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Estimation of Circulatory Visfatin, Potassium Concentrations, and Lipidemic Status in over Weighted Subjects Infected with COVID-19

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Abstract
Corona virus is nowadays one of the most vital medical health problems that all the population suffers from. This was the actual aim of the current study to assess plasma concentrations of Visfatin (Vn)and potassium ion (K+)as novel markers along with C-reactive protein(CRP) and the total lipidemic profile as usual markers. The current study included 75patients infected with COVID-19and 75 healthy subjects as control. The findings displayed highly significant variations in the levels of potassium, CRP, lipidemic status, and Vn. A significant rise in blood Vn, lipidemia, and CRP in COVID patients (P-0.05). As well, significantly decreased potassium values in the patients compared with the control group. In conclusion, the study found that serum Vn and K+ ion levels have an important inflammatory role in OVID-19 in the manifestations of myalgia and muscular aches besides other documented causes of muscle pain among COVID patients.
Keywords: -COVID-19,Visfatin, Lipid profile, Potassium, CRP

1. INTRODUCTION

COVID-19 is a form of viral infection of several kinds, and some of them cause infection. SARS-COV-2, a recently recognized COVID, has triggered an overall pandemic of respiratory illness known as COVID-19[1]. Physicians have exposed that the new cases of COVIDare transmitted by airborne droplets whenever an infected patient coughs. The beads rarely move more than a few feet and quickly fall to the ground (or onto surfaces) this is why physical isolation is so successful in stopping the disease from spreading [2]

Through the appearance and spread of Covid (2019-nCoV), or the extremely severe respiratory disorder Covid 2, another global health emergency is threatening the planet (SARS-CoV-2) [2].

The infection started in bats in December 2019 and the humans were infected through unknown intermediate creatures in Wuhan, Hubei, China. There have been nearly 96,000 informative cases of Covid sickness 2019 (COVID-2019) and 3300 confirmed deaths today (05/03/2020) [3]. Inhalation or interaction with contaminated beads spreads the disease, which has a two-to-four-day incubation duration.

Fever, hacking, sore throat, shortness of breath, fatigue, and uneasiness are common symptoms [4]. Spasms, fatigue, and arthralgia might be the principal indication of potassium inadequacy. The disease is mild in the vast majority of cases, but it can lead to pneumonia, severe respiratory distress, failure of multi organs, and mortality in a limited percentage of people (usually the elderly and others with comorbidities). A significant percentage of the population is asymptomatic. The case casualty rate is predicted to increase from 2% to 3% shortly. The infection is detected in respiratory discharges using special atomic tests[4].

In the presence of frustration, CRP's coursing fixations rise. It is a hepatic root intense stage protein that expands in response to macrophages and T cells releasing interleukin-6. Its physiological role is to link to Lys phosphatidylcholine, which is communicated on the outside of dead or biting dust cells (as well as a few types of microscopic organisms) to start the supplement framework via complement component-1q (C1q) [6].

The liver is in charge of integrating CRP[7], due to the contribution of adipocyte cells and macrophages [8].Vn capacities as an immunomodulatory cytokine are associated with incendiary reactions and are a factor related to stoutness, aggravation, and insulin obstruction [9].Vn is a multifunctional protein developed by adipose tissue that acts as a signaling molecule and catalyzes the production of nicotinamide-adenine-mononucleotide[10]. Vn is a protein of491aminoacids that produces a physiologically active homomeric complex in human bodies [11].Surprisingly, the Vn-specific receptors have yet to be discovered. Both “MAPK and PI3K/Akt”signaling pathways are considered the key targets for the molecules of Vn, as they are for most other adipokines, and P13K/Akt enzyme activation arises 5 minutes after treating the cells with Vn[12].

The white adipose tissue has the largest concentration of Vn. Because of the specific features of patients and the

different methods of measuring the Vnlevels, the plasma Vn levels are gradually elevated in obese and diabetic patients[13] in which overweight and insulin resistance are distinctive [14].

2. MATERIALS AND METHODS

Patients and control

This case-control study included 150 individuals aged ranged (20-70)years and BMI ranged between 25-29.9Kg/m^2. The patients group consisted of 75 (female=25,male=50) subjects with COVID-19. The healthy control group consisted of 75 (female=25, male=50).The patients attended the outpatient clinic of the general hospitals of Al-Hilla city in Babylon Province, Iraq, during the period from February 2020 to February 2021.The control group was selected from the patients' visitors or those who visited the nutrition outpatient clinic. The mean ± SD of descriptive parameters for patient groups and control groups aged range (41.2± 8.9) and (39.7 ± 12.7) years respectively.

Data sampling

Three to five milliliters of blood were drawn from COVID-19 patients and controls, then collected into tubes without anticoagulants and left to clot for 15 minutes at room temperature. After that, blood samples were centrifuged for around 10 minutes at 1000-2000xg. Then samples were tested for potassium levels by atomic absorption Spectrophotometer. Both Vnand Hs-CRP were inspected with a human ELIZA kit (MyBiuSource®, Canada).Triglyceride (TGs) determination was done bythe enzyme-hydrolysis technique. The VLDL-c and LDL-cwere confined in the sera tubes where precipitates and high-density lipoproteins concentrations were determined in the supernatant, which was obtained with later centrifugates consistent with the based method[17]. The fried Ewald equation was applied to analyze LDLand VLDL-cholesterols indirectly [18].

"LDL-c= Total cholesterol-(HDL-c + VLDL-c)"

"VLDL-c(mg/dl)=TG/5"

Statistical investigation

Version-21 of the SPSS software was useful to complete analytical statistics. "Student's t-test" was suitable to scrutinize the results. All the outcomes were demonstrated per means ± standard deviations. P-value was significant when it is equal to or<5%.

3. RESULTS AND DISCUSSION

Table 1: Characteristic descriptive variables of the two studied groups

Variables	COVID-19 Patients Mean ± SD	Healthy control Mean ± SD	Significance
Age/years	41.2±8.9	39.7±12.7	0.08
Visfatin (ng/dl)	7.3±3.1	2.3±1.5	0.05
Hs-CRP (mg/L)	49.9±28.5	4.1±1.9	0.001
Potassium(mmol/L)	2.6±1.5	4.9±1.6	0.05
FBS/RBS (mg/ml)	84.1±5.6	98.6±12.1	0.1
Total Cholesterol (mg/dl)	219.0±7.9	220.5±43.6	0.3
Triglycerides (mg/dl)	201.9±102.1	138.9±46.2	0.05
HDL-c (mg/dl)	37.1±10.9	41.7±25.1	0.05
LDL-c (mg/dl)	145.4±32.3	122.1±48.2	0.05
VLDL-c (mg/dl)	51.8±31.3	39.2±13.7	0.05

Table 2: Correlation of serum potassium levels with other study parameters

Variables	COVID-19		Control	
	r	P	r	P
Visfatin	-0.899	0.001	-0.392	0.05
Hs-CRP	-0.919	0.001	0.309	> 0.05
Total cholesterol	-0.885	0.023	0.071	> 0.05
Triglycerides	-0.791	0.001	-0.010	> 0.05
HDL-c	-0.913	0.046	-0.059	> 0.05
LDL-c	-0.798	0.038	0.103	> 0.05
VLDL-c	-0.814	0.001	-0.087	> 0.05

Table 3: Correlation between Visfatin and another parameter

Variables	COVID-19		Control	
	r	P	r	P
Hs-CRP	-0.817	0.06	-0.103	> 0.05
Total cholesterol	0.88	0.07	-0.068	> 0.05
Triglycerides	0.791	0.1	0.01	> 0.05
HDL-c	0.906	0.06	0.078	> 0.05
LDL-c	-0.699	0.2	-0.089	> 0.05
VLDL-c	-0.932	0.09	0.018	> 0.05

The study results exposed that there are significant differences between those infected with Coronavirus and the healthy group.

As the results confirmed that there is a decrease in potassium levels in the infected compared to the healthy groups, and this may play a role in lethargy and fatigue symptoms in the infected patients, as potassium is involved in disorders of the sensory neural conduction that are corrected with improving hypokalemic status, which is also improving muscular weakness [19].Parallel results in motor involvement have been published infrequently in prior studies. There has been publicized that instinctive fat cells synthesizeVn, which may modulate insulin physiological effect [20]. Higher circulating concentrations of Vn in diabetic patients were detected by earlier scholars [21,22]. Similarly, the outcomes referenced in both nightstands demonstrated that there is a solid potent relationship between potassium and fats, just as Vn and fats. Where they have a cozy relationship dietary-actuated hypercholesterolemia appeared to up-manage the capacity of L-type Ca^{2+}-directs in detrusor smooth muscle [23], TRPC5 and TRPC6 (transient receptor potential channels 5 and 6) in aortic endothelial cells [24]. Internally redressing potassium channels are gated by the heart G- protein. [25], and Na^{+} channels in epithelial cells [26].Vn is a modern adipocytokine included in the atherosclerosis cycle. It has been introduced that Vn itself can actuate the creation of TNF-a and particularly IL-6 [27].

Endothelial dysfunction, platelet function disorder, increased coagulation, and hypo fibrinolysis have all been implicated in the role of adipose tissue in increasing thrombosis in COVID-19 patients with obesity. The release of adipokines (inflammatory mediators) as Vn may consider a causative factor for thrombosis in overweight patients with COVID-19 infection [28]. Along similar lines, “transforming growth factor beta (TGF-B)” as a profibrotic-cytokine with multidisciplinary cell activities[30-33], was contribute to thrombo-fibrosis through endothelial TGFβ1 signaling [34].“Platelet-derived growth factor (PDGF)” is a glycoprotein that has also multidisciplinary cell activities [35] and has a reported pro-inflammatory pro-fibrotic role in patients with COVID-19 [36]. Both TGF-B and PDGF share similar effects in COVID patients including pro-angiogenesis,

and pro-fibrotic, as well as intensifying the proliferating and migrating activities of endothelial cells [36].

4. CONCLUSION

This study which is first done in Iraq reveals that Vn and potassium serum concentrations might perform a fundamental contribution to the inflammatory response in overweightCOVID-19 patients. Vn as an adipocytokine could play an indirect factor leading to thrombosis. Hypokalemia which significantly appears in those patients has a direct relationship with some medical symptoms of COVID-19 infection like weakness, fatigue, and muscle cramps

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