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A Study of High Sensitivity C-Reactive, High Sensitivity Troponin I and Lipid Profile in Patients with an Acute Myocardial Infarction at Hawija City

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Abstract: Background: Acute myocardial infarction (AMI) is a major cause of morbidity and death globally, resulting from a coronary artery blockage, changes in lipid profiles, and a pattern of myocardial infraction that monitors and confirms the early diagnosis of cardiovascular disease using a troponin marker. **Objectives:** The objectives of this study to assess the diagnostic and prognostic value of hs-CRP, troponin I, and lipid profile in AMI patients in Hawija City. **Subjects and Methods:** Fifty patients with an acute myocardial infarction and fifty healthy controls participated in the current investigation. An instrument contained the whole clinical profile, demographic information, and medical history of each patient. The High Sensitivity C-Reactive, troponin I, and lipid profiles of an acute myocardial infarction patients at Hawija City, all AMI patients were monitored for the first 24 hours after the onset of symptoms. **The Results:** The results show that the ratio of male to female in the study and control groups represents 56:0 and 44.0 respectively while the ratio of male to female in control group represents 50.0 in both groups. Furthermore, the outcome demonstrates that the comparison of hs-CRP levels between patients with AMI and the control group, as well as the mean and standard deviation in the study group is 7.44±1.24 and in the control group is 1.7919±0.52. The results also show that the lipid profile was higher in the study group compared to the control group, and the hs-CRP and lipid profile contrast in various early onset and late onset AMI and appear increase of hs-CRP and lipid profile in late onset of AMI 15.55±4.4 comparison in early AMI4.91±0.23. **Conclusions:** The study concluded that there are alterations in lipid profile and inflammatory marker in AMI cases. The results also reveal that the lipid profile increases in patients with AMI (study group) in a comparison with control group. The results find that the hs-CRP and lipid profile were high in the late AMI in a comparison with an early onset of AMI.

Key Words: High Sensitivity, C-Reactive, troponin I, lipid profile, Acute Myocardial

INTRODUCTION

Myocardial Infarction (MI) is a term used to describe the necrosis or death of cardiac cells that occurs when the blood supply to a portion of the heart is cut off. Numerous variables, including age, sex, smoking, hypertension, and dyslipidemia are predictive of cardiovascular disease, which is most frequently caused by an obstruction of a coronary artery [1]. Both cardiac and skeletal muscle have the Troponin marker, however the particular forms of Troponin vary depending on the type of muscle (234). The primary distinction is that skeletal muscle's TnC component of troponin has four calcium ion binding sites, whereas cardiac muscle has only three [2].

AMI risk was linked to a drop in HDL and a rise in LDL levels, according to several studies that discovered inadequate lipid metabolism as one of the key contributors in the development of this disease [3]. An acute thrombus that blocks an atherosclerotic coronary artery accounts for around 90% of myocardial infarctions. Tryglyceride, total cholesterol, HDL, and HSCRP are some cardiac markers that can be used to diagnose myocardial infarction. Troponins I and T are the second marker with the preferred specificity,

and they are the final serum markers for the diagnosis or prevention of acute myocardial infarction [4].

Before there is a discernible increase in cardiac troponin I (cTnI), acute hs-CRP phase levels may prime the body to react to any necrotic or damaged tissue. It has been demonstrated that the hs-CRP levels of individuals with acute myocardial infraction (AMI) varied considerably [5]. As a result, patients with greater baseline hs-CRP titers are more hyper-responsive to circulating cTnI [6]. Among systemic indicators of inflammation, hs-CRP has been the most researched risk factor in clinical practice. Hs-CRP may be a straightforward indicator of the degree of inflammatory response to myocardial ischaemia in the early stages of AMI [7]. Hs-CRP, on the other hand, has been connected to serious adverse cardiovascular events, in addition to myocardial necrosis and infarct size. Treatment should begin with the most appropriate state based on its efficacy and baseline LDL-c, and if not contraindicated [8], at high dosages. Additionally, non-HDL cholesterol levels must be kept below 100 mg/dl in individuals with triglyceridemia >200 mg/dl [9]. The present data unequivocally show that the lipid metabolism plays a significant role in AMI patients [10]. From urgent care and treatment to a long-term education and support, nurses play a vital and diverse role in the management of myocardial infarction (MI). Vital sign monitoring, drug delivery, pain management, and making sure that patients have timely access to critical medical procedures are all part of their duties. In order to stop such incidents, they also teach patients and their families about risk factors, lifestyle changes, and medication adherence [11].

Materials and Methods

The goal of current study is to assess the diagnostic and prognostic value of hs-CRP, troponin I, and lipid profile in AMI patients in Hawija City. This cross-sectional study comprised 50 AMI patients (26 males and 24 females) and 50 healthy controls (26 males and 24 females) who were gathered from Hawija Hospital emergency room and admitted to the hospital Cardiac Care Unit (CCU) between October 2023 and August 2023.AMI patients were included in this research. Consent form were attain from patients before data collection. Individuals were between the ages of 26 and 70 years who had positive troponin I tests. An ECG with elevated ST-segments, and clinical signs of AMI 13 men and 12 women in the control group were ostensibly healthy people between the ages of 25 and 72 with a mean ± SD of 54.23±12.6 years, they did not smoke, had no diabetes, no hypertension, and no family history of IHD. After their myocardial infarction attack, venous blood samples from AMI patients were drawn, collected in plain tubes of non-heparinized blood, allowed to clot, and then centrifuged for 5 minutes at 4000 rpm to extract the serum. The 1.0 ml sample was then put into firmly sealed Eppendorf tubes and kept at -20° C to analyse the lipid profile of individuals with AMI and compare it to indicators of inflammation. Troponin was measured using (CL900 chemiluminescence immunoassay) kits from Mindary Company and Biochemstery (230 BS), which can be used to determine the risk for heart disease and stroke. Hs-CRP by system I chroma 2 flurosent assay and ipid profile were measured using standard methods with reagents from Mindary Company (BS 230 full automated). Using the Tni marker to detect the myocardial infarction early.

RESULTS

Table 1 shows that male to female ratio in the study and contrlo group represents (56:0 and 44.0) respectively while in control group male to female ratio represents (50.0) in both groups.

Table 2 Shows the comparison of hs-CRP levels among Acute Myocardial Infaarction patients and control group and shows mean and st deviation in study group 7.44±1.24 while in control 1.7919±0.52.

Table 3 Shows the level of lipid profile among AMI patients and controls and appear lipid profile increase in study group than control.

Table 4 appers level of hs-CRP and lipid profile between early onset and late onset AMI and appear increase of hs-CRP and lipid profile in late onset of AMI comparison in early AMI.

Table 1: Sociodemographic Characteristic of Study Sample

	Group-I (AMI)				Group-II (Control)			
	Male		Female		Male		Female	
Group	F	%	F	%	F	%	F	%
Male:Famale ratio	30	56:0	22	44.0	25	50.0	25	50.0

Table 2: Hs-Crp Levels in Ami Patients and Controls are Compared

Group	Group-I (AMI) (Mean±S.D.)	Group-II (Control) (Mean±S.D.)	p-value
hs-CRP (mg/L)	7.44±1.24	1.7919±0.52	0.001

Table 3: Displays a Comparison of the Lipid Profiles of Controls and AMI Patients

Group	Group-I (AMI) (Mean±S.D.)	Group-II (Control) (Mean±S.D.)	p-value
V_LDL	35.7731±11.45899	42.5± 7.1	0.001
Total cholesterol (mg/dl)	224.7±36.5	140.52±12.7	0.01
Triglycerides (mg/dl)	1806±30.7	112.9±14.5	0.01
HDL (mg/dl)	31.1±4.82	51.4±5.2	0.02
LDL (mg/dl)	148.5±35.0	64.38±3.12.2	0.001

Table 4: Comparison of Hs-CRP and Lipid Profile Between Early Onset and Late Onset AMI

Group	Early onset AMI patients (Mean±S.D.)	Late onset AMI patients (Mean±S.D.)	p-value
Triglycerides (mg/dl)	120.6±7.1	155.5±13.3	0.01
HDL (mg/dl)	38.5 ±3.26	42.2±6.25	0.01
LDL (mg/dl)	89.43 ±7.24	107.1 ±9.22	0.01
hs-CRP (mg/L)	4.91±0.23	15.55±4.4	0.01
Total cholesterol (mg/dl)	170.4±12.5	179.2±16.6	0.02

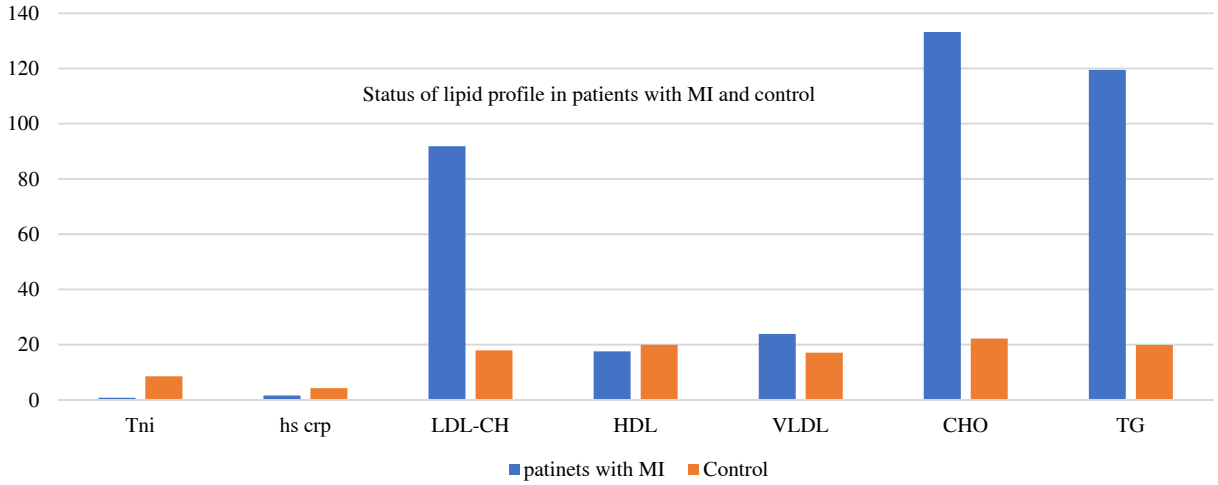

Figure 1: The Mean Values of Tc, Tg, Hdl-C, Ldl-C, Vldl-C, and Hs Crp in Ami Patients and Controls

DISCUSSIONS

This result is consistent with other studies by Osterhout and others [12], (2020), and Millett and others [13], (2018), which mention that men experience MIs at a greater rate than women, with men making up around 70% of MI cases and experiencing MIs 7–10 years sooner than women. Table 1 displays the male to female ratio in the study group and represents (56:0 and 44.0) respectively, while in the control group the male to female ratio represents (50.0) in both groups. However, with an odds ratio (OR) of 1.6, women had a higher one-year mortality risk following a MI. Acute myocardial infarction patients' hs-CRP levels are contrasted with those of the control group in Table 2. The level of hs-CRP in patients with AMI may be associated with the extent of a coronary artery lesion, the size of the myocardial necrosis region, the risk of recurrent AMI, the risk of new-onset AMI, ventricular tachycardia, heart failure decompensation/development, and mortality. This outcome is in line with the earlier Polyakova *et al.* [14] studies. It is critical to understand that CRP is a non-specific sign of a number of acute and chronic disorders, including inflammation, and that it can coexist in individuals with AMI, Mussa *et al.*)mention the signs and syptoms of illneses [15] notes that patients with AMI had higher hs-CRPs.compares the lipid profiles of AMI patients and controls, showing that the lipid profile of the study group is higher than the control group. According to Baeez and others [16], high blood pressure, cigarette smoking, and the history of diabetes comprise the majority of the risk factors of disease, weight gain, elevated cholesterol, and the use of excessive alcohol. Mohammed *et al.* [17] Kulsoom *et al.* [18] noted markedly elevated triglycerides and total cholesterol (TC).

HDL (high-density lipoprotein cholesterol) and TG are lower in those with AMI. Low-density lipoprotein cholesterol (LDL) and the ratio of LDL to HDL did not substantially change between the two groups in a sample of 50 male AMI patients; however, the AMI group's blood HDL levels were significantly lower. Karthikeyan and colleagues [19] found that both Asians and non-Asians had a higher risk of AMI when their HDL levels decreased and their LDL levels increased.

AMI was not associated with serum LDL, while higher TG and lower HDL values were identified as independent risk factors. In AMI patients, Woo and colleagues [20]found reduced mean HDL and increased mean TC, LDL, and TG; high HDL was one of the protective variables. While mean HDL was considerably lower in the AMI group, Lehto *et al.* [21] found no change in mean blood TC levels between the AMI patients and controls. Nayak and associates [22]Troponin T, a cardiac marker exhibits a favourable correlation with HDL and inversely connected with TC, LDL, and TG.

Additionally, the results compare the lipid profile and hs-CRP in the early-onset and late-onset AMI, and they reveal an increase in the latter compared to the early AMI. In Kuwaiti patients with AMI, HDL seems to be the main lipid risk factor., according to Aqeel and colleagues [23]. This suggests that treatment methods that raise HDL should be the main focus of preventative initiatives. HDL and its sphingolipid component, sphingosine-1-phosphate, have been shown to significantly reduce the size of infarcts in an in-vivo mouse model of myocardial ischemia/reperfusion. This suggests that patients at a high risk of acute myocardial ischaemia may benefit from a quick therapeutic increase in plasma HDL levels. In patients with AMI, Suzuki *et al.* [24]. reported that the systemic and coronary levels of hs-CRP were almost equal. Additionally, they found

a favourable association between the coronary plaque area and systemic hs-CRP, indicating a significant connection between systemic and coronary inflammation levels. Their findings are also linked to the development of acute coronary syndromes and susceptible coronary morphology. high blood pressure, According to study by Morrow *et al* (2000) and Karadeniz *et al.* [25], the main risk factors of AMI were smoking, diabetes mellitus and the family history of ischaemic heart disease with stroke. Cardiovascular events are the world's leading cause of death and it is important to comprehend the severity and fatality of the disease in order to manage its effects and prevent mortality [26].

The substantial rise in serum hsCRP levels seen in the AMI group vs to the control group was one of the key results of the study Milano *et al.* [27] and Wang *et al.* [28] the findings of the current study were consistent as inflammation is a key factor in every stage of atherosclerosis, from the beginning of a lesion to the rupture of a plaque and, finally, the clinical thrombotic complication, several studies by Kumar *et al.* [29] and Balci *et al.* [30] have found a correlation between AMI attacks and an increase in hsCRP levels, and some even use it as a prognostic value and a marker of a cardiac damage. Another studies by Carl *et al.* ,WHO ,2020 [31-32] For the purpose of treatment stratification and future preventive measures, acute myocardial infarction is linked to elevated acute phase proteins as demonstrated by an elevated high sensitivity C-reactive protein and elevated total cholesterol, triglycerides, VLDL cholesterol, LDL cholesterol, and the low HDL cholesterol concentrations with Troponin I concentration in the sera of acute myocardial infarction patients, is significant.

CONCLUSIONS

According to the present study, it is concluded that there were changes in the inflammatory marker and lipid profile in AMI sufferers; the results also reveal the lipid profile increase in the patients with AMI (the study group) in a comparison with the control group. The results also find that the hs-CRP and lipid profile were high in the late AMI in a comparison with the early onset of AMI.

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