

Activities of the ESPN CKD-MBD Working Group: Taking care of bones and vessels in children with chronic kidney disease

Background: Children with chronic kidney disease (CKD) are prone to develop alterations of mineral and bone metabolism resulting in long-term sequel, i.e. growth failure, bone deformities, and ectopic calcifications (CKD-MBD). Both, vitamin D deficiency and high phosphate load are important contributors to CKD-MBD.

Objectives: This working group has the aim to i) provide education and training for the management of CKD-MBD in children, to ii) perform clinical studies on this topic, and to iii) develop appropriate guidelines.

Activities: We provide educational material on the management of CKD-MBD on the ESPN website, which is regularly updated. We make suggestions for topics and speakers for symposia on CKD-MBD at the annual ESPN meetings.

We are performing *two* observational studies and plan *one* interventional study:

In the *first* study (coordinator: S. Bakkaloglu) new strategies in hyperphosphatemia management are evaluated. Children with CKD usually take a fixed dose of phosphorus binder. The Phosphate Education Program (PEP) provides simple training tools to instruct patients/parents to eye-estimate meal phosphorus content based on phosphorus units concept and to self-adjust the number of phosphorus binders accordingly. A pilot study using PEP approach showed improved hyperphosphatemia control without reducing phosphorus intake in children. We are currently extending this concept to European pediatric nephrology units to prove its applicability and efficiency.

In the *second* study (coordinator: D. Haffner) we investigate the effects of vitamin D supplementation on bone/mineral metabolism and the immune system in pediatric CKD patients. So far, the effects of vitamin D substitution on CKD-MBD (beside PTH levels) and the immune system are unknown. We hypothesize that vitamin D supplementation has beneficial effects on surrogate markers of CKD-MBD and the immune system. We are currently finalizing data analysis of our pilot study (case-control study, n=40), which is performed in collaboration with the ESCAPE/4C consortium. Our data show that vitamin D supplementation increases FGF-23 and Klotho levels in children with CKD. A manuscript about these data will be prepared.

The *third* study (coordinator: R. Shroff) will be performed together with the ERA-EDTA CKD-MBD working group and addresses the effects of phosphate binders on bone and cardiovascular health (Binders for Bones (B4B) trial). It is a multicentre, open-label, randomised controlled trial to compare the effects of calcium-based versus calcium-free phosphate binders on bone mineral density in children and young adults with chronic kidney disease. A grant application was sent to the European Commission in March 2015 (Horizon 2020).

Conclusions: The activities of our working group are expected to improve the prevention and treatment of CKD-MBD associated complications in children and young adults.

Dieter Haffner on behalf of the ESPN CKD-MBD working group