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ORIGINAL RESEARCH

ASSESSMENT OF INSULIN RESISTANCE AND THE RELATIONSHIP OF TG/HDL CHOLESTEROL INDEX AND HSCRP WITH CORONARY HEART DISEASE

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Abstract

Background: Coronary artery disease is a condition in which there is an inadequate supply of blood and oxygen to the myocardium. Hence; the present study was conducted for assessing Insulin Resistance and the Relationship of TG/HDL Cholesterol Index and HSCRP with Coronary Heart Disease.

Materials & methods: A total of 60 subjects were enrolled in the present study. Among these 60 subjects, 30 subjects were healthy controls while the remaining 30 subjects were CHD patients. Complete demographic and clinical details of all the subjects was obtained. Fasting venous blood samples were collected from all groups. Fasting plasma glucose was estimated in plasma daily from the grey tube while all other parameters were estimated in serum. Lipid profile was estimated in fresh sera on a daily basis. HSCRP levels were estimated using auto-analyser. All the results were recorded in Microsoft excel sheet and were analysed using SPSS software

Results: Mean age of the patients of the study group and control group was 43.5 years and 46.1 years respectively. Mean serum insulin levels among the patients of the study group and control group was 18.6 pmol/L and 3.1 pmol/L respectively. Mean HSCRP levels among the patients of the study group and control group was 11.3 mg/dL and 1.8 mg/dL respectively. Mean TG/HDL index among the patients of the study group and control group was 8.45 and 1.51 respectively. Significant results were obtained while comparing the mean insulin levels, HSCRP levels and TG/GDL ratio among the subjects of the study group and control group.

Conclusion: Insulin Resistance, TG/HDL Cholesterol Index and HSCRP were significantly correlated with Coronary Heart Disease.

Key words: Triglycerides, High density lipoprotein, coronary heart disease

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Introduction

Coronary artery disease is a condition in which there is an inadequate supply of blood and oxygen to the myocardium. It results from occlusion of the coronary arteries and results in a demand-supply mismatch of oxygen. It typically involves the formation of plaques in the lumen of coronary arteries that impede blood flow. It is the major cause of death in the US and worldwide. At the beginning of the 20th century, it was an uncommon cause of death. Deaths due to CAD peaked in the mid-1960s and then decreased however, it still is the leading cause of death worldwide.[1- 3]

CAD can also lead to other health problems like heart failure or heart rhythm problems. Various treatments can be used to reduce the symptoms and the risk of complications.CAD symptoms can range from shortness of breath to chest pain of varying intensity. This kind of chest pain is called angina. It is usually associated with a feeling of constriction or anxiety, and it may extend into the arms, back of the neck, back, upper abdomen or jaw. These symptoms are most often triggered by physical exertion because the heart muscle needs more oxygen then. They occur if too little blood flows through the coronary arteries.[4, 5]

Dyslipidemia consisting of high triglycerides and low high-density lipoprotein cholesterol (HDL-C) is a widely recognized lipid pattern that is frequently associated with the development of coronary heart disease. It is possible that much of the cardiovascular (CV) disease that is associated with the metabolic syndrome may be explained by the presence of insulinresistance (IR).[5, 6] Previous studies have established high sensitivity C-reactive protein (hsCRP), a biomarker of inflammation, as an independent predictor for CAD.[6, 7]Hence; the present study was conducted for assessing Insulin Resistance and the Relationship of TG/HDL Cholesterol Index and HSCRP with Coronary Heart Disease.

Materials & methods

The present study was conducted for assessing Insulin Resistance and the Relationship of TG/HDL Cholesterol Index and HSCRP with Coronary Heart Disease. A total of 60 subjects were enrolled in the present study. Among these 60 subjects, 30 subjects were healthy controls while the remaining 30 subjects were CHD patients. Complete demographic and clinical details of all the subjects was obtained. Fasting venous blood samples were collected from all groups. Fasting plasma glucose was estimated in plasma daily from the grey tube while all other parameters were estimated in serum. Lipid profile was estimated in fresh sera on a daily basis. HSCRP levels were estimated using auto-analyser. All the results were recorded in Microsoft excel sheet and were analysed using SPSS software. Chi-square test and student t test was used for evaluation of level of significance.

Results

Mean age of the patients of the study group and control group was 43.5 years and 46.1 years respectively. Mean serum insulin levels among the patients of the study group and control group was 18.6 pmol/L and 3.1 pmol/L respectively. Mean HSCRP levels among the patients of the study group and control group was 11.3 mg/dL and 1.8 mg/dL respectively. Mean TG/HDL index among the patients of the study group and control group was 8.45 and 1.51

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respectively. Insulin Resistance, TG/HDL Cholesterol Index and HSCRP were significantly correlated with Coronary Heart Disease.

Table 1: Variables

Variable	Study group	Control	p- value
Fasting plasma glucose (mg/dL)	142.2	81.2	0.000 (Significant)
Serum insulin levels (pmol/L)	18.6	3.1	0.001 (Significant)
HSCRP (mg/dL)	11.3	1.8	0.020 (Significant)
Total cholesterol (mg/dL)	205.1	118.2	0.030 (Significant)
Triglycerides (mg/dL)	213.7	78.3	0.031 (Significant)
HDL (mg/dL)	25.3	51.8	0.012 (Significant)

Table 2: TG/HDL Cholesterol Index

TG/HDL Cholesterol Index	Study group	Control	p- value
Mean	8.45	1.51	0.001 (Significant)
SD	1.35	0.46	

Discussion

CAD is caused by the narrowing of the large blood vessels that supply the heart with oxygen. These are called coronary arteries. Arteries that have become extremely narrow can cause shortness of breath and chest pain during physical activity. If a coronary artery suddenly becomes completely blocked, it can result in a heart attack.Coronary artery disease is a multifactorial phenomenon. Etiologic factors can be broadly categorized into non-modifiable and modifiable factors. Non-modifiable factors include gender, age, family history, and genetics. Modifiable risk factors include smoking, obesity, lipid levels, and psychosocial variables. In the Western world, a faster-paced lifestyle has led people to eat more fast foods and unhealthy meals which has led to an increased prevalence of ischemic heart diseases. Better primary care in the middle and higher socioeconomic groups has pushed the incidence towards the later part of life. Smoking remains the number one cause of cardiovascular diseases.[8- 10] Hence; the present study was conducted for assessing Insulin Resistance and the Relationship of TG/HDL Cholesterol Index and HSCRP with Coronary Heart Disease.

In the present study, mean age of the patients of the study group and control group was 43.5 years and 46.1 years respectively. Mean serum insulin levels among the patients of the study group and control group was 18.6 pmol/L and 3.1 pmol/L respectively. Mean HSCRP levels among the patients of the study group and control group was 11.3 mg/dL and 1.8 mg/dL respectively. Mean TG/HDL index among the patients of the study group and control group was 8.45 and 1.51 respectively. Salazar J et al evaluated the relationship between various IR indices and coronary risk in an adult population. Of the evaluated population, 55.2% were female, 34.8% had a coronary risk ≥5% in 10 years, with the TG/HDL and TyG indices showing the highest AUC 0.712 (0.681-0.743) and 0.707 (0.675-0.739), respectively; compared to HOMA2-IR. Both were also the indices most associated with increased coronary risk, especially TG/HDL ≥3 with a higher association [OR = 2.83 (1.74-4.61); p<0.01] after

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multivariable adjustment.TyG (≥4.5) and TG/HDL (≥3) indices showed a great predictive capacity of higher coronary risk, with being TG/HDL more associated even after adjusting for abdominal obesity and hs-CRP. Therefore, these represent useful tools for determining IR.[10]

In the present study, significant results were obtained while comparing the mean insulin levels, HSCRP levels and TG/GDL ratio among the subjects of the study group and control group. Caselli C et al studied 355 patients (60 ± 9 years, 211 males) with stable angina who underwent coronary computed tomography angiography (CTA), were managed clinically and followed for 4.5 ± 0.9 years. At follow-up, the global CTA risk score and the IV quartile of the TG/HDL-C ratio were the only independent predictors of the primary outcome. The TG/HDL-C ratio and the CTA risk score progressed over time despite increased use of lipid-lowering drugs and reduction in LDL-C. In patients with stable angina, high TG and low HDL-C levels are associated with CAD related outcomes independently of LDL-C and treatments.[11]In another study conducted by Park et al, assessed 16,455 individuals (8,426 men and 8,029 women) without diabetes in a community-dwelling cohort. 321 (2.0%) participants developed IHD. After adjusting for potential confounding variables, the HRs of IHD for TG/HDL-C quartiles were 1.00, 1.61, 1.85, and 2.29, respectively. Compared with men, women showed higher HRs for the risk of incident IHD in the fourth quartile. Compared with metabolic syndrome, TG/HDL-C had a more powerful predictive value for IHD.In subjects without diabetes, an increased TG/HDL-C precedes future IHD.[12]

Conclusion

Insulin Resistance, TG/HDL Cholesterol Index and HSCRP were significantly correlated with Coronary Heart Disease.

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