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THE RELATIONSHIP BETWEEN OF CALCITONIN HORMONE AND SOME ELECTROLYTE OF PATIENTS WITH COVID-19 IN SALAH AL-DIN GOVERNORATE: A COMPARATIVE STUDY

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ABSTRACT

Corona virus disease (COVID-19) is the origin of an acute respiratory illness that has spreiding around the world, mini is known about the protective factors of this infection and the future course of this virus is unknown. Therefore an spread of COVID-19 has created a global public health crisis, the COVID-19 is rapidly spreading to the world. this study discussed the comparative between 58 diagnosed COVID-19 patients (G1) and 60 healthy subjects (G2): The aim of this study was estimate Calcitonin Hormone (CT) level, total calcium (Ca), sodium (Na), Magnesium (Mg), potassium (K), inorganic phosphate (P) and Vitamin D (Vit. D) in the sera of patients with COVID-19. and estimate correlation of CT with Vit. D, calcium and Magnesium. Corona virus disease (COVID-19) is the origin of an acute respiratory illness that has spreiding around the world, mini is known about the protective factors of this infection and the future course of this virus is unknown. Therefore an spread of COVID-19 has created a global public health crisis, the COVID-19 is rapidly spreading to the world. this study discussed the comparative between 58 diagnosed COVID-19 patients (G1) and 60 healthy subjects (G2): The aim of this study was estimating Calcitonin Hormone (CT) level, total calcium (Ca), sodium (Na), Magnesium (Mg), potassium (K), inorganic phosphate (P) and Vitamin D (Vit. D) in the sera of patients with COVID-19. and estimate correlation of CT with Vit. D, calcium and Magnesium.

INTRODUCTION

Corona viruses (COVID-19) are a series of highly diverse, envelope positive sense, and single chain RNA viruses, they reason several diseases involving hepatic respiratory, enteric and neurological systems, The COVID-19 is the causes or origin of an acute respiratory illness which has diffusion about the world, a lot of studies have published on the clinical presentation of infected [1,2].

This type of disease has an effect on the physiological process in the human body , Calcium (Ca) and Mg homeostasis can be disordered in many ways in state of COVID-19 . Calcium is also an necessary and important element in animal physiology, nearly all the content of Ca in the body found in the extracellular space, where the ion concentration is around one thousand times higher than inside the cells , [3] .

The CT is a hormone polypeptide and formed of single-chain peptide of 32-amino acid residues , Calcitonin is an inhibitor of bone resorption ,it is to stop bone loss at times of tension on calcium conservation , in more state so pregnancy, lactation, and growth [4] .

CT is works to reduce the blood Ca levels , by direct inhibition of mediated bone re absorption and by enhancing Ca excretion by the kidney product via the para-follicular C- cells of the thyroid gland under serum Ca control , addition to this peptide act as a potent hypophosphatemia and hypocalcemia by rise renal Ca clearance and reducing bone resorption . anyway , the actual role physiological of CT in bone metabolism [5,6] .

The electrolyte impalance in patients with COVID-19 addition to the Magnesium is very important in body of human as cation and the significant intracellular and Magnesium has acqeuired much necessary with the increasing awareness that Mg is wanted as a cofactor in multipile enzymatic reaction and that important arrive to function in neuromuscular processe [5]. Electrolyte imbalances lead to renal involvement and cardiovascular , this pathological states cause loss of some electrolytes in the human body, so the first steps in the treatment form of COVID-19 illness is water supply and electrolyte are lost [7,8] .

Vitamin D produced inside body with the reaction of ultraviolet radiation (UV) on the skin , addition to obtainable from exogenous food origin or dietary supplements and it is a hormone steroidi . Vit. D reduce is a public health trouble affecting higher than a numerous of individuals across all life stages worldwide insufficiency of Vit D affects the immune functions [9] .

Indicated many of studies that Vit D. decline is common in infected with COVID-19 , also important role in the maintenance of immune homeostasis , exerts an immunomodulation role . the strategy potential to prevent or treat COVID-19 has been identified as a treatment , Vit D treatmente has found to decreases viral respiratory infections, especially in persons with Vit D deficiency [10].

METHODOLOGY

The current study were conducted of 58 diagnosed COVID-19 patient (Divided equally females and males) their ages between (30-61) years its called (Gi1) but the tow group were (Gi2) that consisted of 60 healthy subjects . All pateints are suffered from COVID-19 , were register in the study , the doctors specialized in Respiratory system in general hospital of Samarra , Balad and Tikrit have been diagnosed The clinical case of any patient . The blood samples sera were collected from patients ,The healthy groups (controls) include of 58 healthy (Divided equally females and males) and the age for them ranged from 30 to 61 years .

The determination of Na , K , Mg , Ca, Pi , Vit. D , and Calcitonin Hormone were performed by approved methods

Estimation the concentration of Calcitonin and Vit. D in patients The concentration of (CT and Vit D) in serum was estimated according to several kits prepared by Elabscience the American company.

Estimation the concentration of Sodium , Potassium , Calcium , Magnesium and inorganic phosphate in blood serum

The levels of Na , K , Mg , Ca and Pi were determined using the ELISA® Kits from a SunLong Biotech (China), respectively.

RESULTS AND DISCUSSION

Classification The mean values of Ca , Na , K , Mg , Pi ,Vit. D and CT in serum of patients (Gi1) with COVID-19 and healthy subjects as controls (Gi2) are shown in Table (1-1) .

In Tiable (1-1) Mean± SD and statistically significant changing ($P \leq 0.05$ and $P \geq 0.05$) among the groups for our study are shown . in current study The results indicated that was Calcium , Magnesium and Vitamin D Significant decrease ($P< 0.05$) In Gi1 compare with the controls Gi2 while the level of calcitonin were decreased in Gi1(patients with COVID-19) when compared to Gi2 (controls) , and there were no significant differences .

Table (1-1) Mean± SD and statistically significant of some Parameters in Gi1 (patients with COVID-19) compared with Gi2 (control) .

Parameters	Mean± SD		P-Value
	Gi1 patients (n= 58)	Gi2 controls n=60)	-----
Calcitonin (pg/mL)	21.05±0.254	22.01±0.261	#
Ca (mg/dl)	4.219 ± 0.938	7.422 ± 0.766	*
Potassium (mmol/l)	1.187 ± 0.206	1.230 ± 0.277	#
Magnesium (mg/dl)	3.123 ± 1.019	5.883 ± 0.7014	*
Na (mg/dl)	119.119 ± 11.825	123.303 ±7.228	#
Pi (mg/dl)	7.33 ± 1.582	6.58 ± 0.492	#
Vit. D (ng/ml)	10.482 ± 1.085	16.002 ±1.928	*

indicate to no Significantly $p \geq 0.05$, * Significantly $p \leq 0.05$

The data in our study showed in table (1-2) the correlation between Calcitonin With Calcium , Vit. D and Magnesium in serum of patients with COVID-19 , As shown this in figures (1-1) , (1-2) and (1-3) .

Fig (1-1) correlation between CT and Mg in patient with COVID-19

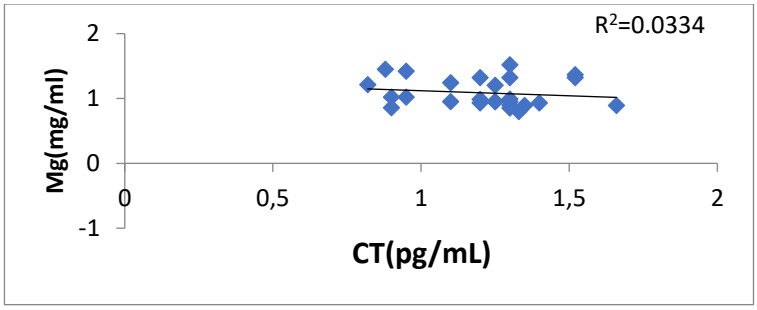


Table (1-2)Correlation Between CT and Vit. D , Mg and Ca in serum of patients with COVID-19

CT(pg/mL) parameter	Patiens	Control
Ca (mg/dL)	-0.0821	-0.2066
Mg (mg/dl)	-0.1782	-0.1531
Vit.D (ng/mL)	-0.02285	0.1768

Fig (1-2) correlation between CT and Vitamin D in patient with COVID-19

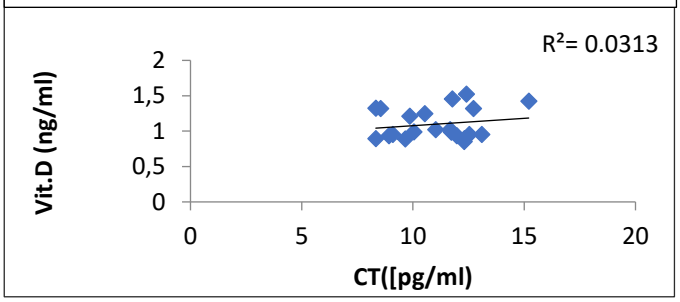
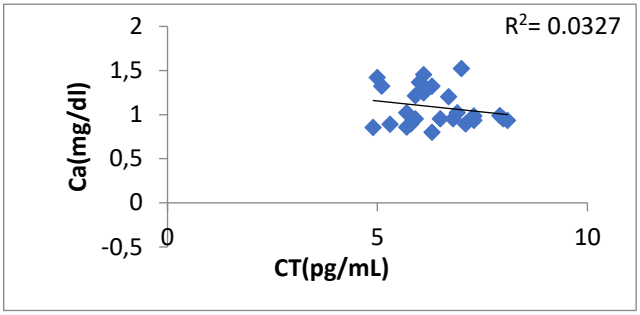


Fig (1-3) correlation between CT and Ca in patient with COVID-19



results of this study showed a significant reduce in the (calcium , magnesium and vitamin D) in the sera of patients with COVID-19 compered healthy individuals . at $P \leq 0.05$. as in the following fig (1-4). and Figures (1-5).

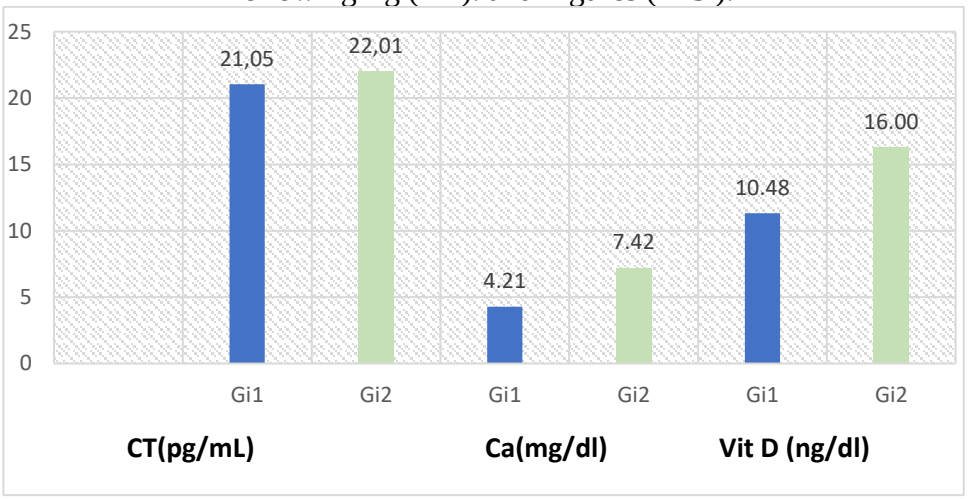


Fig.(1-4) The mean values of Calcitonin, Vitamin D and Calcium in (Gi1 = pateints groups , Gi2 = control groups).

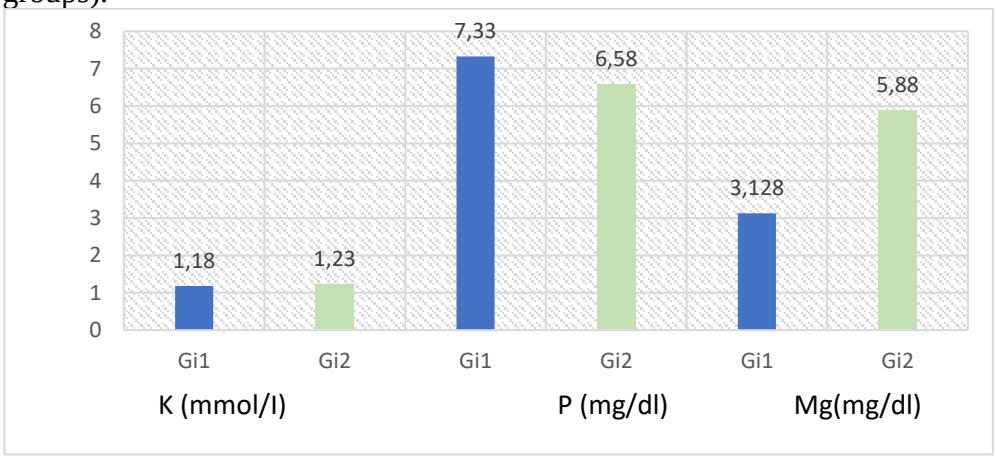


Fig. (1-5) The mean values of mg , P and K in patients with COVID-19 (Gi1 = patient groups , Gi2 = control groups)

Discussion

The Covid-19 is one of the most dangerous and fastest spreading diseases, which results in many disorders in the body , causes contagion via contact , etc. also COVID-19 is causes to disturbance in electrolyte , Calcitonin and Vitamin D and the complicate that may happen following these disorders in infected . Also These disturbances rise with illness progression [9-11].

Also of the this study showed an decreased significantly in calcium , magnesium and Vit. D in group of infections with COVID-19 among to the control group, as the results of this study were consistent with the results of [12,13] .

In our study the level of Calcitonin also decreased in group of patients with COVID-19 compare to control group but non-significant decreased ($P \leq 0.05$) , the level of Calcitonin depends on other factore physiology such as vasoregulaion , puimonary and tissue repaire addition to protein regulators . the calcitonin is very importance for regulator of normal calcium homeostasis in human and Calcitonin disorder is caused by reduced calcium (hypocalcemia) can be a result of acute renal failure [14-16]. The kidneys have a more of roles, including hormone secretion , urine formation, acid-base balance, and osmolality regulation, so these function is essential but the acute renal failure as indicated many of studies due to COVIED-19 therefore causes of impairment in fluid in patients [17] .

In the current study the serum level of Magnesium in the group of patients with COVID-19 significant decreased (Hypomagnesemia) compare with control group and the decline developed with progress illness , as the results of this research were consistent with the results of [18] , The reason is due to increase renal magnesium excretion , many of reported a high level generality of Hypomagnesemia in persons infection with COVID-19 , the reasons of the difference for this in the results of patients' blood Mg levels may be was the include of patients with underlying cardiovascular disease [19,20] .

The progressive Vitamin D decline in serum level of group patients compare with control group With the increased risk of infection [21] . the study conducted by Tsujjeno and *etal* that indicated vitamin D played protective effects on pneumonitis and exerted activity in lung tissue and plays a important role in "respiratory homeostasis" also an decreased significantly of vit. D in patient with COVID-19 and the agreement with our research [22,23] .

The decline of Vit. D according newly studies due to the pro-inflammatory cytokines generate and couses increase COVID-19 pneumonia , reactive protein (CRP), respiratory tract disease and heart failure therefore this due to the glomerular filtration tube (GFT) , The kidney plays an important role in metabolism circulation for vit. D [24,25] , The abnormalities in Vit. D metabolism could contributed to the development of mineral and skeletal disorders, increases in Parathyroid Hormone (PTH) , systemic inflammation , hypertension, and finally result in renal damage . Vit. D can stall hyper -inflammatory responses and expedite healing proces of the affected areas, primarily in the tissue of lung. Thus , there are ecological and mechanistic reasons to promote exploration of vit. D action in Coronaviruse patients [26-28].

Also for the correlation between the Ca, Vit. D and CT with COVID-19 there are no direct relationship for all Gi1 and Gi2, the Calcium and Vitamin D where levels were much lower compared to Gi2, While, the correlation between vit. D levels and the of Gi1 was not significant , In the current analysis the negative correlation observed between Vit D levels and COVID-19 cases is stronger than ($r = -0.02285$) in Calcium and Magnesium respectively [29,30] .

CONCLUSION

The Calcitonin, Magnesium, Inorganic Posphate and Sodium levels can be disturbed but isn't significant in patient with COVID-19. A significant reduce in concentration was the total calcium, Magnesium and Vit. D in patient with Covid – 19 compare Gi2 . The kidney are at risk , electrolyte and Fluid imbalance are complicate of the kidney in Covid – 19 and this can couse many trouble and even death .

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