



Study on Lipid Profile Pattern in Acute Coronary Syndrome Patients with Special Relation to HDL Cholesterol

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Abstract

Background: Acute coronary syndrome was one of the most common cause for mortality and morbidity all over the world. Epicardial arterial atherosclerosis was the main risk factor for coronary heart disease. Dyslipidemia is one of the most important risk factor for atherosclerosis and its consequences.

Aims and Objectives: To study lipid profile pattern in acute coronary syndrome patients

Materials and Methods: It was a retrospective study conducted between January 2017 to December 2017 at Govt Hospital MIMS Mandya. As per inclusion criteria and exclusion criteria cases are included and excluded, and a prestructured proforma was used, and data were entered. A standard serum lipid profile measures the concentration of total and high-density lipoprotein (HDL) cholesterol as well as the triglycerides.

Results: Out of 62 patients 26 were females (41.9%) 36 were males (58.1%). Most common age group was 50 to 60 years. Out of 62 patients 32(51.6) were admitted with STEMI, 20 were (32.3%) admitted with NSTEMI. Average total Cholesterol was 195.5 mg/dl, LDL-C was 119.5 mg/dl, HDL-C was 38.4 mg/dl and TG was 179.1 mg/dl respectively.

Conclusion: Increased LDL-C and decreased HDL-C was one of the important lipid abnormality causing CHD. It is important to advice regarding good dietary habits and exercise to prevent such events at community level.

Keywords: STEMI, NSTEMI, UA, LDL-C, HDL-C.

Introduction

Atherosclerosis remains the major cause of death and premature disability in developed societies. Moreover, current predictions estimate that by the year 2020 cardiovascular diseases, notably atherosclerosis, will become the leading global cause of total disease burden. Although many

generalized or systemic risk factors predispose to its development, atherosclerosis affects various regions of the circulation preferentially and has distinct clinical manifestations that depend on the particular circulatory bed affected. Atherosclerosis of the coronary arteries commonly causes myocardial infarction (MI)¹.

Abnormalities in plasma lipoproteins and derangements in lipid metabolism rank among the most firmly established and best understood risk factors for atherosclerosis¹.

The pathogenesis of acute myocardial infarction (AMI) is multifactorial however, several studies have implicated impaired lipid metabolism as one of the crucial factors in the development of this disease. The risk of AMI was associated with increase in LDL and a decrease in HDL in both Asians and non Asians. Lower concentrations of serum HDL and higher serum TG were found to be independent risk factors².

Ischemic heart disease (IHD) is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium; it typically occurs when there is an imbalance between myocardial oxygen supply and demand. The most common cause of myocardial ischemia is atherosclerotic disease of an epicardial coronary artery (or arteries) sufficient to cause a regional reduction in myocardial blood flow and inadequate perfusion of the myocardium supplied by the involved coronary artery.

Epicardial coronary arteries are the major site of atherosclerotic disease. The major risk factors for atherosclerosis (high levels of plasma low-density lipoprotein [LDL], low plasma high-density lipoprotein [HDL], cigarette smoking, hypertension, and diabetes mellitus) disturb the normal functions of the vascular endothelium^{2,3}.

Total blood cholesterol consists of low-density lipoprotein cholesterol (LDL-C), which is the largest component of total cholesterol (TC), i.e., 60-70% of TC. LDL-C is very atherogenic and it should be decreased and represents the major cause of CHD. HDL-C is one of important lipoproteins and is very potential to prevent atherosclerosis by changing the "biology" of arterial wall lesion, without being affected by LDL-C level. Triglycerides (TG) may cause endothelial dysfunction and may stimulate macrophages migration into endothelium⁴.

Now days acute coronary syndrome increasingly more common in Indian population, may be

because of multifactorial among most important is dietary habits, importantly atherogenic diet and life style.

Aims and Objectives

Study of lipid profile patterns in patients admitted with acute coronary syndrome (UA/non-ST elevation myocardial infarction [NSTEMI]/ST elevation myocardial infarction [STEMI]).

Materials Methods

It was a retrospective study conducted on patients admitted to ICCU wards of Govt Hospital dept of general medicine MIMS Mandya between January 2017 to December 2017.

Inclusion criteria

Age >30 years

New cases of acute coronary syndrome

Exclusion criteria

The patients with previous history of MI are excluded.

Acute coronary syndrome that occur secondary to other reasons such as anemia, trauma or non cardiac surgery is excluded.

The diagnosis of UA is based largely on the clinical presentation. Typically, chest discomfort is severe and has at least one of three features: (1) it occurs at rest (or with minimal exertion), lasting >10 minutes; (2) it is of relatively recent onset (i.e., within the prior 2 weeks); and/or (3) it occurs with a crescendo pattern (i.e., distinctly more severe, prolonged, or frequent than previous episodes)

The diagnosis of NSTEMI is established if a patient with above clinical features develops evidence of myocardial necrosis, as reflected in abnormally elevated levels of biomarkers of cardiac necrosis.

The diagnosis STEMI by detection of a rise and/or fall of cardiac biomarkers values (preferably cardiac troponin (cTn) with at least one value above the 99th percentile upper reference limit and with at least one of the following:

Symptoms of ischemia

New or presumed new significant ST-T changes or new left bundle branch block.

Development of new pathologic q waves in ECG. Imaging evidence of new loss of viable myocardium or new regional motion abnormalities.

Identification of an intracoronary thrombus by angiography or autopsy.

Data regarding age, sex, occupation, risk factors like DM, HTN, Smoking, Family history ,type of MI, Lipid profile pattern and reports of 2D Echo and cardiac enzymes level and associated co-morbid conditions were collected from the hospital records and documented in the prestructured proforma. Then, the data were analyzed by the descriptive statistical method. Ethical clearance was taken from the ethical committee.

Results

Total 62 patients data collected from records ,out of 62 patients 36(58.1%) were males and 26 were females (41.9%).Most common age group affected was 51-60 years(37%) followed by 61-70 years (25.8%), only 6 (9.7%) patients belong to less than 40 years age.

Out of 62 patients 24(38.3%) were diabetic and 38 (61.3%) were chronic smoker.36 (58.1%) patients were suffering from hypertension. 27(43.5%) patients were chronic alcoholic.

Most common presenting symptom was chest pain (90%), followed by breathlessness (6%). Most common type of ACS was STEMI (51.5%), NSTEMI (32.3%), UA (16.7%). (Table-1)

Table-1 Distribution of patients into various types of acute coronary syndromes

Type of ACS patients	Number of patients (%)
Anterior wall MI	18(29%)
Inferior wall MI	10(16.7%)
Anterolateral MI	4(6.5%)
Anterior wall NSTEMI	12(19.4%)
Inferior wall NSTEMI	8(12.9%)
UA	10(16.7%)

Average total cholesterol was195.47 mg/dl, LDL-C was 119.5 mg/dl, HDL-C was 38.4 mg/dl and TG was 179.1mg/dl respectively.

12(19.4%) patients had >160 mg/dl LDL-C,32 (51.6%) patients had >200 mg/dl total cholesterol, 32(51.6%) patients had<40 mg/dl HDL-C and 5(8.1%) patients had >400 mg/dl TG respectively.

Discussion

In the present study incidence of ACS was more common in 51-60(37%) year’s group patients, followed by 61-70 (25.8%) years group patients. Study done by Prashanthkumar et al titled Study of Lipid Profile in Acute Myocardial Infarction within 24 Hours showed similar results. (Tablw-2)

Table-2 Comparison of different clinical profile

Clinical profile	Prashanthkumar et al ³ (%)	Present study (%)
Most common age group	51-60(37%)	61-70(36.6%)
Incidence in <40 years	6(9.7%)	6(10%)
DM	24(38.7%)	10(16.7%)
SMOKER	38(61.3%)	22(36.6%)
Hypertension	26(41.9%)	25(41.6%)
Alcohol	27(43.5%)	26(43.3%)

Present study showed most common lipid abnormality was increased LDL-C and decreased HDL-C. Study done by Prashanth Kumar et al³ showed similar results. Study done by Md Zahid Alam et al⁴ titled Pattern of Dyslipidemia in different type of Myocardial Infarction showed similar results.

Average total Cholesterol was 195.5 mg/dl, LDL-C was 119.5 mg/dl, HDL-C was 38.4 mg/dl and TG was 179.1 mg/dl respectively. Study done Prashanth Kumar et al³ showed, the average TC was 208.53 mg/dl, TG was 168.73, HDL-C was 41.65 mg/dl, mean LDL-C was 133.13 mg/dl respectively. (Table 3)

In our study ratio of TC/HDL>5 and TG/HDL>4 . According to the American Heart Association, the goal is to keep TC/HDL ratio < 5 and TG/HDL <4. A higher ratios indicates a higher risk of heart disease; a lower ratio indicates a lower risk. Study done by Md Zahid Alam et al showed similar results.

Our study showed 51.6% patients had HDL-C <40 mg/dl. It was very significant; this may be the reason for higher incidence of CHD in Indian population.

Average HDL-C in STEMI patients was 38.3 mg/dl, in NSTEMI patients was 37, 3 mg/dl and in

UA patients was 40.87 mg/dl respectively.(Table 4)

Out of 62 patients 32(51.6%) patients had >200 mg/dl total cholesterol, 12 (19.4%) patients had >160 mg/dl LDL-C,5 (8.1%) patients had >400 mg/dl TG and 32(51,6%) patients had <40 mg/dl HDL-C.

Table 3 Lipid profile comparison with different studies

Lipid parameter	Present study(mg/dl)	Prashanthkumar et al ³ (mg/dl)	MdZahidAlam et al ⁴ (mg/dl)
TC	195.5	208.53	195.7
LDL-C	119.5	133.13	120.7
HDL-C	38.4	41.65	37.14
TG	179.1	168.73	152.8

Table 4 Average Lipid profile in different ACS

ACS	Present study(mg/dl)				Md Zahid Alam et al ⁴ (mg/dl)			
	TC	LDL-C	HDL-C	TG	TC	LDL-C	HDL-C	TG
STEMI	204.5	126.9	38.3	180.2	220.7	160.7	35.14	182.8
NSTEMI	194.8	118.7	37.3	178.5	208.4	148.3	41.65	174.4

Conclusion

In the present study has been observed ACS more common in males compared to females because of males had associated risk factors like DM, HTN, Smoking .Most common age group affected was 51-70 years, may be because of age factor and associated other risk factors. it was found that HDL-C was significantly low in most of the patients, that may be reason for more incidence of ACS events in Indian population. Hence, inference may be drawn from the present study that the patients who are having low HDL-cholesterol are prone to develop myocardial infarction. This may be an important guideline for preventing CHD in future. It is important to advice regarding dietary habits and regular physical exercise to prevent to such events at community level.

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