Ministry of Higher Education

and Scientific Research

Journal of Kufa for Chemical Sciences

A refereed

Research Journal Chemical Sciences

Vol.2 No.9 Year 2022

ISSN 2077-2351

Study of Lipid Profiles Levels and Some Parameters of Glucose Monitoring As Predictive Indicators of Recurrent MI in Patients Undergoing Elective Percutaneous Coronary Intervention (PCI)

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Abstract

Background : Coronary heart disease (CHD) also known as coronary artery disease (CAD) or ischemic heart disease (IHD), where it is caused by hindrance of blood transit to muscle of heart cause to collect the lipid and cholesterol on the inner wall of the heart. Because of atherosclerosis, CAD contains many types of disease: stable angina, unstable angina, myocardial infarction (MI), and sudden cardiac death. Percutaneous Coronary Intervention (PCI) is known as angioplasty is a non-surgical operation performed using a catheter to cram either inflate a balloon in the narrowing place or a stent (a very small fin grid tube made of either plastic or metal of stainless steel). So it is covered with medicine to prevent the coronary artery blockage again), to expand or open up the vessels in the muscle of the heart that contain plaque buildup that cause stenosis. Lipid profile is main factor of danger to CVD; each formed of lipid profiles is linked with rise in happening of coronary artery disease (CAD). Insulin is a protein hormone that regulates blood glucose levels, energy metabolism and anabolic. Glycosylated hemoglobin (HbA1c%) is a type of hemoglobin that is generally used to determine the average glucose values of blood that attached to hemoglobin of an individual according to the past 12 weeks that

is red blood cells age for also the resulting values determine the level of blood sugar and aid in the diagnosis of diabetes mellitus. **Subjects:** One hundred individuals were collected to contribute to the present study. These cases were divided into two groups; the first included 70 patients (their age ranged between 30-66 years) with MI who underwent elective PCI, were divided into two subgroups; 30 patients with the first PCI and 40 patients who underwent more than one PCI. The second group involved 30 healthy individuals (with the age range 30-55 years) who were enrolled in the present study as a control group. Where spectral methods, ELISA and some mathematical equations were used to find the results of the current study. **Results:** Using the statistical program SPSS to find the statistical indications. The results showed significant increases (p=0.000) for each of TG, Cholesterol, LDL, vLDL, glucose, insulin, HbA1c% and HOMA-IR, while a significant decrease (p=0.000) in HDL levels was recorded when the two study groups were compared together. Therefore, it is necessary to use the HOMA-IR analysis as a basic parameter to identify and determine the incidence of coronary heart disease

Keywords: Insulin, Glucose, CVD, CHD , PCI, HbA1c% , HAMA-IR & Lipid profile.

Introduction

Coronary heart disease (CHD) so known as coronary artery disease (CAD) or ischemic heart disease (IHD) [*Virani,,2021*], where is result from hindrance of blood transit to muscle of heart cause to collect the lipid and cholesterol on the inner wall of the heart. Because of atherosclerosis, CAD contains many types of disease: stable angina, unstable angina, myocardial infarction, and sudden cardiac death [*Dayana, 2021*]. **Percutaneous**

Coronary Intervention (PCI) is known as angioplasty, is a non-surgical operation performed using a catheter (a tube that is flexible and thin) to cram either inflate a balloon in the narrowing place or a stent (a very small and fin grid tube that is made of either plastic or metal or stainless steel). So it is covered with medicine to prevent the coronary artery blockage again), to expand or open up the vessels in the muscle of the heart that contain plaque buildup that cause stenosis [*Debra & Brian, 2018; Mansoor, et al., 2021*]. The physician accesses the damaged arteries through a small incision in the thigh or arm, where the catheter is inserted through this opening, then delivered to the ascending aorta. Visualize the sites of damage in the arteries by using X-ray fluoroscopy after coronary arteries are injection by IV contrast (Radiopaque dye is a colorless liquid and it's based on iodine) to determine the damage site [*Manda & Baradhi, 2021*].

Lipids are the basic and necessary materials for the needs to the body of human exemplified by total cholesterol, phospholipids, fatty acids, and triglycerides (TG), all of them are involved in the formation of cell membranes and some of them are originator to steroid hormones, as lipids are the most powerful source of energy in the body [*Tareq, et al., 2020*].

Lipid profiles are the main factors of danger to CVD; each formed of lipid profiles is linked with a rise in the happening of coronary artery disease (CAD). Where increase total cholesterol, triglycerides, low-density lipoprotein (LDL) levels, and decrease high-density lipoprotein (HDL) levels in serum [*Laltesh, et. al.,2018*]. TG: The sources of TG are either animal, which are saturated and solid fats, or plant. TG are base lipids transferred to the blood stream with cholesterol. It is considered the main energy source that is utilized and stocked in the body. There are two

pathways to the synthesis of TG in both liver and adipose tissue [*Emine, et al., 2021*]. Hypertriglyceridemia is considered elevated in TG or TG, chylomicrons and vLDL, that caused by high anabolic and low catabolism [*Charlotte, 2020*].

Cholesterol is formed by substantially each tissue, though firstly *via* the liver, adrenal cortex, reproductive tissues and the intestine. Cholesterol is created in the cytoplasm, and can get rid of cholesterol *via* converting it into bile salts, or via excretion into the bile; bacteria can lessen cholesterol to cholesterol and coprostanol, both cholesterol generating neutral fecal sterols. The regulation of the cholesterol levels in the body is carried out by the liver, where it can be synthesized by de novo pathway or cholesterol from a many of sources like food, also excreted through the liver into bile or transformed into bile salts, which are secreted to the intestines. Cholesterol is deposited on the inner of the vessels due to the imbalance of the inside of it with the penetration.[*Emine, et al., 2021*]. There are two kinds of cholesterol, one of which is salutary and the other is harmful to health if it increases [*Charlotte, 2020*]. A healthy cholesterol level in adult humans is dependent on other factors like gender, age, race, obesity, family history, smoking, physical inactivity, diabetes and high blood pressure [*Małgorzata, et al., 2020*]. The cholesterol level in healthy human plasma is less than 200 mg/dL. Lipids are created in the liver and then transferred to the plasma by the intestines in the form of complex molecules known as lipoproteins. Lipoproteins are spherical bodies with neutral lipids (nonpolar) that are triglycerides and cholesterol esters in the center, while on the surface polar lipids are cholesterol and phospholipid molecules [*Nader, 2018*]. Lipoprotein units types are chylomicrons (CM), high-density lipoproteins

(HDL), low-density lipoproteins (LDL), and very-low-density lipoproteins (vLDL); this variation causes lipid and protein ratio, density, size and origin site. The function of lipoproteins is both to save their section of lipids soluble as they transport them in the plasma, and to transport an effective mechanism for moving their lipid contents to or from the tissues [*Denise, 2017*]. vLDL is formed by nearly 60% triacyglycerol and its job is to transport TG from the liver to the tissues of the peripheral. There, the TG is degraded by lipoprotein lipase (LPL); vLDL are excreted into the stream of blood *via* the liver as nascent units include apo-B-100. They must get apo CII and E from HDL circulate. vLDL in the circulation, TAG dissolution *via* LPL, affecting the vLDL to reduce in the size and convert to more density. The components of surface components, counting the C and E apolipoproteins, are regained to HDL, but the units keep apo. B-100. With these alterations, vLDL is transformed to LDL in plasma. The reference value of vLDL is 2 - 38 mg/dL. [*Nader, 2018*]. LDL particles comprise high cholesterol and cholesteryl esters concentrations nearly cholesterol of plasma 70% is in LDL, while fewer TAG than their vLDL. The main function of LDL is to deliver cholesterol to the tissues of peripheral tissues [*Denise, 2017*]. The reference value of LDL below 100 mg/dL. [*Nader, 2018*]. Particles of HDL are made in the blood by the count of apo-A-1, an apolipoprotein complete and secreted by the intestine and liver. HDL of Nascent comprises mostly phospholipids (largely PC) and apo E, A, and C. They move cholesterol to the liver from tissues and form as cholesteryl esters [*Emine, et. al., 2021*].

Insulin is a protein hormone that regulates blood glucose levels, energy metabolism and anabolic. When the sugar level rises insulin is secreted into

the blood circulation by beta-cells located in the Langerhans islets in the pancreas. In the cell membrane, insulin receptors are activated that increase the transport of glucose into the intercellular to reduce its level in the extracellular *[Vargas, et al., 2022*]. The Golgi apparatus in β-cells receives proinsulin, where cleaved to active form, and C-peptide and active form sent to the granules in the cytosol where it is stored. Insulinase is an enzyme in the liver that is released to degrade insulin [Ming, et *al., 2018; Emine, et al., 2021*]. Insulin resistance is associated with many serious medical conditions such as type 2 diabetes mellitus, hypertension, atherosclerosis, and metabolic syndrome. Insulin resistance is the impact of insulin to reduce the blood glucose level because of a defect in insulin receptors on target cells; thus the sugar levels remain high with a rise or normal insulin levels [*Zaman, 2019; Emanuel, et al., 2021*]. Glucose is a major source of energy for cells body, especially for humans and animals [*Fernandes, 2021*]. The normal level of glucose in the blood of an adult is 60 to 110 mg/dL (3.3–6.1 mmol/L). When the level of blood sugar rises above 126 mg/Dl, there may be diabetes; this elevation may cause damage to vessels of blood, cells and nerves [*Mouri & Badireddy, 2021; American Diabetes, 2022*].

Glycosylated hemoglobin percentage (HbA1c%) is a type of hemoglobin that is generally used to determine the average glucose values of blood that attached to hemoglobin of an individual according to the past 12 weeks that is red blood cells age for also the resulting values determine the level of blood sugar and aid in the diagnosis (diabetes mellitus) [*Huang, et. al.,2021*]. Glycosylated hemoglobin is created via non-enzymatic glycation of the β-chain of hemoglobin A by the glucose of plasma; the glycation is synthesis continuously over the life of red blood cells and its creation

irreversibly. World healthy defined the assessment of HbA1c% high 6.5% as investigative of DM and (5.7- 6.4)% as pre-diabetes. [*Bo, et. al., 2021*].

Subjects and Methods

A hundred samples were selected and divided into two main groups, the first of which was 70 (patients with age ranged between 30-66 years) the current study essential the elimination of a group of patients (Patients with Covid-19 virus who have undergone elective PCI, people with cancer, patients who are undergoing cancer treatments or who have been cured, patients with thyroid diseases, patients with liver diseases, patients with diabetes complications added to cardiopathy, patients who underwent any surgical intervention during 5 years of MI occurring, whether or not the surgery involved heart disease, patients who are on the keto diet during the period of the onset of symptoms of heart attack and alcohol drinkers were excluded, 70 patients who underwent PCI on condition that they take clopidogrel therapy as a result of the diagnoses made by doctors in cardiology, they were divided to two subgroups (30 patients with one PCI and 40 patients with more than one underwent PCI. While the second involved 30 healthy individuals with the age range(30- 55 years). A subjective perception of good health as determined by a health questionnaire; healthy controls should have no medical history of heart disorders; control individuals are non-smokers and not alcohol drinkers. individuals should not take any medication during at least one year before study carrying out; they have not undergone surgical intervention or any illness requiring hospitalization, and the control group might be at an

approximate age range with the patients group. Five milliliters of intravenous blood samples were taken from patients (after subjecting them to the PCI procedure) and healthy subjects while the participants were fasting for at least 8 hours. after it was divided into two portions: (1) Two mL were placed in an EDTA tube to determine HbA1c% level. **(2)** Three mL were placed in a plane tube at laboratory room temperature for measuring glucose and insulin, TC, TG, HDL, LDL, and vLDL levels. The samples were left to coagulate at laboratory temperature, analyzers then separated using a centrifuge at 3000 xg for 15 minutes.

Result and Discussion

Evaluation of lipid profile levels, Glucose, Insulin and HbA1c% levels in the sera of the two main study groups (elective PCI patients and healthy individuals) are shown in **Table 1.** Its noted that there are significant increases (**p=0.000**) in the TG, Cholesterol and LDL, vLDL, glucose, insulin, HbA1c% and HOMA-IR in the patients group comparison to controls group, while there is a significant decrease (**p=0.000**) in the sera HDL levels of patients comparing to controls.

In **Table 2**, the statistical results showed an increase (**p=0.000**) of all parameters in the two patients subgroups (those who carried out to the elective PCI for the first time and the others who underwent to this strategy at least for twice) compared to healthy individuals, while the results of the comparison of the two disease groups did not illustrated significant differentiation for lipid profiles and glucose, on the other side significant increase of insulin (**p=0.008**), HbA1c% (**p=0.013**), and HOMA-IR (**p=0.002**) were noted in the second patients subgroup comparison to the first.

When the three study subgroups were subdivided into six mini subgroups according to the sexes (**Table 3**). Outcomes of the statistical analysis demonstrated significant increases (**p<0.005**) in each of TG , Cholesterol, vLDL, and LDL, but are not in other parameters that evaluated in the present work, when the comparison between genders in the same subgroup was done (patients who underwent to the first elective PCI). While the comparison between sexes in the second subgroup (patients who underwent to two PCI at least) was illustrated a significantly raise in the female samples (**p< 0.005**) for each of TG , Cholesterol and vLDL, while the results were not recorded acceptable changes when the other parameters were measured. In healthy individuals group, there were not significant variations between the males and females at all parameters were evaluated.

When the comparing was carried out among the two subgroups of patient females as well as healthy female subgroup, a significant increase (**p< 0.005**) was observed in each of the lipid profiles, glucose, HbA1c%, insulin, and HOMA-IR in the females patients subgroups comparison to healthy. Exception of the results of glucose, the results of the comparison among the males in the two patients subgroups and subgroup of healthy males were similar to those in the females subgroups.

One of the main risk factors for coronary heart disease is dyslipidemia, which results from an increase in cholesterol, TG and LDL levels and a decrease in the level of HDL in the serum of patients with CAD [*Hedayatnia, 2020*]. The effect of the lipid profiles on the work of the coronary arteries depends mainly on some mechanisms of the physiological functions of the lipid profiles. The origin of the development of atherosclerosis is the accumulation of LDL on the inner wall of the vessels,

where lipoprotein of atherogenic that include apo-B (LDL), is support collection of cholesterol in macrophages and responses of inflammatory inner well of the vessel, the transfer of LDL from the blood to the vessels walls results start of lipid deposition. Where the deposited lipids either return to the bloodstream and thus reduce the lipids deposited on the vessels and reduce the development of the lesion or oxidize through the activity of free radicals or Leukocytes, or become foam cells after being devoured by macrophages\monocyte [*Ferrari, et al., 2016*].

ApoA-I main apolipoprotein of (HDL), It usually carries 20% of all the cholesterol in the blood, moving extra cholesterol to the liver from the foam macrophages of arterial walls is largely facilitated through adenosine triphosphate-binding cassette transporters (ABC) and by lecithin-cholesterol acyltransferase (LCAT) assistances transform the cholesterol esterification into complete HDL2 and HDL3 units after the pass of cholesterol from peripheral cells through adenosine triphosphate-binding cassette transporters (ABC). Transfer protein of cholesterol ester (CETP) transmissions to HDL cholesterol esters of additional apolipoprotein B- inclosing units, then, HDL units are stuck via hepatocytes through scavenger receptor B1 (SR-B1); so, the study association between the hazard for atherosclerosis and low levels of HDL [*Maha, et al., 2017*]. The results of the current study are in agreement with previous studies [*Hassan, et al., 2013; Maha, et al., 2017; Laltesh, & Ajay, 2018*].

The high level of glucose in the blood is one of the main causes of atherosclerosis, which results in cardiovascular disease; it plays an essential role in the dysfunction of endothelial pathogenesis. Additionally, high glucose levels produce damage to the metabolic environment via

inflammation of chronic inflammation, pro-coagulability, oxidative stress, and other abnormalities which alter vascular structure [*Shuai, et al.,2021; Paolisso, et al.,2021*]. The results of the current study match a number of previous studies by researchers including [*Metwally, et al., 2020; Çetin , et al., 2021; Suzanne, et al., 2021*]. So the results of the current study are similar to previous studies that dealt with measuring the levels of HbA1C% % in patients with heart disease [*Ul-Haque, et al., 2019; Yildiz & Aclan, 2021; Abu Tailakh, 2021*].

Hyperinsulinemia is the elevation in the insulin level than normal, It's the state that categorized by injured myocardial insulin signaling, dysfunction of mitochondrial function, different homeostasis of calcium, uneven coronary microcirculation, endoplasmic stress of reticulum, dysfunction of sympathetic nervous system, and other. These pathophysiological modifications product in enlarged fibrosis, oxidative stress, hypertrophy, dysfunction of diastolic cardiac, and ultimate systolic heart failure [*Dominic, et al., 2019*]. The functions of the endothelium (is contain the inner lining of the vessels) are affected by increased insulin and its result among which endothelium dysfunction such as cheap nitric oxide (NO) bioavailability, enlarged oxidative stress via raised production of reactive oxygen species (ROS), abnormal vasoreactivity and the create of pro-thrombotic and pro-inflammatory factors. This state may influence proliferation liability to hypertension, atherosclerosis, and coronary heart disease [*Rahman, et al.,2021*]. This study gives results that are close to previous studies [*Metwally, et al., 2020; Suzanne, et. al.,2021*]. Cardiovascular disease is affected by high insulin resistance, as it works on high pressure, and these diseases work on a similar pathomechanical. In

specific, they make an imperfection of renin-angiotensin and sympathetic nervous systems that effects in the higher stimulation receptors of both angiotensin II and adrenergic, a decrease of NO_2 with dysfunction of endothelial, the improvement of oxidative stress, and the creation of inflammatory cytokines [*Fiordelisi, et. al.,2019; Teresa, et al., 2021*].

Table 1: Levels (Mean±S.D.) of Lipid Profiles, Glucose, Insulin and HbA1c% levels in The Sera of The Study Individuals

Test	The Study Groups		*p-value*
	Patients (70) Mean ± S.D. Min.- Max. Range	Controls (30) Mean ± S.D. Min.- Max. Range	
TG (mg/dL)	241.556 ± 44.727 128-345 217	98.327 ± 10.436 75-116.8 41.8	0.000
Cholesterol (mg/dL)	268.560 ± 43.871 151.7-361.6 209.9	115.695 ± 11.845 96.13-138.53 42.4	0.000
HDL (mg/dL)	29.501 ± 9.582 7.4-52 44.6	50.773 ± 2.636 44.5-56.5 12	0.000
vLDL (mg/dL)	48.439± 8.975 25.6-69 43.4	19.664 ± 2.088 15-23.36 8.36	0.000
LDL (mg/dL)	190.602 ± 38.545 92-273.5 181.5	44.957 ± 11.244 28.1-63.15 35.05	0.000
Glucose (mg/dL)	154.096 ±73.065 69-381 312	87.600 ± 15.732 60.6-120 59.4	0.000
HbA1c%	7.919 ± 2.252 4.15-13.88 9.72	5.297 ± 0.781 3.79-6.99 3.21	0.000
Insulin (mIU/L)	21.681 ± 6.427 13.89-68.82 54.93	12.560 ± 2.416 8.98-17.93 8.95	0.000
HOMA-IR	8.275 ± 4.585 2.9-27.6 24.7	2.747 ± 0.726 1.5-4.3 2.8	0.000

The Mean Difference is Significant at 0.05 Level

Table 2: Levels (Mean ± S.D.) of Lipid Profiles, Glucose, HbA1c% and Insulin in Sera of Patient with One PCI, Patient with More PCI and Healthy Groups

Parameters	Subjects (N)			*p-value*
	Patients with One PCI 30	Patients with More PCI 40	Controls 30	
	Mean±S.D.	Mean±S.D.	Mean±S.D.	

	Min-Max Range	Min-Max Range	Min-Max Range	
TG (mg/dL)	239.631±44.335 128-322.8 194.8	243.000 ± 45.528 177.40-345.00 167.60	98.327±10.436 75.00-116.80 41.80	0.715 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
Cholesterol (mg/dL)	262.991±46.882 151.7-361.6 209.9	272.736±41.582 201.60-354.70 153.10	115.695±11.845 96.13-138.53 42.40	0.283 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
HDL (mg/dL)	28.763±11.092 8.8-52 43.2	30.055±8.379 7.4-43.3 35.9	50.773±2.636 44.5-56.5 12.00	0.515 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
vLDL (mg/dL)	47.925±8.867 25.60-64.56 38.96	48.824±9.148 35.48-69 33.52	19.664±2.088 15-23.36 8.36	0.628 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
LDL (mg/dL)	186.252±42.259 92-264.1 172.1	193.865±35.710 131.87-273.50 141.63	44.957±11.244 28.1-63.15 35.05	0.341 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
Glucose (mg/dL)	138.280±57.858 69-280.6 211.6	165.957±81.357 70.70-381.00 310.30	87.600 ±15.732 60.6-120 59.4	0.064 for 1 vs 2 0.002 for 1 vs 3 0.000 for 2 vs 3
HbA1c%	7.259±1.675 5.1-11.46 6.36	8.414±2.510 4.15-13.88 9.72	5.297±0.781 3.79-6.99 3.21	0.013 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
Insulin (mU/L)	19.669±3.209 13.89-25.57 11.68	23.190±7.744 17.19-68.82 51.63	12.560±2.416 8.98-17.93 8.95	0.008 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3
HOMA-IR	6.684±2.849 2.9-12.11 9.21	9.467±5.267 3.9-27.6 23.70	2.746±0.726 1.5-4.3 2.8	0.002 for 1 vs 2 0.000 for 1 vs 3 0.000 for 2 vs 3

1: One Elective PCI Patients, 2: More Elective PCI Patients, 3:Healthy. The Mean Difference is Significant at 0.05 Level

Table 3: Levels (Mean ± S.D.) of Lipid Profiles, Glucose, HbA1c% and Insulin in Sera of Patient with One PCI, Patient with at least two PCI and Healthy Groups

Parameters	Subjects (N)						*p-value*
	Patients with One PCI 30		Patients with More than One PCI 40		Controls 30		
	Females-1 (13)	Males-2 (17)	Females-3 (13)	Males-4 (27)	Females-5 (13)	Males-6 (17)	
	Mean ± S.D. Min-Max Range	Mean ± S.D. Min-Max Range	Mean ± S.D. Min-Max Range	Mean ± S.D. Min-Max Range	Mean ± S.D. Min-Max Range	Mean ± S.D. Min-Max Range	
TG (mg/dL)	219.36±40.93 128-289.4 161.4	255.12±41.43 188.8-322.8 134	267.64±43 212.7-345 132.3	231.13±42.49 177.4-320.4 143	95.85±10.09 81.96-16.8 34.84	100.21±10.59 75-112.9 37.9	<0.05 FOR: 1vs2, 3vs4, 1vs3, 1vs5, 2vs4, 2vs6, 3vs5, and 4vs6
Cholesterol (mg/dL)	247.51±40.87 151.7-300.2 148.5	274.82±48.859 200.45-361.6 161.15	292.95±37.89 231.6-354.7 123.1	263±40.35 201.6-341.5 139.9	115.97±10.85 101.06-138.53 37.470	115.485±12.8 96.13-135.32 39.19	<0.05 FOR: 1vs2, 3vs4, 1vs3, 1vs5, 2vs6, 3vs5, and 4vs6
HDL (mg/dL)	32.7±12.04 9.7-52 42.3	25.747±9.591 8.8-40 31.2	32.96±8.08 19.9-43.3 23.4	28.65±8.3 7.4-42 34.6	51.63±3.14 45.1-56.5 11.4	50.11±2.02 44.5-54.3 9.8	<0.05 FOR: 1vs2, 1vs5, 2vs6, 3vs5, and 4vs6

vLDL (mg/dL)	43.87±8.18 25.6-57.88 32.28	51.02±8.28 37.76-64.56 26.8	54.22±8.2 9 42.54-69 26.46	46.22±8.49 35.48-64.08 28.6	19.17±2.0 1 16.39-23.36 6.97	20.04±2.12 15-22.58 7.58	<0.05 FOR: 1vs2, 3vs4, 1vs3, 1vs5, 2vs4, 2vs6, 3vs5, and 4vs6
LDL (mg/dL)	170.88±39.25 9 92-235.15 143.15	198±41.74 118.77-264.1 145.33	205.79±34 .07 149.76-67.6 117.84	188.12±35.65 131.87-273.5 141.63	44.47±10. 67 28.1-62.93 34.83	45.32±11.97 28.28-63.15 34.87	<0.05 FOR: 1vs2, 1vs3, 1vs5, 2vs6, 3vs5, and 4vs6
Glucose (mg/dL)	152.91±70.13 69-280.6 211.6	127.08±45.50 5 75.6-232.3 156.7	178.29±78 .8 82-336.4 254.4	160.01±83.36 70.7-381 310.3	82.67±17. 06 60.6-109.0 48.4	91.36±13.98 72.2-120 47.8	<0.05 FOR: 1vs5, 3vs5, and 4vs6
HbA1c%	7.465±1.886 5.14-11.46 6.31	7.102±1.535 5.10-9.95 4.85	8.68±2.33 5.36-13.57 8.21	8.28±2.62 4.15-13.88 9.72	5.624±0.7 29 4.50-6.99 4.49	5.046±0.744 3.79-6.83 3.04	<0.05 FOR: 1vs5, 2vs4, 2vs6, 3vs5, and 4vs6
Insulin (mU/L)	18.10±3.04 13.89-23.60 9.71	20.86±2.86 16.80-5.57 8.77	22.8±2.41 19.56-26.8 7.24	23.37±9.33 17.19-8.82 51.63	13.29±2.5 1 8.98-16.95 7.97	12.00±2.24 9.06-17.93 8.87	<0.05 FOR: 1vs3, 1vs5, 2vs6, 3vs5, and 4vs6
HOMA-IR	6.68 ± 2.90 2.93-12.12 9.19	6.69±2.89 3.27-11.95 8.68	9.96±4.18 4.00-17.88 13.88	9.21±5.78 3.92-27.61 23.69	3.56±0.68 2.48-4.83 2.35	4.08±0.86 2.74-5.85 3.11	<0.05 FOR: 1vs3, 1vs5, 2vs4, 2vs6, 3vs5, and 4vs6

1: One Elective PCI Female Patients, 2: One Elective PCI Male Patients, 3: More Elective PCI Female Patients, 4: More than one Elective PCI Male Patients 5: Healthy Female Control, and 6: Healthy Male Control. The Mean Difference is Significant at 0.05 Level

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