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Cross-Sectional Study with Hemodynamically Stable Dialysis Patients to Estimate PTH

***Dr. Firas Fadhil Abdulatteef*[1] *and Dr. Mohammed Yousif Mahmood*[2]**

[1]M.B.CH.B, F.I.B.M.S. \ MEDICINE C.A.B.M.S. \ MEDICINE F.I.B.M.S. \ NEPHROLOGY Ministry of Health, Baghdad Medical office Al-Karkh, Al Karama Educational Hospital, Baghdad, Iraq

[2]M.B.CH.B C.A.B.M.S. \ MEDICINE F.I.B.M.S. \ NEPHROLOGY Ministry of Health, Baghdad Medical office Al-Karkh, Al Karama Educational Hospital, Baghdad, Iraq

Abstract: This paper aims to made a Cross-sectional study with hemodynamically stable dialysis patients to estimate PTH. A retrospective, observational, longitudinal study was conducted of 50 patients aged 20-60 years with CKD who started follow-up in CKD clinics from January 1, 2019, to December 31, 2020, with their progression noted, and all patients were on a one-day consultation and follow-up At least six months. The results which found in this study were the level of PTH patient (87.62±12.9) and for the control group (66.5±16.22), Phosphorus levels of the patient (6.3±1.34) and for the control group (7.88±2.45). And through the logistic regression to mortality and risk factors to patients, it was found that the most important factors affecting the main images are PTH patient CI-95% (2.94–7.60), HR=4.57 with p-value < 0.001, and ages between 50-60, CI-95% 1.2-1.6, HR= 1.39 with p-value < 0.001. In conclusion, we found patients had a statistically significant relationship between CKD patients with High levels of PTH.

Keywords: CKD, PTH, hemodynamically, BMI, Charlson index.

INTRODUCTION

In recent years, increased mortality of elderly patients with advanced chronic kidney disease (CKD). In some previous studies, it was estimated that these patients had doubled in the past 25 years. Important factors such as increased life expectancy and PTH contributed to the development of CKD [Kalantar-Zadeh, K. *et al*., 2009; Wizemann, V. *et al*., 2009].

It is very difficult to judge the prevalence of secondary hyperparathyroidism in dialysis centers, as this is due to the fact that the world's leading experts in this field recommend different levels of PTH, calcium, and phosphorous in the blood for patients with CKD in Iraq; some dialysis centers Renal, dynamic determination of these biochemical markers of bone mineral disorders (mainly PTH) is difficult.

According to the recommendations [Jacobs, L.H. *et al*., 2010; David, S. *et al*., 2008], the prevalence of secondary hyperparathyroidism among patients with stage III-V CKD is 32%, among patients receiving treatment with a hemodialysis program - 34%, and among patients receiving peritoneal dialysis - 18%. Our analysis of the frequency and severity of secondary hyperparathyroidism in patients receiving renal replacement therapy with dialysis in several Iraqi health centers indicates a fairly high prevalence of the disease—up to half of the patients require hyperparathyroidism prevention and treatment, as 6-21% of them have severe secondary hyperparathyroidism [Chazot, C. *et al*., 2011; Hutchison, A.J, 1999; Mix, T.C.H. *et al*., 2003; Haroun, M.K. *et al*., 2003].

In the last decade, there have been reports of a low prevalence of secondary hyperparathyroidism, and this appears to be quite reasonable and may be due to several reasons, including the inverse association of plasma PTH concentration with the age of patients [USRDS, 2004; K/DOQI, 2003] (according to our data, r = -0.235, p = 0.016). Currently, there is an "aging" of hemodialysis patients (the average age of patients starting dialysis is 65-71 years, in which the improvement of dialysis treatment plays an important role, which is close to achieving an increased volume of original kidney function [Smith, D.H. *et al*., 2009; Kovesdy, C.P. *et al*., 2008; Cockcroft, D. W. *et al*., 1976].

MATERIAL AND METHOD

Patient Sample

A retrospective, observational, longitudinal study was conducted of 50 patients aged 20-60 years with CKD who started follow-up in CKD clinics from January 1, 2019, to December 31, 2020, with their progression noted, and all patients were on a one-day consultation and follow-up At least six months.

Study Design

Demographic data, comorbidity (general comorbidity measured by the Charlson index, in particular, DM and hemodialysis time (months)), body mass index (BMI), PTH (pg/ml), calcium, phosphorous, vitamin D (ng/mL), 24-hour urine excretion.

***Corresponding Author:** Dr. Firas Fadhil Abdulatteef

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Biochemical determinations were made using standard automated methods. Creatinine level was determined by the Jaffee method. Albuminuria per gram of creatinine in a 24-hour urine sample was measured by a turbidimeter (Beckman AU 2700). Plasma concentrations of 25(OH) vitamin D and PTH were measured by electroluminescence (ECLIA) (Roche Diagnostics, Cobas 6000).

An elevated serum thyroid hormone level should be considered a useful diagnostic criterion for secondary hyperparathyroidism in patients with CKD.

The study indicated that the exclusion criteria included patients under the age of 20 years and over 60 years of age, in addition to patients who did not provide analyzes, patients who were not able to perform physical and pulmonary function tests, and who suffer from hemodynamic instability.

Study Period

This is a cross-sectional study with a descriptive approach. It was approved by the Research Ethics Committee of the Iraqi Ministry of Health with a study period from January 1, 2019, to December 31, 2020.

Aim of Study

This paper aims to made a Cross-sectional study with hemodynamically stable dialysis patients to estimate PTH.

RESULTS

Table 1: Demographic results of the patient (hemodynamically stable dialysis patients to estimate PTH, N=50)

Variable	Patient, N=30	control N=20	P value
Age	40.66±12.2	45±11.2	0.778
SEX			
female	20	12	
Male	10	8	0.22
BMI	29±3.3	28.8±4.4	0.06
Smoking			
YES	5	2	0.88
NO	25	18	0.32
Education level			
LOW	4	3	
Medium	5	3	0.69
High	3	2	
financial capacity			
LOW	2	1	
Medium	7	5	0.88
High	3	2	
Hemodialysis time (months) (mean sd)	37.9 ± 22.22	57.67 ± 14.4	0.53
P urine B, mg/day	500 ±240	378±255	
Charlson index	8±2	7±2	0.45
Alb / Cr M ،mg / g Cr. urine	218 (895)	340 (1044)	0.087

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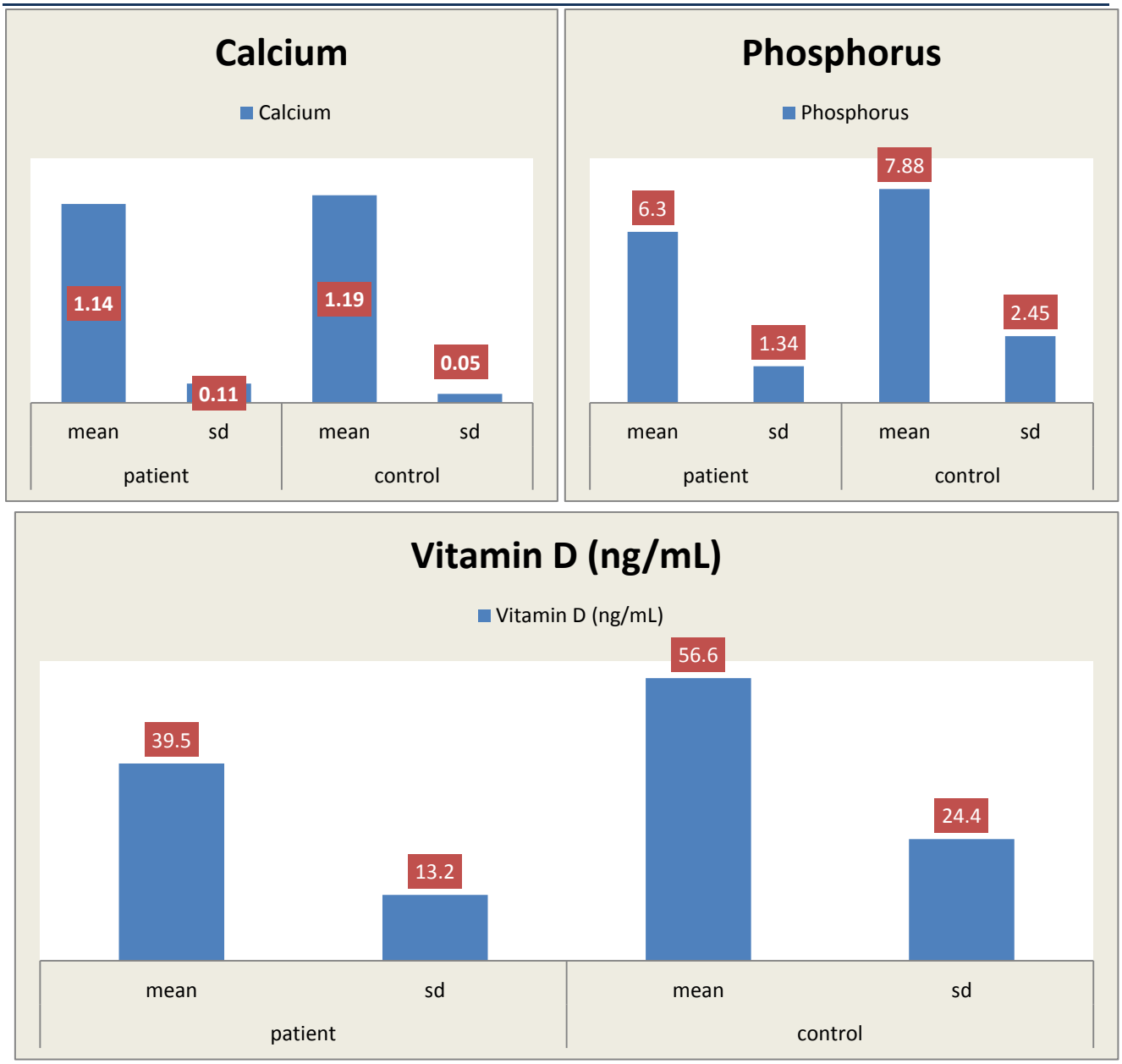

Figure 1: Outcomes of patients according to (Calcium, Phosphorus (mg/dL), Vitamin D (ng/mL)

Table 2: Clinical Characteristics of patients

	Patient	**Control**
Hypertension	142.3 (18.1)	134.33 (15.66)
Diabetes	16	13
Coronary artery disease	6	5
Peripheral vascular disease	8	2
Mean (SD) gout/uric acid	8.22 (1.99)	6.44 (2.11)
Mean (SD) CCI	1.74 (1.44)	1.94 (1.67)
glomerular filtration rate	20.67 (13.48)	44.55 (13.92)
Serum albumin	3.33 (0.55)	4.20 (0.23)

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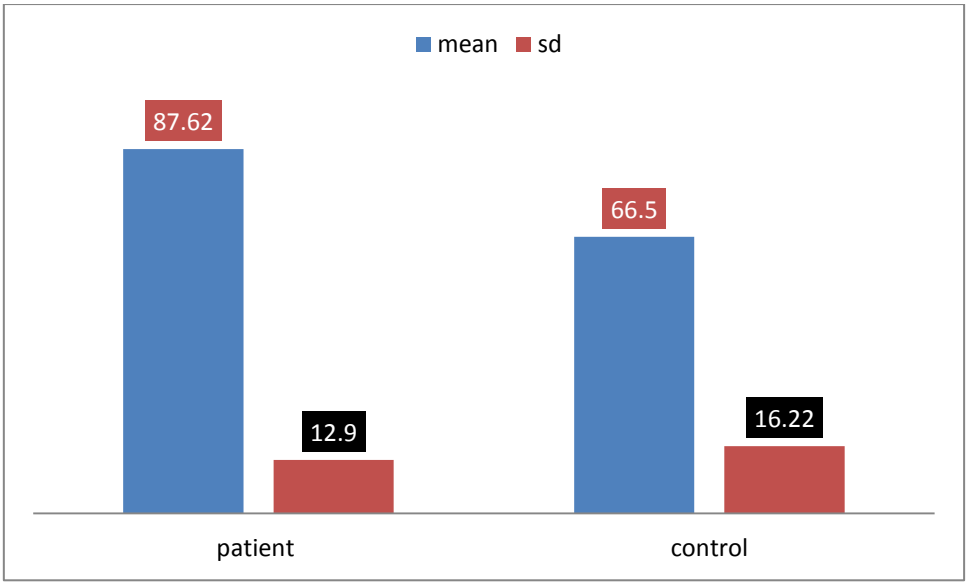

Figure 2: Final outcomes of the patient according to PTH

Table 3: Death outcomes during 6 -month follow-up according to analysis logistic

	CI-95%	hazard ratio;	P value
PTH control	0.85–2.04	1.43	0.87
PTH patient	2.94–7.60	4.57	<0.001
Age			
20-29	0.33–0.67	0.55	0.98
30-39	0.45-0.66	0.52	0.78
40-49	0.69-0.78	0.72	0.03
50-60	1.2-1.6	1.39	<0.001
sex	0.63–1.31	0.88	0.8
Smoking status	0.34-0.8	0.72	0.55
Diabetes	1.44-2.98	2.1	0.53
Coronary artery disease	1.49-3.1	2.3	0.01
Peripheral vascular disease	1.1-1.9	1.6	0.04

DISCUSSION

In this study, 50 patients were collected and distributed into two groups (30 patients, 20 as a control group), as if the average ages ranged between 20 to 60 years. The study showed a high body mass index for ages ranging from 50 to 60 years. Smokers to patients 25% and the control group 10%.

Phosphorous and PTH values correlate with various variables, among which are GFR score, calcium, and phosphorous intake, and administration of phosphate binders and vitamin D.

We tried to neutralize the effect of eGFR on the level of phosphorous and PTH in the total group, and the true value and the mean for the group of patients were 20.67 (13.48), while for the control group, 44.55 (13.92).

The average values of phosphorus were determined for the two groups, and the decrease of the value was observed in the patient group (6.3 ± 1.34) and the control group (7.88 ± 2.45), and it was analyzed whether the slope of renal failure progression was significantly different between the two groups, after conducting this analysis with regard to phosphorus. There were no statistically significant differences between the two groups.

Statistical significance was found when, by the test of ANOVA, we compared the slopes of renal failure progression between the different phosphorous strata, both in stages 4 and 5. When comparing PTH by ANOVA, we found in stage 4 that the lowest level of PTH was associated with progression of PTH Less for renal failure (P = 0.04 for both groups).

The results of this study show that the deterioration of renal function in our group of

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elderly patients with CKD was very slow throughout six months of follow-up. The variables that had the most negative effect were the level of PTH, and an association of progression with phosphorus was observed in patients with CKD. We found no association with age, global comorbidities, history of diabetes, ischemic heart disease, and gender.

The development of CKD (a decrease in the mass of the working nephron) and some other causes (nutrition and loss of vitamin D in the urine, metabolic acidosis) lead to a deficiency of the active form of vitamin D (calcitriol) that limits the activation of certain receptors (sensitive to vitamin D) located on the membranes of major cells (Parathyroid cells) of the parathyroid glands, on the other hand, causes hypocalcemia due to a decrease in the absorption of calcium in the intestine [Levey, A. S. *et al*., 1999; Rothman, K. J. *et al*., 2008].

Both insufficient activation of vitamin D-sensitive receptors and hypocalcemia stimulate the secretion of parathyroid hormone [London, R. *et al*., 2003; Winkelmayer, W.C. *et al*., 2006] and also cause the development of parathyroid hyperplasia and parathyroid hyperplasia. Decreased kidney function leads to a positive balance of phosphorus metabolism, but an increase in thyroid hormone synthesis for some time provides a normal level of phosphorus in the blood. The development of chronic kidney disease is accompanied by hypophosphatemia, which stimulates the secretion of parathyroid hormone directly and indirectly through the development of reciprocal hypocalcaemia [Schumock, G.T. *et al*., 2008].

CONCLUSION

We conclude from this study that patients have a statistically significant relationship between CKD patients with High levels of PTH.

Through the logistic regression to mortality and risk factors to patients, it was found that the most important factors affecting the main images are PTH patient CI-95% (2.94–7.60), HR=4.57 with p-value < 0.001 and ages between 50-60, CI-95% 1.2-1.6, HR= 1.39 with p-value < 0.001.

RECOMMENDATION

CKD progresses slowly in this patient group as hyperparathyroidism increases the progression of CKD in the elderly, although normal phosphate levels appear in most cases.

Albuminuria is an important factor in the development of CKD in elderly patients, as in other groups with renal failure.

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