STUDY OF CLINICAL PROFILE OF PATIENTS WITH ACUTE CORONARY SYNDROME WITH SPECIAL REFERENCE TO FASTING AND POST PRANDIAL LIPID PROFILE

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Conflict of Interest: Nil
Abstract

**Aim:** To evaluate the association between fasting and postprandial dyslipidemia and cardiovascular complications in patients of ACS.

**Materials and Methods:** The present Cross-sectional Observational Study was undertaken among 100 patients diagnosed with Acute Coronary Syndromes (ACS) admitted in the Department of Medicine, Dr D.Y Patil Medical College, Hospital and Research Centre, Pimpri, Pune, during the period of August 2019 to September 2021. Detailed medical history, including personal data, chief complaints, medical history, family history and personal habits, was obtained according to the attached protocol. Thorough clinical examination including a detailed cardiovascular system examination was carried out using standard 12-lead electrocardiogram and venous blood samples for fasting and postprandial lipid profile was analyzed using colorimetric reflectance spectrophotometric method.

**Results:** It was evident from the above table that majority of patients in this study were in the 51-60 age group (29%) followed by 61-70 years (25%) and 71-80 years of age (20%). Majority (57%) of the patients with acute coronary symptoms were male. 31% were overweight and 21% were obese. The most common symptoms were chest pain (98%) and hypertension was most common risk factor observed (81%). It was observed that 68% patients were suffering from STEMI type of coronary heart disease while 11% patients were suffering from NSTEMI and 21% were suffering from unstable angina. Mild type of LV dysfunction on echocardiograph was observed in 22% patients while moderate LV dysfunction was observed in 15% patients whereas severe LV dysfunction was observed in 10% patients. Mean difference in fasting and postprandial Total Cholesterol levels among all three types of ACS (STEMI, NSTEMI and Unstable angina) patients was statistically not significant (p>0.05). Mean difference in fasting and postprandial LDL Cholesterol, HDL Cholesterol and Triglycerides levels among all three types of ACS (STEMI, NSTEMI and Unstable angina) patients was statistically significant (p<0.05).

**Conclusion:** Deranged mean fasting and postprandial lipid profile was observed among STEMI, NSTEMI and unstable angina patients.

**Keywords:** STEMI, NSTEMI, unstable angina, lipid profile

**Introduction**
Coronary heart disease is very common in both developed and developing countries. Despite advances in diagnostic facilities and new treatments, coronary heart disease remains the leading cause of death.\(^1\) Cardiovascular disease (CVD) is a group of conditions that include both the heart and blood vessels, that is coronary heart disease (CHD) and coronary arterial disease (CAD) and acute coronary syndrome (ACS).\(^2\) Coronary artery disease is a multifactorial disease which is the main cause of dyslipidemia and atherosclerosis.\(^1\) Atherosclerotic plaques build up in the coronary arteries and restrict blood flow and oxygen supply in coronary heart disease. This condition continues to be the number one killer in many countries.\(^3\)

ACS is a condition characterised by signs and symptoms of sudden myocardial ischemia caused by a sudden decrease in blood flow to the heart. The term ACS was adopted because it was believed to clearly reflect the disease progression associated with cardiac ischemia. Myocardial infarction (MI) and unstable angina states both fall under ACS.\(^3\)

The signs of acute coronary syndrome (ACS) range from unstable angina to non-ST segment elevation myocardial infarction (NSTEMI) to ST segment elevation myocardial infarction (STEMI). NSTEMI and unstable angina result from coronary arteries intermittently blocked, and STEMI results from complete occlusion of the coronary arteries. Persistent risk factors that affect coronary artery disease include age, gender, family history, ethnicity or race, and high levels of serum cholesterol, low density lipoprotein cholesterol, and triglycerides. From low levels of high-density lipoprotein cholesterol; type 2 diabetes, obesity, sedentary lifestyle, smoking, high blood pressure and the presence of stress are correctable risk factors.\(^3\)

Although hypertriglyceridemia and hypercholesterolemia are considered independent risk factors, most early studies only consider fasting lipoproteins and lipids. It has been proposed that postprandial lipoproteins may be a better indicator of a disturbance in lipoprotein metabolism and hence of coronary heart disease and atherosclerosis.\(^2\) Lipoproteins are rich in cholesterol and triglycerides, and absorption by macrophages of these lipoproteins leads to the formation of foam cells containing cholesterol. The etiology and progression of coronary artery disease have been reported to be positively associated with the extent and duration of postprandial lipemia.\(^1\)

Interventions in lipid after ACS have been focused primarily on raising high-density lipoprotein cholesterol and lowering of low-density lipoprotein cholesterol. Triglyceride-rich lipoproteins & intermediate-density lipoproteins, denser forms of the VLDL are believed to be atherogenic.
Traditional fasting lipid profile has been used to assess CVD risk includes TG, high-density lipoprotein cholesterol (HDL-C), total cholesterol (TC) and LDL-C. Several notable advantages have been recognized for non-fasting measurements, including more reflective measurements of daily mean plasma lipids, simplified blood collection for patients, laboratories and clinicians, and for lipid testing. Although fasting dyslipidemia is strongly associated with CVD risk, only 47.5% of patients with acute coronary syndrome experience fasting dyslipidemia. It has been suggested that postprandial and non-fasting lipid parameters may be more accurate in predicting CVD risk compared to fasting measurements. However, there is no evidence supporting that fasting measurements of lipid parameters are better than non fasting measurements. Strong and unfavorable relationship of fasting triglyceride levels to long-term and short-term prognosis after ACS has been observed in various studies. Postprandial dyslipidemia has been thought to be major contributor of atherogenesis and observed as an important risk factor for CVD. However, studies on the role of fasting and post prandial levels of lipoproteins as markers of the severity of Acute Coronary Syndrome (ACS) are still very few in literature. Hence, the present study was taken up to assess clinical profile of the patients with Acute Coronary Syndrome in special reference to Fasting and Post Prandial Lipid Profile.

Materials and Methods
The present Cross-sectional Observational Study was undertaken among 100 patients diagnosed with Acute Coronary Syndromes (ACS) admitted in the Department of Medicine, Dr D.Y Patil
Medical College, Hospital and Research Centre, Pimpri, Pune, during the period of August 2019 to September 2021.

Ethical approval and Informed consent were taken

The study protocol was approved by the institutional Ethical Committee. All the study participants and/or relatives were also informed about the study procedure and the information required from them for the study.

Inclusion Criteria

- The patients with Acute coronary syndromes either of STEMI, NSTEMI or Unstable Angina attending Medicine OPD, and patients who were admitted to the Emergency Department, Medicine wards and ICU.
- Above the age of 18 and willing to give consent to participate in the study.

Exclusion Criteria

- The Patients with liver parenchymal diseases, patients with chronic kidney disease
- The Patients on hypolipidemic medications
- The Patients not willing to participate in the study and not willing to give informed consent

Case definition:

A) STEMI- The criteria for MI as per the current (fourth) Universal Definition of MI Expert Consensus Document (American College of Cardiology) includes detection of a rise and/or fall of cTn with at least one value above the 99th percentile and with at least one of the following:

a. New ischemic electrocardiographic changes;

b. Symptoms of acute myocardial ischemia;

c. Development of pathological Q waves on ECG;
d. Image evidence of new viable myocardial loss or new local wall motion abnormalities following a pattern consistent with ischemic etiology

e. A coronary thrombus identified by angiography including intracoronary imaging or by the autopsy.

B) NSTEMI- is an acute ischemic event causing myocyte necrosis with elevation of cardiac biomarkers and absence of ST-segment elevation.

C) Unstable Angina (UA) is defined by the absence of biochemical evidence of myocardial damage. And it is characterized by the specific clinical findings of prolonged angina at rest (>20 minutes); new onset of severe angina; angina that is increasing in frequency, longer in duration, or lower in threshold; or angina that occurs after a recent episode of myocardial infarction.

Clinical evaluation:

Detailed medical history, including personal data, chief complaints, medical history, family history and personal habits, was obtained according to the attached protocol. Thorough clinical examination including a detailed cardiovascular system examination was carried out using standard 12-lead electrocardiogram.

Lab investigations:

- Complete hemogram
- Cardiac biomarkers- Troponin I/ Troponin-T and creatine kinase MB (CK-MB)
- Electrocardiogram (ECG), 2D echocardiography.
- Routine Investigation of liver function tests (Liver function test) and Renal function tests (RFT) electrolytes and Random Blood Sugar, hbA1c
- 2D echocardiography.
- Venous blood samples for fasting and postprandial Lipid profile.

Lipid profile evaluation:
Fasting lipid profile will be done after 8 hours of overnight fasting and postprandial lipid profile will be done 48 hours post admission.

Venous blood samples for lipid profile including: total cholesterol, triglycerides, Low density lipoprotein cholesterol and high density lipoprotein cholesterol.

The lipid profile testing was carried out by using a colorimetric reflectance spectrophotometric method and normal values of which are mentioned below.

**Statistical analysis**

Data management and analysis was performed using Microsoft Excel and SPSS software. For presenting variables, frequency distribution tables and graph were used. The data was analyzed using Independent sample t-test.

Table 1: Demographic profile of the study population

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<table>
<thead>
<tr>
<th>Age (In years)</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤30</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>31-40</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>41-50</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>51-60</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>61-70</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>71-80</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>&gt;81</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Male</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Hypertension</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td><strong>Body Mass Index (BMI)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 25 kg/m² (Normal)</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>25-30 kg/m² (overweight)</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>30 kg/m (obese)</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

It was evident from the above table that majority of patients in this study were in the 51-60 age group (29%) followed by 61-70 years (25%) and 71-80 years of age (20%). Majority (57%) of the
patients with acute coronary symptoms were male. 40% patients had family history of diabetes mellitus while 31% had family history of hypertension. It was seen that 48% patients in the present study were having normal body weight while 31% were overweight and 21% were obese.

Table 2: Distribution of symptoms and risk factors in the study population

<table>
<thead>
<tr>
<th>Symptom</th>
<th>No. of Patients*</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Palpitation</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Fatigue</td>
<td>55</td>
<td>55</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>No. of Patients*</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>Smoking</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>68</td>
<td>68</td>
</tr>
</tbody>
</table>

It was seen that most common symptoms was chest pain (98%) and it was followed by dyspnoea (59%), fatigue (55%), and palpitation (32%). Hypertension was most common risk factor observed (81%). In 72% patients’ diabetes mellitus was reported. Dyslipidemia and smoking was reported in 68% and 65% patients respectively.

Table 3: Distribution according to type of Acute Coronary Syndrome (ACS)

<table>
<thead>
<tr>
<th>Type of ACS</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
</table>

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It was observed that 68% patients were suffering from STEMI type of coronary heart disease while 11% patients were suffering from NSTEMI and 21% were suffering from unstable angina.

Table 4: Distribution according to echo-cardiographic findings in Acute Coronary Syndrome (ACS)

<table>
<thead>
<tr>
<th>LV Function</th>
<th>No. of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (LVEF: 50-70%)</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Mild (LVEF: 40-49%)</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Moderate (LVEF: 30-39%)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Severe (LVEF: less than 30%)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Mild type of LV dysfunction on echocardiograph was observed in 22% patients while moderate LV dysfunction was observed in 15% patients whereas severe LV dysfunction was observed in 10% patients. Normal LV function was observed in 53% patients.

Table 5: Comparison of mean values of fasting and postprandial; Total Cholesterol, LDL, HDL and Triglycerides
<table>
<thead>
<tr>
<th>Type of ACS</th>
<th>Fasting (Mean ± SD)</th>
<th>Postprandial (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Cholesterol</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMI</td>
<td>208.56 ± 42.17</td>
<td>210.45 ± 45.36</td>
<td>0.783 (NS)**</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>203.34 ± 34.65</td>
<td>206.46 ± 65.82</td>
<td>0.675 (NS)**</td>
</tr>
<tr>
<td>UA</td>
<td>211.64 ± 54.15</td>
<td>215.53 ± 65.35</td>
<td>0.647 (NS)**</td>
</tr>
<tr>
<td><strong>LDL Cholesterol</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMI</td>
<td>142.45 ± 38.29</td>
<td>154.65 ± 42.76</td>
<td>0.0347 (Sig.)*</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>136.67 ± 45.25</td>
<td>149.17 ± 38.57</td>
<td>0.0367 (Sig.)*</td>
</tr>
<tr>
<td>UA</td>
<td>146.46 ± 39.68</td>
<td>157.88 ± 41.57</td>
<td>0.0482 (Sig.)*</td>
</tr>
<tr>
<td><strong>HDL Cholesterol</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMI</td>
<td>31.34 ± 12.65</td>
<td>35.12 ± 13.34</td>
<td>0.0410 (Sig.)*</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>27.87 ± 16.54</td>
<td>32.26 ± 13.26</td>
<td>0.0396 (Sig.)*</td>
</tr>
<tr>
<td>UA</td>
<td>34.47 ± 17.75</td>
<td>39.13 ± 15.12</td>
<td>0.0470 (Sig.)*</td>
</tr>
<tr>
<td><strong>Triglycerides</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMI</td>
<td>257.65 ± 78.75</td>
<td>280.98 ± 74.65</td>
<td>0.040 (Sig.)*</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>254.36 ± 65.25</td>
<td>273.34 ± 67.15</td>
<td>0.044 (Sig.)*</td>
</tr>
<tr>
<td>UA</td>
<td>263.25 ± 55.98</td>
<td>282.65 ± 77.59</td>
<td>0.043 (Sig.)*</td>
</tr>
</tbody>
</table>

Test applied: Independent sample t-test. **(p>0.05), *(p≤0.05).

Mean difference in fasting and postprandial **Total Cholesterol** levels among all three types of ACS (STEMI, NSTEMI and Unstable angina) patients was **statistically not significant** (p>0.05).
Mean difference in fasting and postprandial **LDL Cholesterol, HDL Cholesterol** and **Triglycerides** levels among all three types of ACS (STEMI, NSTEMI and Unstable angina) patients was **statistically significant** (p<0.05).

**Discussion**

The present cross sectional observational study showed that the majority of patients in this study were in the 51-60 age group (29%) followed by 61-70 years (25%) and 71-80 years of age (20%).
Thus the majority of the patients were above 50 years of age. Similar findings were also reported by Joshi HS et al.\(^5\) where 69.2% patients were above 50 years of age. In a study conducted by Rosengren A, Wallentin L et al.\(^6\), 52% of the study population belonged in the age group of 55-75 yrs.

It was observed that majority of the patients with acute coronary symptoms were male with proportion of 57%. Similarly Joshi HS et al.\(^5\) also reported male predominance with 63.1% male patients with ACD. The study done by Heeschen et al.\(^7\), showed 69% male patients and study done by Janorkar et al.\(^8\) showed 79% male patients. Nguyen HL, Saczynski JS et al.\(^9\) also observed around 60% of prevalence in male population and the study by Vaccarino V, Horwitz RI et al.\(^10\) which showed 58% of the prevalence in the male population.

It was evident from the table that 40% patients had family history of diabetes mellitus while 31% had family history of hypertension. Similar findings were also reported by Chahare VW et al.\(^11\) in their study where Family history of diabetes mellitus was seen in 34% patients and hypertension in 34%. In a study conducted by Misiriya KJ et al.\(^12\) found that 43% patients had family history of hypertension and 41.05% patients had family history of diabetes.

It was seen that 48% patients in the present study were having normal body weight while 31% were overweight and 21% were obese. Similarly in the study conducted by Chahare VW et al.\(^11\) majority of the patients (53%) were having normal Body Mass Index (BMI) while 43% were between 25-30 kg/m\(^2\) and only 4% were above 30 kg/m\(^2\). In contrary study done by Diercks DB, et al.\(^13\) reported that most (70.5%) of the patients were classified as overweight or obese.

While studying the presenting signs and symptoms it was seen that most common symptoms was chest pain (98%) and it was followed by dyspnoea (59%), fatigue (55%), and palpitation (32%). Joshi HS et al.\(^5\) also reported chest pain (94%) as the most common presenting symptom in the patients with Acute Coronary Syndrome in their study while palpitation, breathlessness, cough and oedema were other symptoms. Similarly, Chahare VW et al.\(^11\) in their study, observed chest pain in 82%, fainting/syncope in 2%, dyspnoea, impending to doom or choking sensation in 30%, sweating in 30%, and 19% with Chest discomfort and 7% experienced nausea, vomiting, dizziness, etc.
While studying the risk factors present among the patients in the present study it was seen that hypertension was most common risk factor observed (81%). While among 72% patients diabetes mellitus was reported. Dyslipidemia and smoking was reported by 68% and 65% patients respectively. Joshi HS et al.\textsuperscript{5} reported dyslipidemia (72.3%) as most common risk factor among the study patients was followed by IHD, smoking, hypertension and diabetes mellitus. In the study conducted by Chahare VW et al.\textsuperscript{11} hypertension was observed in 75% patients and diabetes mellitus in 71%, whereas smoking was reported in 70% as risk factor and dyslipidemia was found in 64% patients. Where as in CREATE study conducted by Xavier D\textsuperscript{14} it was seen that 37.7% patients were hypertensive while 40.2% patients were smokers and 37.7% patients were with diabetes mellitus. While in another study done by Selim S et al.\textsuperscript{15} it was observed that 70% cases were smokers, 23.5% of cases were having diabetes, 5% of case were having dyslipidemia.

It was observed that 68% patients were suffering from STEMI type of coronary heart disease while 11% patients were suffering from NSTEMI and 21% were suffering from unstable angina. Similarly Chahare VW et al.\textsuperscript{11} in their study showed STEMI as most common type of ACS followed by NSTEMI and unstable angina was observed. In a study done by Misiriya KJ,\textsuperscript{12} observed that 56% patient had STEMI while 44% patient had unstable angina or NSTEMI. In Xavier D.\textsuperscript{14} study it was found that majority of patients (60.6%) presented with STEMI and only 39.4% patients they presented with UA/NSTEMI. It was observed that among the STEMI patient’s chest pain was the most common symptom and it was followed by dyspnoea, fatigue and palpitation. Among the NSTEMI patients dyspnoea was most common presenting sign and symptom. While among the unstable angina patient’s chest pain was the most common presenting symptom.

Mild type of LV dysfunction was observed on echocardiograph in 22% patients while moderate LV dysfunction was observed in 15% patients whereas severe LV dysfunction was observed in 10% patients. Normal LV function was observed in 53% patients. Joshi HS et al.\textsuperscript{5} and Chahare VW et al.\textsuperscript{11} also observed that majority of the ACS patients had normal LV function.

In the present study Fasting lipid profile was done after 8 hours of overnight fasting and postprandial lipid profile will be done 48 hours post admission. Venous blood samples for lipid profile including total cholesterol, triglycerides, Low density lipoprotein cholesterol, high density lipoprotein cholesterol and very low density lipoprotein (VLDL) was collected and tested.
Branchi A et al., Sidhu D et al., Langsted A et al., and Wilder LB et al. reported that among stable the patients triglycerides levels are affected very little after normal dietary intake and fasting, with only small changes in Low density lipoprotein (LDL-C) of approximately 4% to 7%. Postprandial changes in triglycerides and LDL-C have been observed to depend on the amount of food and water consumed, and the proportion of each major nutrient (such as fat) in the diet and the time elapsed since consumption.

The postprandial triglycerides (TG) increase is especially important, as LDL-C calculation using the Friedewald Equation (LDL-C = TC − HDL-C − [TG/5]) is directly dependent upon the triglycerides (TG) measurement (because the TC and HDL are relatively stable). Postprandial increase in triglyceride (TG) is important because TC and HDL-C are relatively stable and the calculation of LDL-C using the Friedwald equation (LDL-C = TC-HDL-C- [TG / 5]) depends directly on the measurement of triglyceride (TG).

Rifai et al. in a well-managed study of healthy young male volunteers showed that triglycerides (TG) increased by up to 150% and LDL-C decreased by up to 37% after a high-fat diet. ApoB and ApoA-I often do not change or have a small postprandial response. It should be noted that non-fasting conditions do not compromise lipid predictions. Increases in CRP and other inflammatory markers in the non-fasting state have been previously reported.

It was observed that mean fasting total cholesterol level was 207.65±41.81 mg/dl while mean postprandial total cholesterol level was 209.85±54.23 mg/dl and the difference observed in fasting and postprandial total cholesterol level was not statistically significant (p=0.748). Similar funding was also observed by Steen DL et al. in their study.

Mean fasting LDL cholesterol level among study patients was 141.24±34.22 mg/dl and it was raised upto 152.43±42.34 mg/dl postprandially and the rise observed was statistically significant (p=0.0411). Steen DL et al. also observed statistically significant difference in fasting and non-fasting ACS patients.

Mean fasting HDL cholesterol among the study patients was 30.12±12.26 mg/dl while mean postprandial level was 34.65 ± 16.76 mg/dl and the difference observed was statistically significant (p=0.030).
The mean fasting Triglycerides level in the present study was 258.52±69.12mg/dl while mean postprandial Triglycerides level was 279.43±73.57mg/dl and the difference observed also statistically significant (p=0.039). Similar findings were also observed by Steen DL et al.26 in their study.

The presence of stable coronary heart disease has been shown not to affect the postprandial response.27 Lipid levels have been reported to be relatively stable in the period immediately following ACS.28 These levels change from pre-ACS states due to acute reactions, decreased levels of some HDL-C regulatory proteins, stress-induced myocardial damage and necrosis facilitating adrenergic-mediated adipocyte lipolysis and lifestyle changes.30 So far, it is not clear whether the factors that modify lipids profile during ACS also affect the effects of fasting on these measures.

It was observed that mean fasting total cholesterol level among STEMI patients was 208.56 ± 42.17mg/dl while mean postprandial total cholesterol level was 210.45 ± 45.36mg/dl and the difference observed in fasting and postprandial total cholesterol level was not statistically significant (p=0.783). Similarly difference in fasting and postprandial total cholesterol level among NSTEMI and unstable angina patients was also not significant.

Mean fasting LDL cholesterol level among STEMI patients was 142.45 ± 38.29mg/dl and it was raised upto 154.65 ± 42.76mg/dl postprandially and the rise observed was statistically significant (p=0.0347). Among the NSTEMI patients fasting LDL cholesterol was 136.67 ± 45.25mg/dl and postprandial LDL cholesterol was 149.17±38.57mg/dl and the difference observed was statistically significant. Similarly, among the unstable angina patients fasting LDL cholesterol was 146.46±39.68mg/dl and postprandial LDL cholesterol was 157.88±41.57mg/dl and the difference observed was statistically significant.

Mean fasting HDL cholesterol among the STEMI patients was 31.34±12.65mg/dl while mean postprandial level was 35.12±13.34mg/dl and the difference observed was statistically significant (p=0.0410). Similarly the difference in the NSTEMI and unstable angina patients was statistically significant.

The mean fasting Triglycerides level in the STEMI patients was 257.65±78.75mg/dl while mean postprandial Triglycerides level was 280.98±74.65mg/dl and the difference observed also
statistically significant (p=0.040). The difference observed in fasting and postprandial triglyceride level among NSTEMI and unstable angina patients was statistically significant.

Various guidelines differ in their recommendations for fasting. According to the 2013 American Heart Association (AHA) guidelines, pre-statin initiation fasting lipid profiles helps to calculate LDL-C and improve the diagnosis of specific conditions (familial hypercholesterolemia, metabolic syndrome, hypertriglyceridemia, etc.).\textsuperscript{31} In follow-up evaluations, fasting is also preferred to assess response to treatment and to assess adherence.

In contrast, the European Atherosclerosis Society (EAS) and the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) in the year 2016 reported that the net benefits favour not recommending fasting prior to a lipid profile, even though the current European Society of Cardiology (ESC) primary treatment target is LDL-C.\textsuperscript{32} Other guidelines that now focus on non–HDL-C as the primary treatment (as opposed to LDL-C) do not recommend fasting prior to initiation of therapy or during follow-up.\textsuperscript{34-35}

Similarly the present study provides reassurance to these recommendations that lipid profile do not significantly change by fasting status after the onset of an ACS.

**Conclusion**

The present investigation concluded that majority of the patients with Acute Coronary Syndrome were more than 50 years of age and male. Also, majority of them were belonging to the middle socioeconomic class. Hypertension and diabetes were most common disease reported in family history and also as risk factor. STEMI type of coronary heart disease was most common type observed followed by unstable angina and NSTEMI were observed.
Deranged mean fasting and postprandial lipid profile i.e. total cholesterol, LDL, HDL and TG was observed in the present study. The difference observed in the fasting and postprandial HDL, LDL and TG was statistically significant whereas mean fasting and postprandial total cholesterol was not statistically significant. Similarly deranged mean fasting and postprandial lipid profile was observed among STEMI, NSTEMI and unstable angina patients.

References


