**Evaluating the impact of routine colecalciferol on erythropoietin (EPO) requirements**

**Background**

Vitamin D deficiency and insufficiency (serum 25(OH)D <30nmol/L and <75nmol/L respectively) is prevalent in haemodialysis patients,andis associated with increased erythropoietin (EPO) requirements. Lack of renal 25-hydroxyvitamin D-1α hydroxylase (CYP27B1) for the conversion of 25(OH)D to active 1,25(OH)D is well acknowledged in end stage renal disease (ESRD) with the routine use of active vitamin D analogues. However, this overlooks 25(OH)D deficiency. Following the development of a new local clinical guideline, UHCW NHS Trust introduced colecalciferol supplementation to all in-centre haemodialysis patients as part of standard routine care (colecalciferol supplementation: serum 25OHD <50nmol/L repletion dose of 40,000IU for 3 months, ≥50nmol/L maintenance dose of 20,000IU fortnightly, >150nmol/L stop and recheck in 3 months). This provided a unique opportunity to investigate potential benefits of adequate serum 25(OH)D.

**Study Aim**

To assess whether increased serum 25(OH)D levels result in an improved response to EPO, measured by a reduction in mean EPO usage.

**Method**

Data from all 350 patients receiving in-centre haemodialysis across Coventry and Warwickshire was included in this study. Retrospective data looking at total monthly EPO dose received and serum haemoglobin was collected for 12 months prior to the introduction of colecalciferol (T-12 to T-1). The same data was collected prospectively for 15 months post introduction of colecalciferol (T0-T15). The 15 month prospective observational period was chosen to allow collection of 12 months of data after vitamin D repletion had been achieved (3 months to achieve repletion, followed by 12 months post repletion). Monthly serum calcium (corrected for albumin) and 3 monthly serum 25(OH)D was measured throughout the 15 month prospective follow up period. All aspects of the study received NHS ethical approval (reference numbers 14/NS/1012 and 14/EE/10). The primary outcome measure was the reduction of mean total monthly EPO dose needed to maintain haemoglobin within the target range of 100-120g/L according to UHCW renal anaemia guidelines. Wilcoxon signed rank test was used to test the null hypothesis that there is no difference in EPO dose after vitamin D supplementation is introduced.

**Results**

EPO dosage data was analysed for all patients at all monthly timepoints where their serum haemoglobin levels fell between 100-120g/L (n=264). Data showed that the total EPO use fell following vitamin D supplementation. Total monthly EPO (mcg) received during the 12 months prior to the introduction of vitamin D supplementation (T-12 to T-1) was compared to total monthly EPO (mcg) received during the 12 months post vitamin D repletion (T4 to T15). In months T-12 to T-1 mean EPO use was 141.30mcg (median 112.1mcg) which was reduced to 139.34 mcg (median 95.0mcg) post vitamin D repletion *(p = 0.0258).* Mean serum 25(OH)D increased from 27.41±25.28nmol/L at T0 to 120±27.09nmol/L at T15 *(P < 0.0001).* Vitamin D repletion (serum 25(OH)D ≥75nmol/L) was achieved in 76.5% of patients by T3. Mean serum 25(OH)D continued to increase from T3 to T6 and was adequately maintained throughout the duration of the study.

**Conclusion**

Hypovitaminosis D is prevalent in the haemodialysis population in Coventry and this is likely to reflect UK haemodialysis patients. The vitamin D supplementation guideline developed at UHCW for all haemodialysis patients, is both safe and effective. Complementing 1,25(OH)D analogue treatment with colecalciferol may have a role in improving EPO response and thus in the management of renal anaemia.

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