Evaluation of Chronic Kidney Disease-Mineral and Bone Disorder (CKD-MBD) Among Patients on twice weekly Hemodialysis in Khartoum Teaching Hospital, Sudan

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ABSTRACT

Background: Many predictors of morbidity and mortality in dialysis patients but bone metabolism remains one of the important factors. Kidney Disease Outcomes Quality Initiative (K/DOQI) clinical practice guidelines for bone metabolism and disease in chronic kidney disease (CKD) recommend that, in Stage 5 CKD, the target levels for calcium (Ca) (corrected for serum albumin), phosphate (P), calcium X phosphate (Ca X P) product and parathyroid hormone (PTH) levels should be maintained at 8.4-9.5 mg/dl, 3.5-5.5 mg/dl, < 55 mg2/dl2 and 150-300 pg /ml, respectively.

Objectives: To recognize the effectiveness of twice per week haemodialysis (8 hours per week dialysis) in achieving the control level of calcium, phosphorus, calcium phosphorus products according to K/DOQI guidelines.

Patients & Methods: A prospective observational cross-sectional hospital based study was conducted on 77 adult patients with End Stage Renal Disease (ESRD) who received complete two sessions of haemodialysis per week equivalent to eight hours/week hemodialysis.

Personal and demographic data was collected together with the data regarding calcium, phosphorus, calcium times phosphorus (ca X po4) product, PTH, Serum Albumin, information of the dialysis session, co-morbidities according to Davis score. Data was analysed using software program SPSS v 16. Correlation between control of mineral and bone disorder and co-morbidities was tested using Qui-Square test (α 0.05).

Results: The aetiology of ESRD was not recognized in 33.8% and thirty-two patients (41.6%) were hypertensive prior to initiation of hemodialysis Forty-two patients (54.5%) maintained residual renal function (RRF) as defined 24hours diuresis ≥ 100 ml. 84% of patient (n=65) had their HD sessions through arterio-venous (AVF.) About 88.2% of patients with AVF had mild Davies's score. While 20% and 75% of patients with jugular catheter either had moderate or severe score respectively, this relation found to be significant (p= 0.002).

The percentage of patients whose Ca, P, Ca X p product and PTH were within K/DOQI recommended ranges were 43%, 36%, 65% and 21% respectively. All the patients with target level of phosphorus had target level of ca x po4 product and 75% of patient with phosphorus level above the target had ca x po4 product above the target level also (P=0.0001). On the other hand serum calcium had no significant effect on the ca x po4 product (P= 0.24).

We found 85% of our study population used to take the fixed dose of 1500mg caco3 in 3 divided doses per day despite variation in their bone biochemical parameters. But on the other hand, 88.9% of patients with above target PTH level appropriately prescribed Vitamin D and 37.5% with target level of PTH did not take vitamin D (p=0.04).
Sixty out of the 77 patients in the study (78%) prescribed similar dose of Alfacalcidol (0.25ug/day) regardless of the level of PTH, in the other words this means 26 out of the 34 patients with low PTH (76.4%) were prescribing Alfacalcidol despite their lower level of PTH rendering them to in threat of developing dynamic bone disease.

Conclusion: Current clinical management of chronic kidney disease-metabolic bone disorder CKD-MBD is far from reaching the target set by K/DOQI guidelines not only because of twice weekly HD but also due to inappropriate phosphate binders and vitamin D prescriptions. Other approach rather than medical intervention such as well-planned parathyroidectomy need to be considered for management of uncontrolled secondary or tertiary hyperparathyroidism.

Keywords: Chronic kidney disease (CKD), Hemodialysis, End stage renal disease (ESRD), Kidney Disease Outcomes Quality Initiative (K/DOQI), Mineral and Bone Disorder

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