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Factors associated with 25(OH)D deficiency in Sarawak patients receiving maintenance dialysis

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Objectives: Patients receiving renal replacement therapy (RRT) are on a steady rise in Malaysia. Vitamin D status of these patients are generally unknown. There are several known factors associated with 25(OH)D deficiency in patients receiving long term RRT namely age, female gender, BMI, diabetes mellitus, albumin level and sun exposure time. This study explores the factors for Malaysian population.

Methods: In this retrospective, single-centre, cross-sectional study, data from a total of 170 patients receiving RRT were collected during November 2015 to September 2016. The patients in this study are divided into two arms namely 101 patients receiving haemodialysis while 69 patients receiving peritoneal dialysis. Based on Endocrine Society guidelines, patients are labelled vitamin D insufficient when levels were between 20 and 30 ng/ml, and deficient when levels were less than 20 ng/ml. Simple and multiple logistic regression were performed using SPSS Statistics for Windows, version 17.0

Results: Diabetes mellitus status, female gender, serum magnesium, serum phosphate and serum albumin levels are significantly associated with vitamin D deficiency. The decrease in albumin along with low level of Vitamin D-binding protein concentrate leads to impaired 25(OH)D absorption in the body. Our study showed a significant association between serum phosphate and 25(OH)D deficiency. The phosphate mechanism was not well studied, some studies showed both significant and inverse relationship with vitamin D level. The defective synthesis of the active metabolite of vitamin D by non-functioning kidney will lead to impaired absorption of magnesium from human gut. In addition, poorly controlled diabetes mellitus with substantial proteinuria and loss of protein binding carriers will thus lead to Vitamin D deficiency.

Conclusions: Vitamin D deficiency is highly prevalent among dialysis patients especially those undergoing Continuous Ambulatory Peritoneal Dialysis (CAPD). Hence, Vitamin D supplementation among dialysis patients should be encouraged according to local guidelines to reduce morbidity and mortality.

Table 1: Multiple logistic regression analysis of 25-hydroxyvitamin D(calcifediol) deficiency (<20ng/ml) in 170 patients with renal replacement therapy

Table

Multiple logistic regression analysis of 25-hydroxyvitamin D(calcifediol) deficiency (<20ng/ml) in 170 patients with renal replacement therapy

Determinants	OR	95% CI	p-value	Adjusted OR	95% CI	p-value
Albumin (g/L)	**1.19**	**1.10, 1.29**	**0.0001**	**1.19**	**1.07, 1.33**	**0.002**
Age (years)	1.00	0.98, 1.03	0.90	1.02	0.99, 1.06	0.19
BMI (kg/m^2)	1.01	0.93, 1.10	0.82	1.09	0.97, 1.22	0.16
ALP (U/L)	1.00	0.99, 1.01	0.34	1.00	0.99, 1.01	0.41
Calcium (mmol/L)	2.89	0.55, 15.19	0.21	0.18	0.01, 2.12	0.18
Phosphate (mmol/L)	2.13	0.99, 4.60	0.052	**3.72**	**1.21, 11.46**	**0.022**
iPTH (pmol/L)	1.01	1.00, 1.02	0.058	1.00	0.99, 1.02	0.74
Tchol (mmol/L)	0.74	0.55, 1.00	0.052	0.74	0.51, 1.07	0.11
Magnesium (mmol/L)	**34.36**	**5.65, 208.87**	**0.0001**	**46.58**	**3.75, 579.30**	**0.003**
Female gender	0.26	0.12, 0.56	0.001	**0.17**	**0.06, 0.52**	**0.002**
Diabetes Mellitus	**5.76**	**2.71, 12.24**	**0.0001**	**5.50**	**1.92, 15.74**	**0.001**