

Clinical Study of Lipid Profile Pattern in Acute Coronary Syndromes

V Suresh Kumar, Madavaram Sreelatha

Assistant Professor, Department of General Medicine, Mahatma Gandhi Memorial Hospital, Warangal, Telangana, India

Abstract

Introduction: Acute coronary syndrome is one of the leading cause of morbidity and mortality in the world today. There has been constant effort on the part of medical researchers to analyze this problem and search for factors that may aid in its prevention.

Materials and Methods: The present study was undertaken in the Department of Cardiology/General Medicine in the MGM Hospital, Warangal. A total of 50 cases were studied, which were admitted consecutively (not picked up at random) during the month of June 2013-April 2015. The patients were in the age group of 25-70 years and had the complaints of chest pain/chest discomfort, breathlessness, vomiting, sweating, and near syncope/syncope variably.

Results: This study shows that in patients with acute coronary artery syndromes, a maximum number of patients (90%) presented with chest pain as a symptom. Majority were in the age group of 51-60 years (40%) followed by 61-70 years (36%) age group. Majority of them (42%) had anterior wall (ST elevation myocardial infarction) transmural infarct. Majority of them were in lower socioeconomic status group. Vegetarian diet rich in carbohydrates is the staple diet. It might be one of the factors for increased triglyceride levels in this group of patients.

Conclusion: Sedentary lifestyle, low socioeconomic status, smoking, diabetes, and hypertension are risk factors for acute coronary syndromes.

Key words: Acute coronary syndrome, Lipid profile, Low-density lipoprotein

INTRODUCTION

Acute coronary syndrome is one of the leading cause of morbidity and mortality in the world today. There has been constant effort on the part of medical researchers to analyze this problem and search for factors that may aid in its prevention.

Elevated blood cholesterol level is a main risk factor of atherosclerosis process, which underlies the development of coronary heart disease (CHD), including acute coronary syndrome. 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.¹ LDL-C is very atherogenic (a very atherogenic lipoprotein)

and it should be decreased and represents the major cause of CHD. The correlation between elevated LDL-C level and CHD development should be observed as a multistep process, which starts from the young age.²⁻⁴ Plaque rupture or erosion usually leads to acute coronary syndrome (acute myocardial infarction [MI], unstable angina (UA) pectoris, and sudden death caused by CHD).⁵⁻⁸

The second cholesterol component is high-density lipoprotein cholesterol (HDL-C). Normally, it is 20-30% of TC. 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.⁹

Correlation between blood triglyceride (TG) level and CHD may be derived from various mechanisms such as TGs cause more atherogenic LDL-C and cause higher clearance rate of HDL-C, which finally causes low HDL-C level. TGs may cause endothelial dysfunction and may stimulate macrophages migration into endothelium. It may also stimulate vascular endothelium to promote thrombogenic mediator synthesis, for example, plasminogen activator

Access this article online



www.ijss-sn.com

Month of Submission : 05-2017
Month of Peer Review : 06-2017
Month of Acceptance : 07-2017
Month of Publishing : 07-2017

Corresponding Author: Madavaram Sreelatha, Department of General Medicine, Mahatma Gandhi Memorial Hospital, Warangal, Telangana, India. E-mail: haritv2002@gmail.com

inhibitor (PAI-1).¹⁰ In this study, which component of the triad lipid that has more important role and frequently found in patients with acute coronary syndrome, focusing on HDL-C.

Aims and Objectives

1. The aim of the present study is a clinical study of lipid profile patterns in patients admitted with acute coronary syndrome (UA/non-ST elevation myocardial infarction [NSTEMI]/ST elevation myocardial infarction [STEMI]).
2. It is a prospective study of 50 cases over 2 years in the MGM Hospital, Warangal. The age groups of patients from 25 to 70 years are included in the present study.
3. The study emphasizes on lipid profile pattern.
4. To study the risk factors that effect lipid profile pattern in acute coronary syndromes.

MATERIALS AND METHODS

The present study was undertaken in the Department of Cardiology/General Medicine in the MGM Hospital, Warangal district. A total of 50 cases were studied, which were admitted consecutively (not picked up at random) during the month of June 2013-April 2015.

The patients were in the age group of 25-70 years and had the complaints of chest pain/chest discomfort, breathlessness, vomiting, sweating, and near syncope/syncope variably. The symptoms suggestive of acute coronary syndrome.

Inclusion Criteria

1. Cases are studied, which are admitted consecutively (not picked up at random).
2. The patients are taken in the age group of 25-70 years and had the complaints of chest pain/chest discomfort, breathlessness, vomiting, sweating, and near syncope/syncope variably.
3. Lipid profile samples are taken within 24 h of onset of symptoms.

Exclusion Criteria

1. The patients <25 years and more than 70 years are excluded.
2. The patients with previous history of MI are excluded.
3. Acute coronary syndrome that occur secondary to other reasons such as anemia, trauma or noncardiac surgery is excluded.

After recording the complaints and history of the patients, they were subjected to computerized electrocardiogram. ST elevation, convex in nature of more than 2 mm in the chest leads or 1 mm in the limb leads in at least two consecutive

leads, convex in nature (or) ST elevation with “T” wave inversion (or) ST elevation with “T” wave inversion along with a forming “q” wave, considered as diagnostic of acute coronary syndrome.

These patients were subjected to 2D echocardiography and regional wall motion abnormalities are recorded. For these patients, creatinine phosphokinase (CPK-MB) levels and troponin levels are estimated. The serum sample for lipid profile was collected 14 h after the patient’s last oral intake of solids/liquids (excluding water to take aspirin tablet at the time of admission) but within 24 h of onset of symptoms (to eliminate the lipid profile changes due to autonomic system activity if serum is collected after 24 h).

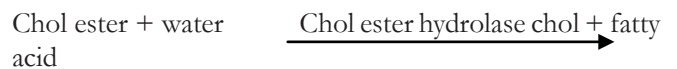
Methods of Estimation of Lipid Profile Patterns in this Study

The lipids are estimated using the semi autoanalyzer of Chem – 7 using the Transosi.

Procedures

The slide is a multilayered film in a plastic support, containing all reagents necessary to determine lipid levels in serum/plasma. A 10 µL drop of specimen is deposited on the slide. The sample spreads evenly and undergoes a series of reactions in the slide to produce a colored compound. Intensity of color is proportional to the amount of lipid in a sample. The reagents vary with the fraction of lipid to estimated.

Reaction Sequence



Before the collection of serum sample for lipid profile 100 ml of normal saline with streptokinase/heparin was given intravenously for transmural infarcts, no IV fluids was given for non-transmural infarcts.

RESULTS

- Admitted 50 inpatients in MGM Hospital, Warangal with acute coronary syndromes, the results are as follows:
- The present study consisted of:
 - Anterior wall MI - 21 (42%)
 - Inferior wall MI - 11 (22%)
 - Antero-lateral wall MI - 4 (8%)
 - Anterior wall NSTEMI - 3 (6%)

- Inferior wall NSTEMI - 2 (4%)
- UA - 9 (18%)

Majority of the patients (42%) had anterior wall MI, then followed by inferior wall MI (22%) and unstable angina (18%).

1. TC average - 185.68 mg%
2. LDL-C average -116.75 mg%
3. TGs average - 179.62 mg%
4. HDL-C average - 32.38 mg% (Table 1).

1. The TC levels are found to be more in the males and TGs are to be more in the females.
2. HDL-C levels not much change between males and females.
3. LDL-C levels more in males than females (Table 2).

DISCUSSION

In the present study, 50 cases were admitted with acute coronary syndrome were studied. For their mode of presentation, risk factors for atherosclerosis with special emphasizes on their lipid profile patterns (Tables 3-8).

The age group of the patients from 25 to 70 years. Out of 50 cases, there were 19 female patients and 31 male patients. All of them were from North Telangana districts (Adilabad, Karimnagar, and Warangal).

Table 1: Average lipid profile fractions in patients

Lipid fraction	TC	LDL	HDL	TG
Mean in mg%	185.68	116.75	32.38	179.62

TC: Total cholesterol, LDL: Low-density lipoprotein, HDL: High-density lipoprotein, TG: Triglycerides

Table 2: Average lipid profile fractions in males and females

Lipid fraction	Male (mean mg%)	Female (mean mg%)
TC	187.88	182.11
LDL	121.46	109.07
HDL	31.58	33.68
TG	153.10	222.89

TC: Total cholesterol, LDL: Low-density lipoprotein, HDL: High-density lipoprotein, TG: Triglycerides

Table 3: Age-wise distribution of patients

Age range (years)	No. of patients (%)
20-30	1 (2)
31-40	1 (2)
41-50	10 (20)
51-60	20 (40)
61-70	18 (36)

1. Majority of the patients (90%) presented with chest pain as the symptom.
2. Majority of the patients are in the age group of 51-60 years (40%), then followed by the age group of 61-70 years (36%) (Table 3).
3. Majority of the patients (42%) had anterior wall MI, then followed by inferior wall MI (22%) and unstable angina (18%) (Table 4).

Table 4: Distribution of patients into various types of acute coronary syndromes

Type of acute coronary syndrome	No. of patients (%)
Antero lateral wall MI	4 (8)
Anterior wall NSTEMI	3 (6)
Anterior wall MI	21 (42)
Inferior wall NSTEMI	2 (4)
Inferior wall MI	11 (22)
Unstable angina	9 (18)

MI: Myocardial infarction, NSTEMI: Non-ST elevation myocardial infarction

Table 5: Distribution of total cholesterol in patients

Value in mg%	No. of patients (%)
>200	18 (36)
160-200	15 (30)
<160	17 (34)

Table 6: Distribution of LDL-C in patients

Value in mg	No. of patients (%)
>160	6 (12)
130-160	11 (22)
100-130	20 (40)
<100	13 (26)

LDL-C: Low-density lipoprotein cholesterol

Table 7: Distribution of HDL-C in patients

Value in mg	No. of patients (%)
>60	0 (0)
35-60	27 (54)
<35	23 (46)

HDL-C: High-density lipoprotein cholesterol

Table 8: Distribution of triglyceride cholesterol in patients

Value in mg	No. of patients (%)
>400	2 (4)
200-400	10 (20)
160-200	9 (18)
<160	29 (58)

Table 9: Study by the Department of Medicine in Monilek Hospital and Research Center, Mumbai

Age	Mean TC	Present study	LDL-C	Present study	HDL-C	Present study	TG	Present study
20-29	157	209	93.8	100.4	42.5	37	106.9	158
30-39	177.6	188	108	107	45	35	122	180
40-49	181	181.17	110	113.77	43.2	29.5	138.8	168
50-59	171	189.44	98.3	122.94	43.6	32.62	145.3	169.57
60+	167.9	182	99.5	112.66	43.1	32.62	126.4	194

LDL-C: Low-density lipoprotein cholesterol, HDL-C: High-density lipoprotein cholesterol, TC: Total cholesterol, TG: Triglycerides

- About 36% of patients had TC >200 mg%, 30% had between 160 and 200 mg%, and 34% had <160% (Table 5).
- About 4% of patients had TG levels >400 mg%, 20% of patients had TG levels 200-400 mg%, 18% of patients had TG levels 160-200 mg%, and 58% of patients had TG levels >160 mg% (Table 8).
- About 82% of the patients had LDL/HDL-C >2.5, 72% of the patients had TC/HDL-C >4.5, 50% of the patients had triglyceride-rich lipoproteins (TRL)/HDL-C >5.75 (Tables 6 and 7).
- Most of the patients having more mean lipid profile fractions and acute coronary syndromes in sedentary life style (62%), low socioeconomic status (52%), smokers (58%), hypertensive (72%), and diabetes (72%).

A study done at MGM, New Bombay Hospital, Department of Cardiology using carotid intima/media thickness of >0.8 as a marker for atherosclerosis. About 27% of patients with LDL/HDL-C >2.5 had atherosclerosis while only 10% of patients with ratio <2.5 had atherosclerosis. TC/HDL-C >4.5 and TG/HDL-C >5.75 were associated with intimal thickening.

In the present study:

- 82% of the patients had LDL/HDL-C >2.5
- 72% of the patients had TC/HDL-C >4.5
- 50% of the patients had TRL/HDL-C >5.75.

In a study in Chennai, 75% of patients with myocardial infarct had TC <200 mg%. In another study, a still lower level of <150% was reported. In South Africa, 62% of Indian coronary artery disease (CAD) patients had high TC while their HDL-C was lower than native Africans. In UK, Indians with CAD had TC lower than the Whites.

In the present study, 36% of patients had TC >200 mg%, 30% had between 160 and 200 mg%, and 34% had <160%.

TGs

The role of it in CAD is controversial, but Framingham study, Paris prospective study, and Edinburgh and Stockholm study suggested hypertriglyceridemia to be a risk factor. Data from UK and USA also revealed that 50% of Indian CAD patients had high TGs levels than native Whites.

In the present study:

- 4% of patients had TG levels >400 mg%
- 20% of patients had TG levels 200-400 mg%
- 18% of patients had TG levels 160-200 mg%
- 58% of patients had TG levels >160 mg% (Table 9).

CONCLUSIONS

This study shows that in patients with acute coronary artery syndromes, maximum number of patients (90%) presented with chest pain as a symptom. Majority were in the age group of 51-60 years (40%) followed by 61-70 years (36%) age group. Majority of them (42%) had anterior wall (STEMI) transmural infarct. Majority of them were in lower socioeconomic status group. Vegetarian diet rich in carbohydrates is the staple diet. It might be one of the factors for increased TG levels in this group of patients.

TC levels crossed 200 mg% in only 36% of the patients, showing that estimating the TC level is not sufficient to assess the risk factor for atherosclerosis. Total LDL-C levels crossed 160 mg% in 12% of patients. HDL-C levels are <35 mg% in 46% of patients, and levels are between 35 and 60 mg% in 54% of patients. TGs crossed 160 mg% (studies in India showed that TGs above this level is considered a risk factor for Indians compared with the Westerners) in 42% of the patients. Hence, TC and LDL-C levels are within normal limits in majority of the patients, but HDL-C levels are below the required levels and TGs are above the normal levels in majority of the patients.

Female patients were found to have more TG and HDL-C levels than male patients. TC and LDL-C levels are more in the male patients.

TC, LDL-C, and TG levels are found to be more in smokers than non-smokers. HDL-C levels are found to be slightly higher in smokers than nonsmokers, which probably might be due to their concomitant occasional alcohol intake.

TC/HDL-C was >4.5 in 72% of patients.
LDL/HDL-C was >2.5 in 82% of patients.
TG/HDL-C was >5.75 in 50% of patients.

This once again emphasizes that low levels of HDL-C are the major risk factor in the lipid abnormality.

Sedentary lifestyle, low socioeconomic status, smoking, diabetes, and hypertension are also risk factors for acute coronary syndromes.

These patients are presumed to have other causative risk factors such as increased homocysteine levels, increased lipoprotein (a) levels, increased fibrinogen levels, increased PAI levels, and decreased plasminogen levels which are not measured as a risk factor in this study.

REFERENCES

1. Third Report of the National Cholesterol Education Program (NCEP), Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III/ATP III). (Final Report). National Institutes of Health. National Heart, Lung, and Blood Institute. NIH Publication No.02-5215; 2002.
2. Sary HC, Blankenhorn DH, Chandler AB, Glagov S, Insull W Jr, Richardson M, *et al.* A definition of the intima of human arteries and of its atherosclerosis prone regions: A report from the committee on vascular lesions of the council on arteriosclerosis. American heart association. *Circulation* 1992;85:391-405.
3. Sary HC, Chandler AB, Glagov S, Guyton JR, Insull W Jr, Rosenfeld ME, *et al.* A definition of initial, fatty streak, and intermediate lesions of atherosclerosis: A report from the committee on vascular lesions of the council on Arterio-sclerosis, American heart association. *Arterioscler Thromb* 1994;14:840-56.
4. Sary HC, Chandler AB, Dinsmore RE, Fuster V, Glagov S, Insull W, *et al.* A definition of advanced types of atherosclerotic lesions and histological classification of atherosclerosis; A report from the committee on vascular lesions of the council on Arteriosclerosis, American heart association. *Circulation* 1995;92:1355-74.
5. Libby P. Molecular bases of the acute coronary syndromes. *Circulation* 1995;91:2844-50.
6. Libby P, Schoenbeck U, Mach F, Selwyn AP, Ganz P. Current concepts in cardiovascular pathology: The role of LDL cholesterol in plaque rupture and stabilization. *Am J Med* 1998;104:14S-8.
7. Fuster V, Fayad ZA, Badimon JJ. Acute coronary syndromes: Biology. *Lancet* 1999;353:SH5-9.
8. Thérout P, Fuster V. Acute coronary syndromes: Unstable angina and non-Q-wave myocardial infarction. *Circulation* 1998;97:1195-206.
9. Castelli WP. Cholesterol and lipids in the risk of coronary artery disease. the Framingham heart study. *Can J Cardiol* 1988;4:5A-10.
10. Hokanson J, Austin M. Plasma triglyceride and coronary risk. A metanalysis. *Circulation* 1993;88:501-10.

How to cite this article: Kumar VS, Sreelatha M. Clinical Study of Lipid Profile Pattern in Acute Coronary Syndromes. *Int J Sci Stud* 2017;5(4):174-178.

Source of Support: Nil, **Conflict of Interest:** None declared.