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ORIGINAL ARTICLE

Incidence of Aberrative Lipids in Patients with Coronary Artery Disease

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ABSTRACT

Objective: The purpose of this study is to assess the prevalence of lipid abnormalities in patients presenting with coronary artery disease.

Study Design: Cross-sectional

Place and Duration: In the Cardiology department of Qazi Hussain Ahmad Medical Complex hospital, Nowshera for six-months duration from February 2021 to January 2022.

Methodology: 175 patients of both genders with ages 20-80 years were included in this analysis. Following informed consent, patients' vital statistics, including age, sex and BMI were recorded. Each patient had a blood sample obtained to analyze in the lab. Cholesterol, triglycerides, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very low-density lipoprotein (VLDL) were all monitored on a regular basis. The entire dataset was examined via SPSS 22.0.

Results: We found that majority of the patients were males 112 (64%) were males and females were 63 (36%). Majority of the patients 65 (37.1%) had age >60years and 95 (54.3%) had BMI >25kg/m^2. Among 175 patients, we found abnormal lipid profile found in 82 (46.9%) cases. Among cases of abnormal lipid profile, cholesterol 203.17±6.44 and LDL was found higher 108.6±13.45, while HDL-Cholesterol was lowered 51.64±7.25. We found that serum triglycerides were also higher 212.19±28.49 among cases of abnormal lipid profile.

Conclusion: In this study, we found that total cholesterol and LDL were considerably higher than HDL c in patients who presented with coronary artery disease, and that the frequency of lipid profiles was high.

Keywords: Serum triglyceride, Coronary Artery, Lipid profile, Serum cholesterol,

INTODUCTION

One who is overweight is said to be obese. According to a press release from the World Health Organization (WHO), obesity is a chronic condition that is on the rise throughout the world and increasingly overtaking other traditional health concerns [1]. Child and adolescent obesity is strongly linked to parental cardiovascular disease [2]. Researchers predict that by 2020 [3, 4], coronary heart disease (CHD) would be the major cause of mortality in low-income nations. More than 80% of the world's coronary heart disease (CHD) burden falls on low-income nations, while much of what we know about key risk factors comes from high-income nations. CHD risk factors vary in prevalence depending on location, thus it's crucial to consider in regional statistics when analysing causation. How much the Western-recognized risk factors for coronary heart disease (CHD) apply in Pakistan is still up for debate. The high rates of coronary heart disease risk factors as hypertension, obesity, and dyslipidemia in Pakistan may be to blame. Research indicates that South Asians have higher rates of obesity-related risk factors such as abdominal obesity, insulin resistance, and type 2 diabetes (T2DM). Obesity is a risk factor for CHD, hence the biochemical mechanisms that contribute to obesity have also been examined for their potential significance in the development of CHD [1-3].

Modifiable risk factors for atherosclerosis and CHD include blood lipids. Due to their hydrophobicity, lipoproteins carry cholesterol, cholesterol esters, triglycerides, and phospholipids to numerous tissues in the body. Chylomicrons (CM), low density lipoproteins (LDL), and high density lipoproteins (HDL) differ in where they're built, the lipids they include, and the apo proteins they comprise. Triacyglycerols are created when the liver's excess fatty acids (FA) are combined with phospholipids, free and esterified cholesterol, and other apo proteins to create very low density lipoprotein (VLDL). During transit through peripheral tissues, lipoprotein lipase (LPL) hydrolyzes triacyglycerol content into fatty acid (FA) and very low density lipoprotein (VLDL) remnants [4]. IDL and LDL are derived from VLDL residues by additional hydrolysis of their triglyceride contents. The apoB100-containing LDL is the primary lipid transporter in the periphery [5]. Increased plasma levels of these non HDL lipoproteins are important risk factors for coronary heart disease [6].

Multiple studies have demonstrated that an individual's lipid profile is a major factor in the onset of CVD. Elevated levels of triglycerides (TG) and total cholesterol (TC) are associated with an increased risk of cardiovascular disease (CVD) [5]. Both TG and TC can cause a narrowing of blood vessels and a raising of blood pressure in the heart. Further, arteriosclerosis caused by LDL-C accumulation in the artery's intima-media might induce thrombocytopoiesis [6]. Low-density lipoprotein cholesterol (LDL-C) is associated with an increased risk of cardiovascular disease, whereas high levels of HDL-C may reduce that risk. It has been suggested that those who have a high HDL-C level and a low non-HDL-C level have a lower chance of developing cardiovascular disease. [7]

The ACC/AHA guideline recommends utilising the greatest achievable intensity of statin medication without generating significant side effects [8], which was chosen as the treatment's end point. LDL-C levels should be maintained at or below 70 mg/dL for those at very high risk, 100 mg/dL for those at high risk, and 115 mg/dL for those at low to moderate risk, as suggested by the ESC/EAS Guidelines [9]. High-density lipoprotein cholesterol should be at or above 40 mg/dL and low-density lipoprotein cholesterol should be at or below 100 mg/dL or non-HDL-C should be at or below 100 mg/dL, according to the Japan Atherosclerosis Society Guidelines [10]. The effect of the lipid profile on the prognosis of patients with coronary heart disease (CHD) is still up for discussion, despite growing evidence linking particular characteristics in the lipid profile to the onset of cardiovascular disease. In light of the inconclusive findings from systematic reviews and meta-analyses, it is crucial to better understand the role of lipid profile factors in determining the prognosis of patients with CHD.

Chronic illness patients [11], overweight persons [12], and the Chinese general population [13-15] have all been the subjects of previous research on dyslipidaemia.

MATERIAL AND METHODS

This cross-sectional study was conducted at Cardiology department of Qazi Hussain Ahmad Medical Complex hospital, Nowshera for six-months duration from February 2021 to January 2022 and comprised of 175 patients. After obtaining written consent, subjects' ages, sexes, and body mass indexes were recorded in detail. Patients were not included in the trial if they had hepatic impairment, renal disease, or thyroid disease, or if they refused to provide written consent.

Patients with CHD were chosen based on the consultant cardiologist's diagnosis of a nonfatal myocardial infarction from the patient's electrocardiogram (ECG), cardiac echocardiogram (ECHO), angiography, troponin T/I, and clinical history. Only patients with newly diagnosed CAD who had not yet started treatment with medications to decrease their cholesterol or their blood pressure were included. Patients were aged between 20-80 years with both sexes. All of the patients who were diagnosed with coronary artery disease were brought in, and blood samples were taken from each one. Patients who were fasting had their blood sugar levels, serum homocystein levels, and lipid profiles examined. The lipid profiles included serum triglycerides, low density lipoprotein (LDL), and high density lipoprotein (HDL). The standard deviation formula was utilized in order to evaluate the numerical data, and the percentages and frequencies were utilized in order to evaluate the demographics information. SPSS 22.0 was used to perform an in-depth analysis on all of the data.

RESULTS

We found that majority of the patients were males 112 (64%) were males and females were 63 (36%). Majority of the patients 65 (37.1%) had age >60years and 95 (54.3%) had BMI >25kg/m^2. Majority of the cases 109 (62.3%) were married and 97 (55.4%) had rural residency.(table 1)

Table 1: Demographics data of the presented cases

Variables	Frequency	Percentage
Gender		
Male	112	64
Female	63	36
Age (years)		
20-40	53	30.3
41-60	57	32.6
>60	65	37.1
BMI		
<25kg/m^2	80	45.7
>25kg/m^2	95	54.3
Marital Status		
Married	109	62.3
Un-married	66	37.7
Place of Residence		
Urban	78	44.6
Rural	97	55.4

Among 175 patients, we found abnormal lipid profile found in 82 (46.9%) cases.(figure 1)

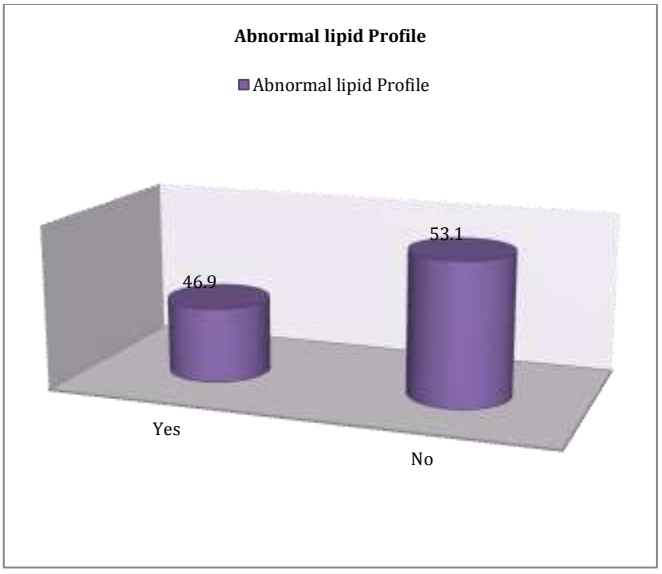

Figure-2: Included patients with abnormal lipid profile

Among cases of abnormal lipid profile, cholesterol 203.17±6.44 and LDL was found higher 108.6±13.45, while HDL-Cholesterol was lowered 51.64±7.25. We found that serum triglycerides were also higher 212.19±28.49 among cases of abnormal lipid profile.(table 2)

Table-2: Comparison of lipid profile among controls and abnormal

Variables	Abnormal Lipid Profile	Controls
Lipid Profile		
LDL mg/dl	108.6±13.45	99.4±11.64
Cholesterol mg/dl	203.17±6.44	195.08±6.19
TG mg/dl	212.19±28.49	208.11±20.67
HDL c mg/dl	51.64±7.25	62.17±6.97

In all cases of CAD, we found HDLc (<40mg/dl) among 110 (62.9%) cases, TG (>150mg/dl) in 25 (14.3%) cases, TC (>200mg/dl) in 29 (16.6%) cases and LDL (>130mg/dl) in 11 (6.3%).(figure 3)

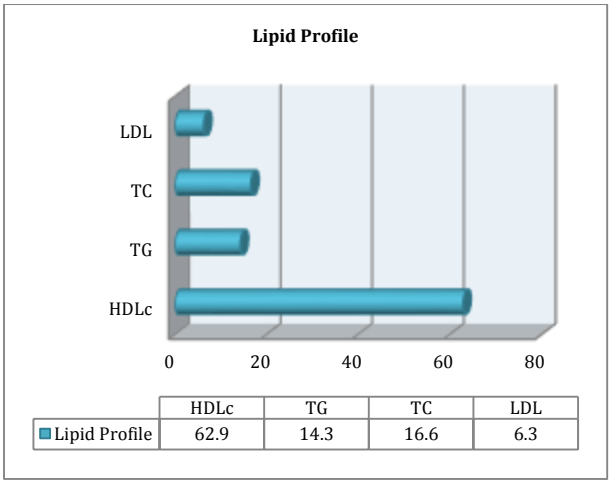

Figure-3: Lipid profile among all CAD patients

DISCUSSION

Hypertriglyceridemia and low HDL-C levels have been linked to chronic disease risk. Every 1 mg/dL increase in HDL-C reduces CVD risk by 2% to 3% [16]. Despite some debate, fasting and nonfasting triglyceride levels appear to be a risk factor for CHD [17]. Results from post hoc analyses [18] support the idea that low HDL-C and high triglycerides are CHD risk factors. Small dense LDL levels and coronary heart disease risk are correlated. High serum cholesterol increases CHD risk in Europeans and Asians. High plasma LDL-C levels are a CHD risk factor since they're negatively associated to LDL-C level reduction [19,20].

In this study 175 patients of coronary artery disease were presented. Majority of the patients were males 112 (64%) were males and females were 63 (36%). Majority of the patients 65 (37.1%) had age >60years and 95 (54.3%) had BMI >25kg/m^2. These findings of or study was comparable to the previous studies.[21,22] Among 175 patients, we found abnormal lipid profile found in 82 (46.9%) cases. Previous research showed comparable results to our findings.[23] Although our findings were lower than those reported by Youmbissi et al. in 2001 [24], total, HDL, and LDL cholesterol and TG were all higher in males than in women. We have a bigger sample size than Youmbissi et al., therefore the discrepancy could be attributable to the fact that our patients all had hypertension. There was an increase in the number of patients with both low HDL cholesterol and low LDL cholesterol, and 35 of them were on anticholesterol drugs, which may have been a contributing factor. Women in Nigeria, in comparison to men, have been found to have significantly higher rates of aberrant lipid profile [25].

Patients with higher baseline LDL-C levels benefited more from more aggressive reduction of LDL-C compared to less aggressive lowering, as found in a meta-analysis of 34 studies by Navarese et al. [26]. Nevertheless, people with coronary heart disease were not prioritised. De Vries et al. conducted a recent meta-analysis in which they analysed data from 5 trials consisting of a total of 4351 diabetic people with overt CVD. High- and low-dose statins have been shown to have similar effects on lowering the risk of cardiovascular and cerebrovascular events [27]. Even though most CHD patients use drugs to reduce their cholesterol, it's necessary to evaluate their lipid profile. In a meta-analysis of 6 studies, Afilalo et al. reported intensive statin treatment reduced the risk of MACE and heart failure hospitalisation. Intensive statin treatment improved all-cause mortality in individuals with recent ACAS, but not in those with stable CHD [28]. In current study, cases of CAD, we found HDLc (<40mg/dl) among 110 (62.9%) cases, TG (>150mg/dl) in 25 (14.3%) cases, TC (>200mg/dl) in 29 (16.6%) cases and LDL (>130mg/dl) in 11 (6.3%).

In our study, among cases of abnormal lipid profile, cholesterol 203.17±6.44 and LDL was found higher 108.6±13.45, while HDL-Cholesterol was lowered 51.64±7.25. We found that serum triglycerides were also higher 212.19±28.49 among cases of abnormal lipid profile. Mean cholesterol levels fluctuate little in the first four days following an ACS incident, according to a study published by Pitt et al[29], suggesting that these values can be used to direct the choice of lipid-lowering medicine. To better decide the kind and severity of cholesterol-lowering medication, it may be helpful to have an accurate understanding of baseline lipid levels in patients hospitalised with ACS. Our patients' lipid profiles showed that 85.1% had at least one change, with some patients showing different values than those who had reported a history of dyslipidemia upon admission. One interpretation of this finding is that it reflects how international recommendations for the prevention of cardiovascular disease emphasise focusing on identifying just TC and LDL-C values. [30]

CONCLUSION

In this study, we found that total cholesterol and LDL were considerably higher than HDL c in patients who presented with coronary artery disease, and that the frequency of lipid profiles was high.

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