution of bone structure using HR-pQCT compared to standard technique (DXA) in a prospective cohort of KTRs.
METHOD: All patients referred for a single kidney transplant at the university hospital of Liège with no history of exposure to antiresorptive agents were eligible for inclusion (NCT04713774). Participants underwent baseline and 3-month biomarkers analysis, BMD measurements by DEXA. HR-pQCT images were obtained of the distal radius and distal tibia (non-dominant, non-fractured limb) using the XtremeCT device with standard protocols. HR-pQCT assessed quantitative measurement of the volumetric density of trabecular and cortical bone as well as bone structure (trabecular number or thickness or cortical porosity for instance).
RESULTS: A total of 26 patients were prospectively included. The mean age was 57.3 ± 12.1 years. The mean dialysis vintage was 27.5 ± 16.4 months before transplantation. Bone biomarkers showed a significant decrease at 3 months after transplantation. PTH decreased from 221.72 ng/L to 59.6 ng/L ($P < 0.0001$), P1NP from 211 ug/L to 72 ug/L ($P < 0.013$) and BLAP from 23 ug/L to 13 ug/L ($P = 0.042$). BMD was measured by DXA and HR-pQCT at 7 days [6; 8] and 102 days (90; 113) after transplantation. We observed a significant reduction of BMD by DXA at the hip site from 0.868 g/cm^2 to 0.856 g/cm^2 ($P = 0.02$), but not at the lumbar site. The HR-pQCT analysis demonstrated a significant reduction of the trabecular BMD from 152.62 mg HA/ccm to 150.80 mg HA/ccm ($P < 0.0001$) at the tibia site and from 159.09 mg HA/ccm to 156.25 mg HA/ccm ($P < 0.0001$) at the radius site. No change in bone structure have been observed at 3 months post-transplantation with the HR-pQCT analysis.
CONCLUSION: HR-pQCT is sensitive enough to show a significant decrease of BMD at the trabecular site, as soon as 3 months after transplantation compared to DEXA at the lumbar spine. However, no change in bone structure nor cortical bone volume has been observed. The sensibility of this technique might be higher than DEXA. The rapid assessment of bone structure (3 months post-transplantation) might be too soon to evaluate such abnormalities. Detecting properly rapid changes in bone density, as soon as 3 months after renal transplantation seems feasible. The impact on bone health management needs to be further studied.

MO543 EFFICACY AND INFLUENCE ON THE KEY INDICATORS OF MINERAL-BONE DISORDERS OF THE SUCROFERRIC OXYHYDROXIDE AND SEVELAMER CARBONATE IN HEMODIALYSIS PATIENTS

Evgeny Shutov[1,2], Galina Kotlyarova[1], Ksenia Lysenko[1,2] and Sergey Lashutin[1]

[1]Clinical Hospital named after S.P. Botkin, Moscow, Russia, nephrology, Moscow, Russia and [2]Russian Medical Academy of Continuous Proffessional Education, Moscow, Russia, nephrology and hemodialysis, Moscow, Russia

BACKGROUND AND AIMS: Currently, the effectiveness of phosphate-binding agents in patients with CKD should be determined not only by the level of reduction in hyperphosphatemia, but also by the effect on other key factors involved in the development of CKD-MBD. The results of the effect of phosphate binders on the parameters of CKD-MBD, excluding phosphate, are unclear. Our prospective randomized controlled trial evaluated the effect of 16-week treatment with sucroferric oxyhydroxide versus sevelamer carbonate ('sevelamer') on the parameters of CKD-MBD in patients with hyperphosphatemia on programmed hemodialysis.
METHOD: A total of 50 stable patients with hyperphosphatemia ($P > 5.5$ mg/dL) after a 4-week washout period, were randomized at a 1:1 ratio to receive sucroferric oxyhydroxide ($n = 25$) or sevelamer ($n = 25$) for treatment up to 16 weeks. In all patients were monthly evaluated levels of FGF23, soluble Klotho, c-reactive protein (CRP), hemoglobin (Hb), ferritin, transferrin saturation, phosphorus (P), calcium (Ca), parathyroid hormone (PTH). The dose of both medications was adjusted according to serum phosphate.
RESULTS: The average intact fibroblast growth factor 23 (FGF23), PTH, transferrin saturation and ferritin levels did not significantly change in both groups. Meanwhile, Klotho levels increased by 25% in the sucroferric oxyhydroxide group ($P < 0.05$). We observed a significant decrease in serum phosphate level from 6.8 ± 1.5 to 5.27 ± 0.99 mg/dL ($P < 0.01$) only in the group with sucroferric oxyhydroxide. However, treatment with sevelamer did not decrease the level of *P*: 6.32 ± 1.5 versus 6.35 ± 1.9 mg/dL by the end of the study. The number of prescribed tablets was lower in the sucroferric oxyhydroxide group (2.0 ± 1.5 tab/day, mean ± SD) compared with sevelamer group (6.1 ± 3.2 tab/day, mean ± SD). We noted also in group sucroferric oxyhydroxide an increased Hb level from 105.6 ± 15.7 to 111.9 ± 22.3 g/L ($P < 0.05$) and a simultaneous decrease of CRP level by 50% ($P < 0.01$).
CONCLUSION: Treatment with sucroferric oxyhydroxide significantly increased Klotho and Hb levels and lowered CRP levels. Sucroferric oxyhydroxide was more effective in lowering phosphorus levels than sevelamer, which can be explained by an insufficient dose of sevelamer and a short treatment period.

MO544 OUTCOMES ASSOCIATED WITH USE OF PHOSPHATE BINDERS IN PERSONS WITH CHRONIC KIDNEY DISEASE STAGES 4 AND 5 IN SPAIN

Pablo Molina[1,2,3], Mariola D. Molina[4], Jordi Bover[5], Elena Gimenez-Civera[6,7], Cristina Castro Alonso[1], Veronica Escudero Quesada[1], Jonay Pantoja[1,3], Juan Jesus Carrero[8] and Jose Luis Gorriz Teruel[2,6,7]

[1]Hospital Universitari Dr Peset, Nephrology, Valencia, Spain, [2]University of Valencia, Medicine, València, Spain, [3]Fisabio, València, Spain, [4]University of Alicante, Mathematics, San Vicente del Raspeig, Alacanti, Spain, [5]Germans Trias i Pujol Hospital, Nephrology, Badalona, Spain, [6]Hospital Clínic Universitari, Nephrology, València, Spain, [7]Incliva Institut d'Investigació Sanitària, Valencia, Spain, and [8]Karolinska Institute, Medical Epidemiology and Biostatistics, Solna, Sweden

BACKGROUND AND AIMS: Use of phosphate binders among non-dialysis chronic kidney disease (ND-CKD) patients remains controversial, since clinically relevant benefits have not been fully demonstrated. The goal of this study was to determine patterns of phosphate binders use and its associated outcomes in ND-CKD patients.
METHOD: PECERA (Collaborative Study Project in Patients with Advanced CKD) is a 3-year, prospective multicentre, open-cohort study of 966 adult patients with non-dialysed CKD stages 4–5 enrolled from 12 centres in Spain. The end of the follow-up was December 2012. At baseline and every 6 months, demographics, comorbidities, treatments and serum biochemical parameters were collected. Patients who received treatment with calcium-based and calcium-free phosphate binders were compared with those who had not. In a prespecified statistical approach, we assessed the association of phosphate binders use with all-cause mortality using time-dependent Cox proportional hazards models.
RESULTS: Sevelamer was the only calcium-free based binder prescribed during the study. Overall, 515 (53%) patients received some form of binder, with most of them using calcium-based binders ($n = 360$, 37%) and a minority ($n = 111$, 11%) using exclusively sevelamer ($n = 111$, 11%) or a combination of the two ($n = 44$, 5%). After a median follow-up of 29 months (IQR 13–36 months) there were 181 deaths (19%). Crude overall all-cause mortality was significantly lower in patients receiving sevelamer, but not in those receiving calcium-based binders (Figure). After multivariate adjustment for age, weight, blood pressure, diabetes, comorbidity, vitamin D treatment, renal function and levels of albumin, calcium, phosphorous and PTH, treatment with sevelamer was independently associated with lower mortality [adjusted hazard ratio (HR), 0.44 (95% confidence interval (95% CI), 0.22–0.88); P = 0.02]. Use of calcium-based phosphate binders did not predict death.
CONCLUSION: The administration of sevelamer is associated with lower all-cause mortality in advanced ND-CKD patient. Clinical trials are warranted to clarify the risks and benefits of phosphate binders in this population.