CHRONIC KIDNEY DISEASE

Doxercalciferol is as effective as calcitriol for the treatment of secondary hyperparathyroidism in CKD

Doxercalciferol and calcitriol are equally effective at modulating serum parathyroid hormone levels, bone turnover and fibroblast growth factor 23 (FGF-23) in pediatric patients with secondary hyperparathryoidism owing to chronic kidney disease (CKD), according to new research by Katherine Wesseling-Perry and colleagues.

Secondary hyperparathyroidism is common in pediatric patients with CKD and can lead to skeletal deformities, bone pain and increased risk of fractures. "Although numerous studies have assessed the efficacy of different vitamin D sterols and phosphate binders on biochemical end points (such as parathyroid hormone, calcium and phosphorus levels), their effects on bone and FGF-23 were unknown," explains Wesseling-Perry.

The investigators enrolled 60 pediatric patients on peritoneal dialysis (aged 13.9 ± 0.5 years) in their prospective study. Patients were then treated with either calcitriol or doxercalciferol (in combination with either calcium carbonate or sevelamer) for 8 months. Of the 51 patients who completed the study, decreased bone formation rates and serum parathyroid hormone levels and a more than fourfold increase in FGF-23 levels (despite stable serum phosphate concentrations) were observed in all treatment groups—that is, irrespective of the combination of vitamin D sterol or phosphate binder used. Patients treated with doxercalciferol had greater reductions in the eroded bone surface than those treated with calcitriol. Moreover, treatment with sevelamer did not induce changes in serum calcium levels and enabled increased doses of vitamin D sterol to be used. Mineralization defects were prevalent in the study cohort and were not improved by any combination of therapy.

Wesseling-Perry highlights that sevelamer can be used to treat secondary hyperparathyroidism without inducing hypercalcemia, a finding that could have "important implications for the process of vascular calcification, which is linked to hypercalemia". "The study also suggested that doxercalciferol may be preferable to calcitriol with respect to osteoclastogenesis in bone." Investigations into the bone biology—especially the prevalence and pathophysiology of bone mineralization defects—of pediatric patients with CKD, and the role of vitamin D deficiency and FGF-23 expression in early CKD are ongoing.

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Original article Wesseling-Perry, K. *et al.* Calcitriol and doxercalciferol are equivalent in controlling bone turnover, suppressing parathyroid hormone, and increasing fibroblast growth factor-23 in secondary hyperparathyroidism. *Kidney Int.* doi:10.1038/ki.2010.352