CKD-MBD
Chronic Kidney Disease Mineral and Bone Disorder

CKD-MBD related publications in the ERA journals
From July to December 2022

The ERA acknowledges the high clinical and scientific relevance of the CKD-MBD syndrome, reflected by several key publications in the journals of our society. We hereby summarize the content of several recent important papers, providing a link to their abstracts and/or full texts.

From July to December 2022, 19 CKD-MBD related articles have been published, including editorial comments and experimental studies; 13 in Nephrology Dialysis and Transplantation and 6 in the Clinical Kidney Journal.

1) **Cardiovascular risk and cardiovascular calcifications** were the subject of several reports. **M.A. Podestà et al** (Nephrol Dial Transplant 37 (11):2063-2071) provide an overview of mediators involved in the pathogenesis of cardiovascular calcification in *kidney transplantation*, describe the clinical and radiological features, and discuss current evidence on preventive and novel strategies to potentially prevent their long-term deleterious effects. In a different population of *hemodialysis* (HD) patients, **T. Saritas et al** (Clin Kidney J 15 (12): 2300-2311) demonstrated in a small but randomized clinical trial that vitamin K1 is a potent, safe and cost-effective approach not only to correct vitamin K deficiency but also to potentially reduce progression of cardiovascular calcification in this population. In an *experimental in vivo* model of CKD, dietary magnesium supplementation was shown to inhibit abdominal vascular calcification in a report by **N.H.J. Lenders et al** (Nephrol Dial Transplant 37 (6):1049-1058). Interestingly, **P-H. Wu et al** (Nephrol Dial Transplant 37 (6):1162-1170) described that *osteoprotegerin* was the most important *bone biomarker* related to cardiovascular events in a prospective cohort in Danish HD patients, independently of cytokine inflammatory activity. Associations of time-dependent changes in *phosphate (P)* levels with cardiovascular diseases in patients undergoing dialysis *without* secondary hyperparathyroidism were shown by **E. Koshi-Ito et al** (Clin Kidney J 15 (12): 2281-2291). Their results suggest the importance of maintaining stable P levels, not only in the normal range but also without fluctuations. **K.J. Martin** (Nephrol Dial Transplant 37 (10):1830-1832) reports that we should shift current P classical evaluations and that clinical decisions should be made with a method which takes into account serial P levels for potentially better clinical outcomes.

2) Regarding **P and fibroblast growth factor-23 (FGF-23)**, **J.T. Daugirdas** (Nephrol Dial Transplant 37 (12):2522-2527) describes similar results when comparing measured vs kinetic-model predicted P removal during HD and hemodiafiltration (10% or greater P removal for postdilution hemodiafiltration). **S.B. Ascher et al** (Nephrol Dial Transplant 37 (9):1637-1646) reported that higher serum FGF-23 was individually associated with higher risk of the composite adverse-event outcome in multivariable-adjusted models, including kidney tubule health biomarkers, eGFR and albuminuria from SPRINT (Systolic Blood Pressure Intervention Trial). **D. Verbueken and O.W. Moe** (Nephrol Dial Transplant 37 (10):1800-1807) summarized strategies to lower FGF-23 bioactivity and addressed critical questions remaining to be answered. In an experimental rat model of CKD-MBD, **A. Biruete et al** (Nephrol Dial Transplant 37 (10):1857-1867) demonstrated that oral ferric citrate improved P homeostasis, some iron-related parameters and the production and cleavage of FGF23. On the other hand, **F. Di Mario et al** (Nephrol Dial Transplant 37 (12):2505-2513) reports that *hypo*phosphatemia is a frequent complication in critically ill patients undergoing sustained low-efficiency dialysis (SLED) with standard dialysis solutions, that worsens with increasing SLED treatment intensity. Moreover, in patients undergoing daily SLED, phosphate supplementation is strongly associated with reduced

mortality.

3) **Secondary hyperparathyroidism (SHPT)** is frequent in patients with Bartter syndrome type I and II as reported by **M.F.A. Verploegen et al** (Nephrol Dial Transplant 37 (12):2474-2486) in an international cross-sectional study. *Low* serum P was observed in 22% of patients with Bartter and Gitelman syndrome and appeared to be associated with renal P wasting. Interestingly, **L.D.Dubourg et al** (Nephrol Dial Transplant 37 (11):2150-2156) described tubular maximum phosphate reabsorption per glomerular filtration rate (TmP/GFR) reference values from child to adulthood in the era of IDMS-standardized creatinine assays. SHPT treatment, defined as the use of vitamin D analogs, phosphate binders, calcimimetics or parathyroidectomy (PTX), was associated with a lower risk of incident dementia among older patients (age ≥66 years) with end-stage kidney disease as reported by **A. Mathur et al** (Nephrol Dial Transplant 37 (11):2111-2118). **L. Magagnoli et al** (Nephrol Dial Transplant 37 (11):2039-2041) wrote an editorial on these new perspectives of CKD-MBD beyond vessels and bones. Finally, **G. Cianciolo et al** (Clin Kidney J 15 (8): 1459-1474) propose a roadmap to PTX for kidney transplant candidates.

4) Regarding CKD-associated risk of fractures, **D.A. Jaques et al** (Clin Kidney J 15 (6): 1188-1474) described that bone mineral density (BMD) measured at the femoral neck is predictive of mortality in patients requiring renal replacement therapy, although low BMD might be a marker frailty rather than a direct causal factor. Femoral neck BMD was also a strong predictor of hip and any fracture risk, as well as an overall prognostic marker in these patients. Metabolic acidosis was associated with fractures, falls protein-calorie malnutrition and failure to thrive in a large cohort of patients with CKD G3-5 as reported by **V. Mathur et al** (Clin Kidney J 15 (6): 1379-1386). It was also shown an association between the cause of kidney failure and fracture incidence in a national US dialysis cohort study performed by **S. Ziolkowski et al** (Clin Kidney J 15 (12): 2245-2257); however, the study was limited by lack of data regarding numerous potential confounders beyond the cause of kidney failure. Perhaps unexpectedly, lupus nephritis was associated with a lower fracture hazard.

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