

## Cinacalcet Benefits in Chronic Kidney Disease Patients in Babylon Province

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### Abstract

**Introduction:** Cinacalcet is calcium sensitive receptor and professionally reduces parathyroid hormone (PTH). The aim of study is to assess the effect of Cinacalcet on the level of PTH, serum calcium and phosphate in patients they have CKD and on maintenance hemodialysis.

**Method:** Cross sectional experimental study of 60 patients with chronic kidney disease, group A; 30 patients on maintenance hemodialysis not receive cinacalcet 60 mg daily at night for 6 months' group B; 30 patients also on maintenance hemodialysis receive cinacalcet 60 mg daily at night for 6 months'. Patients age gender were taken, also measured the serum calcium ( $Ca^{++}$ ), phosphate and parathyroid hormone levels.

**Results:** Mean age of patients in group A ( $50.83 \pm 14$ ) years, while group B ( $48.9 \pm 15$ ) years with no significant difference. There is significant difference in mean of serum  $Ca^{++}$  level between group A and group B. There is significant difference in mean of serum phosphate level between group A and group B. There is significant difference in mean of parathyroid hormone level between group A and group B.

**Conclusion:** The serum  $Ca^{++}$  level decrease in patients received cinacalcet, serum phosphate and parathyroid hormone levels decrease in patients received cinacalcet.

**Keywords:** cinacalcet, chronic kidney disease, hemodialysis, Babylon province

### 1. INTRODUCTION

Chronic kidney disease (CKD) is the most important illness with life time risk <sup>(1)</sup>, It associated with electrolyte disturbance and cardiovascular disease and death <sup>(2)</sup>, also it is associated with high level of parathyroid hormone and increase risk of hypercalcemia and cardiovascular events <sup>(3)</sup>. Patients with final stage renal illness, due to 2<sup>nd</sup> hyperparathyroidism this lead to bone disease and blood vessels calcifications and atherosclerosis <sup>(4, 5)</sup>. Cinacalcet is act as "calcium sensitive receptor" and help to decrease parathyroid hormone (PTH) <sup>(6)</sup>. Cinacalcet can also managing phosphate level to be normal and decrease hypercalcemia <sup>(7, 8, 9)</sup>. Cinacalcet and vitamin D postponements the calcification of "valvular, aortic and coronary" <sup>(10, 11)</sup>. Numerous studies show lowering in the cardiovascular disease after used Cinacalcet trial <sup>(9)</sup>. The aim of study is to assess the effect of Cinacalcet on the level of PTH, serum calcium and phosphate in patients they have CKD and on maintenance hemodialysis.

### 2. METHOD

Cross sectional experimental study of 60 patients with chronic kidney disease, group A; 30 patients on maintenance hemodialysis not receive cinacalcet 60 mg daily at night for 6 months' group B; 30 patients also on maintenance hemodialysis receive cinacalcet 60 mg daily at night for 6 months'. The study done in Marjan medical city/ dialysis department from August 2021 to March 2022. Patients age gender were taken, also measured the serum calcium ( $Ca^{++}$ ), phosphate and parathyroid hormone levels. The symptoms also diagnosed in 2 groups; (bone pain, Bone fracture Anemia ( $Hb < 10$ ), no fatal cardiovascular events, fatal cardiovascular events, Pruritus, Calciphylaxis, Nausea and vomiting). Statistical analysis done by SPSS 22, frequency and percentage, mean, SD. T test used for assessment differences between mean of continues variables. P-value less or equal to 0.05 is consider significant.

### 3. RESULTS

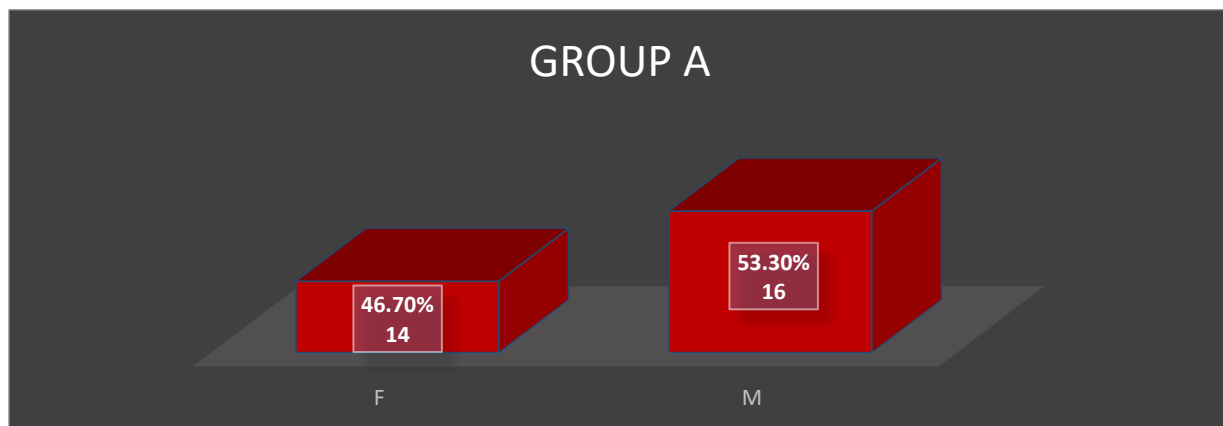
60 patients with chronic kidney disease, group A; 30 patients on maintenance hemodialysis not received cinacalcet 60 mg daily at night for 6 months' group B; 30 patients also on maintenance hemodialysis received cinacalcet 60 mg daily at night for 6 months'. Mean age of patients in group A ( $50.83 \pm 14$ ) years, while group B ( $48.9 \pm 15$ ) years with no significant difference. There is significant difference in mean of serum  $\text{Ca}^{++}$  level between group A and group B; patients received cinacalcet have decrease in the mean of serum  $\text{Ca}^{++}$  level less than in patients not received cinacalcet. There is significant difference in mean of serum phosphate level between group A and group B; patients received cinacalcet have decrease in the mean of serum phosphate level less than in patients not received cinacalcet. There is significant difference in mean of parathyroid hormone level between group A and group B; patients received cinacalcet have decrease in the mean of parathyroid hormone level less than in patients not received cinacalcet. As show in table 1.

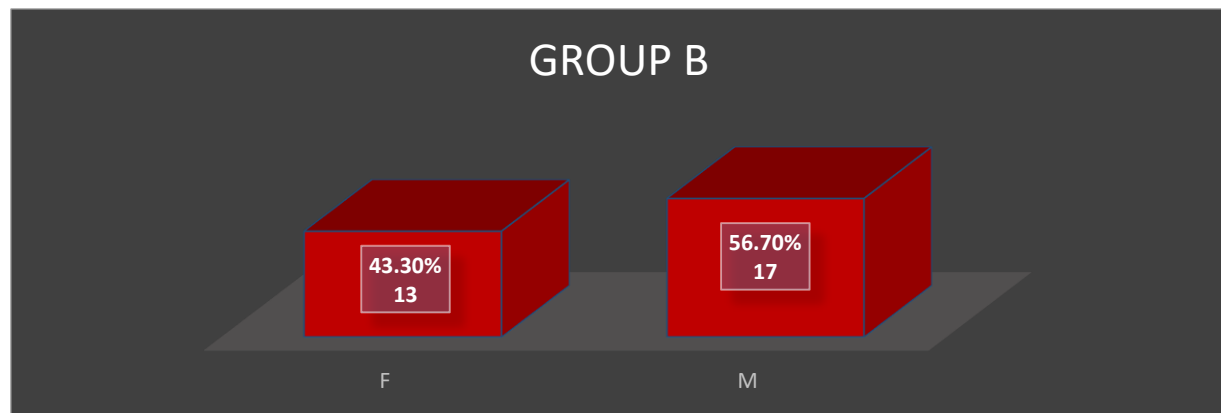
**Table 1:** mean difference of Age, serum  $\text{Ca}^{++}$ , phosphate and parathyroid hormone levels according to groups of study.

Variables	hypothyroidism	N	Mean	SD	P-value
Age	Group A	30	50.83	14.03	0.6
	Group B	30	48.90	15.03	
$\text{Ca}^{++}$	Group A	30	1.96	0.15	<b>0.0001</b>
	Group B	30	1.78	0.18	
Phosphate	Group A	30	5.93	1.93	<b>0.0001</b>
	Group B	30	4.05	1.83	
PTH	Group A	30	491.63	308.91	<b>0.0001</b>
	Group B	30	171.34	168.55	

**P-value  $\leq 0.05$  (significant).**

According to fig 1; gender distribution in 2 groups as the following; group A: ( 53.3%) are males and ( 46.7%) are females. In group B; (56.7%) are males and (43.3%) are females.





**Figure 2:** distribution accoprding gender in groups A and B.

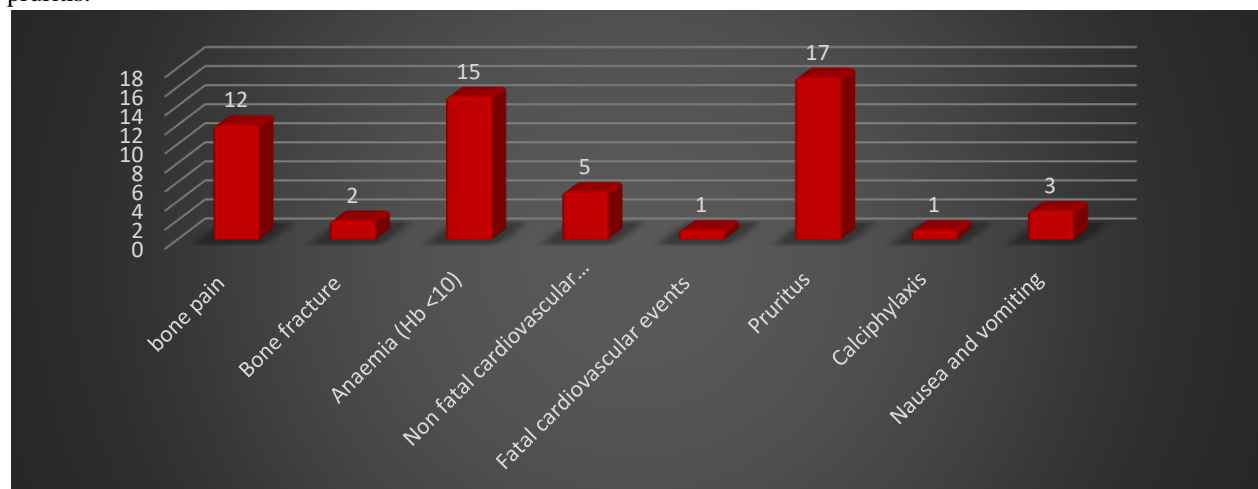
Table 2 show; there is no significant difference mean of serum phosphate, serum  $\text{Ca}^{++}$ , PTH level between males and females in patients they received cinacalcet (group B).

**Table 2:** difference mean of serum phosphate, serum  $\text{Ca}^{++}$ , PTH level between males and females.

Variables	hypothyroidism	N	Mean	SD	P-value
Age	<i>female</i>	13	45.46	16.551	0.3
	<i>male</i>	17	51.53	13.675	
Ca	<i>female</i>	13	1.992	.1891	0.4
	<i>male</i>	17	1.935	.1869	
Phosphate	<i>female</i>	13	3.7408	1.80584	0.4
	<i>male</i>	17	4.2941	1.87919	
PTH	<i>female</i>	13	122.2231	83.50461	0.1
	<i>male</i>	17	208.9112	206.89774	

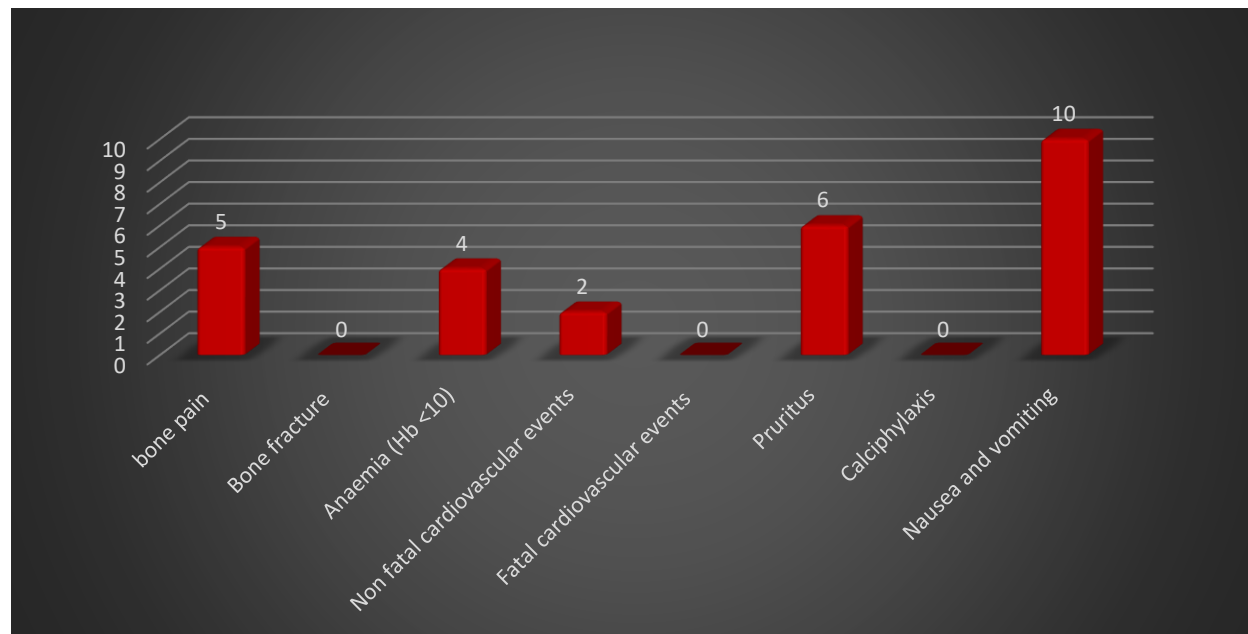
**P-value  $\leq 0.05$  (significant).**

According to fig 2; When compate with clinical manifistations of patients not received cinacalcet (group A); 12 patients have bone ache, 15 patients have anemia, 5 patients have non fatal cardiovascular disease, 17 patients have pruritis.



**Figure 2:** Clinical data for patients not receivedcinacalcet (group A).

The clinical manifestations of patients received cinacalcet (group B) are; 4 patients have anemia, 2 patients have non fatal cardiovascular disease, 10 patients have nausea and vomiting, 6 patients have pruritis and 5 patients have bone ache. As show in fig 3.



**Figure 3:** Clinical data for patients received cinacalcet (group B).

#### 4. DISCUSSION

Cinacalcet decrease the cardiovascular disease<sup>(11)</sup>. In current study there is significant difference in mean of serum  $\text{Ca}^{++}$  level between group A and group B; patients received cinacalcet have decrease in the mean of serum  $\text{Ca}^{++}$  level less than in patients not received cinacalcet. This is similar to other study that state the serum calcium values increased before cinacalcet start, although they persisted within the normal before cinacalcet management ongoing. But after cinacalcet start, calcium fallen shortly to slightly minor values<sup>(11)</sup>. Marcocci et al. also show that decrease in serum calcium to the usual range “ $[\leq 10.3 \text{ mg/dl (2.6 mmol/liter)}]$ ” at the final stage was completed in 9 patients (53%)<sup>12</sup>. Also Yasuhiro et al. agreed with current results and stated that serum  $\text{Ca}^{++}$  concentration at the standard was  $12 \pm 1 \text{ mg/dL}$  and decreased to  $10.1 \pm 1.6 \text{ mg/dL}$  at the end of the titration phase with cinacalcet dosage of up to  $75 \text{ mg /3 times in a day}^{(13)}$ . In addition there is significant difference in mean of parathyroid hormone level between group A and group B; patients received cinacalcet have decrease in the mean of parathyroid hormone level less than in patients not received cinacalcet. This is agreed with **Evans et al.**<sup>(11)</sup> and **Marcocci**<sup>(12)</sup> and **Peacock et al.**<sup>(14)</sup> they **stated that** the decrease in PTH concentration. Also there is significant difference in mean of serum phosphate level between group A and group B; patients received cinacalcet have decrease in the mean of serum phosphate level less than in patients not received cinacalcet. This is agreed with Evans et al.<sup>(11)</sup> that stated there is dropped of serum phosphate after treatment cinacalcet, other study show serum phosphate alterations in dialysis patients have cinacalcet, (41%) had decreased, (4%) unchanged and (25%) increased, serum P at Month 12<sup>(15)</sup>. In the current study the clinical manifestations of patients received cinacalcet (group B) are; 4 patients have anemia, 2 patients have non fatal cardiovascular disease, 10 patients have nausea and vomiting, 6 patients have pruritis and 5 patients have bone ache. Nausea, vomiting, and paresthesias were reflected to be knowledgeable management linked side effects in 9 (53%), 4 (24%), and 3 (18%) patients, correspondingly. Paresthesia happened when concentrations of serum  $\text{Ca}^{++}$  were within or more than the normal range<sup>(12, 16, 17)</sup>.

## 5. CONCLUSION

The serum  $\text{Ca}^{++}$  level decrease in patients received cinacalcet, in addition to that serum phosphate and parathyroid hormone levels decrease in patients received cinacalcet in patients with chronic kidney disease they are on maintenance hemodialysis.

## 6. ACKNOWLEDGEMENTS

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