Lipid Profile of Patients With Acute Coronary Syndrome in Sanjiwani Regional General Hospital

Cokorda Istri Padmi Suwari[1], Cokorda Bagus Nurparma Putra[2]

[1]Faculty of Medicine and Health Sciences, Warmadewa University
Cokistripadmiswari[at]gmail.com

[2]Faculty of Medicine, Udayana University
Baguscokorda[at]gmail.com

Abstract: *Backgrounds: Acute Coronary Syndrome (ACS) is one of main cardovascular diseases. It is recommended that the lipid profile should be checked in all patients hospitalized due to ACS. An accurate knowledge of baseline lipid levels may affect the initiation of lipid-lowering therapy. Objective: This study aimed to evaluated blood lipid profile in patients with ACS that will give us knowledge about the baseline levels of lipid profile. Methods: Design of this research is a descriptive cross-sectional study. The subjects are hospitalized patients with ACS were treated at Sanjiwani Regional General Hospital in 2019 until February 2021. Total samples are 94 and they were selected by total sampling. Data about age, gender, and lipid profile were collected from medical record. Received datas were analyzed using descriptive statistics. Results: The test results showed that among 94 ACS patients about 74.5% patients were male, 34% patients in the age range of 51-60 years, 78.7% patients with total cholesterol less than 200 mg/dl, 58.5% patients with optimal LDL cholesterol level (< 100 mg/dl), 64.9% patients with low HDL holesterol level < 40 mg/dl, and 83% patients with triglycerides level less than 150 mg/dl. Conclusion: Based on this results, it can be concluded that the most common ACS patients are male and in the age range of 51 – 60 years. Most common ACS patients have total cholesterol less than 200 mg/dl, optimal LDL cholesterol (<100 mg/dl), low HDL cholesterol (40 mg/dl), and triglycerides less than 150 mg/dl.*

Keywords: acute coronary syndrome, lipid profile, LDL cholesterol, HDL cholesterol

1. Introduction

Acute Coronary Syndrome (ACS) is one of main cardiovascular diseases because of its high hospitalization rates and high mortality rates. This disease occurs because of acute ischemia in the heart due to rupture of atheromatous plaques on the walls of coronary arteries then causing obstruction of blood flow.ACS subsumes a spectrum of clinical presentations including unstable angina pectoris (UAP), non-ST elevation miokard infark (NSTEMI) and ST-elevation miokard infark (STEMI). This condition accounts for two million hospitalizations per year and 30% of all deaths. There was increased in coronary operations (83%) at Harapan Kita National Heart Center in 2000 – 2009. ACS is also estimated to reach 23.3 million deaths in the world by 2030.[1-4]

Elevated blood cholesterol level is a main risk factor of atherosclerosis process, which underlies the development of coronary heart disease including ACS. It is recommended that the lipid profile should be checked in all patients hospitalized due to ACS.Low Density Lipoprotein (LDL) cholesterol is the largest component of total cholesterol. LDL cholesterol is very atherogenic and it should be decreased. The second cholesterol component is High Density Lipoprotein (HDL) cholesterol which is 20 – 30% of total cholesterol. HDL cholesterol is one of important lipoproteins and very potential to prevent atherosclerosis by changing the biology of arterial wall lesion, without being affected by LDL cholesterol level. Triglycerides may cause endothelial dysfunction and may stimulate macrophages migration into endothelium. It may also stimulate vascular endothelial to promote thrombogenic mediator synthesis.[5-6]

An accurate knowledge of baseline lipid levels may affect the initiation of lipid-lowering therapy and the patient's willingness to adhere to a recommendation for long-term lipid-lowering therapy. Thus, this studyaims to evaluate blood lipid profile in patients with ACS that will give us knowledge about the baseline levels of lipid profile.

2. Methods

This study was a descriptive cross-sectional study with total sampling methods. There were 139 hospitalized patients with ACS who presented in the Cardiology Departement of Sanjiwani Regional General Hosiptal, from 2019 until February 2021. All patients with age > 18 years with diagnose of ACS were recruited. Only those patients were eligible for this study who had their diagnoses confirmed through clinical evaluation, electrocardiography, and cardiac enzymes investigations. Patients without recent lipid profile repport were excluded from this study.SPSS-20 was used for data analysis. Descriptive statistics were applied on age, gender, and lipid profile. Received datas were presented in narrative and tables.

3. Results

There were 139 patients with ACS who hospitalized in Sanjiwani Regional General Hospital and 45 patients were excluded because unreported lipid profile. Total 94 patients were participated in this study. There were 70 male (74.5%) and 24 female (25.5%), who had complete lipid profile records including total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides (Table 2).

The mean value of age was 63.56 ± 10.602, total cholesterol level was 166.01 ± 41.404, LDL cholesterol was 96.60 ± 33.001, HDL cholesterol was 36.27 ± 13.853, and triglycerides was 120.16 ± 47.847 (Table 1).

Table 1: Descriptive statistics of age and lipid profile in ACS

	Minimum	Maximum	Mean	SD
Age	42	89	63.56	10.602
Total Cholesterol	79	291	166.01	41.404
LDL Cholesterol	33	218	96.60	33.001
HDL Cholesterol	11	94	36.27	13.853
Triglycerides	47	301	120.16	47.847

Table 2: Distribution of patients with ACS based on gender

Gender	Number of Patients	Percentage (%)
Male	70	74.5
Female	24	25.5
Total	94	100

In this study, among 94 patients of ACS, 32 (34%) patients in the age range of 51 – 60 years and only 5 patients (5.3%) in the age range of 81 – 90 years (Table 3).

Table 3: Distribution of patients with ACS based on age

Age (years)	Number of Patients	Percentage (%)
41-50	9	9.6
51-60	32	34
61-70	27	28.7
71-80	21	22.3
81-90	5	5.3
Total	94	100

There were only 4 patients (4.3%) with high total cholesterol (≥ 240 mg/dl), 74 patients (78.7%) with total cholesterol less than 200 mg/dl and 16 patients (17%) with borderline total cholesterol level between 200 – 239 mg/dl (Table 4).

Table 4: Distribution of total cholesterol level in ACS based on NCEP/ATP III criteria

Total Cholesterol (mg/dl)	Number of Patients	Percentage (%)
≥ 240	4	4.3
200-239	16	17
< 200	74	78.7
Total	94	100

There was only 1 patient (1.1%) who had very high LDL cholesterol level more than 190 mg/dl. Among 94 patients, 2 patients (2.1%) with high LDL cholesterol level between 160 – 189 mg/dl, 8 patients (8.5%) with LDL cholesterol level between 130 – 159 mg/dl, 28 patients (29.8%) with LDL cholesterol level between 100 – 129 mg/dl, and 55 patients (58.5%) with optimal LDL cholesterol level (< 100 mg/dl) (Table 5).

Table 5: Distribution of LDL cholesterol level in ACS based on NCEP/ATP III criteria

LDL Cholesterol (mg/dl)	Number of Patients	Percentage (%)
≥ 190	1	1.1
160-189	2	2.1
130-159	8	8.5
100-129	28	29.8
< 100	55	58.5
Total	94	100

Patients with low HDL holesterol level < 40 mg/dl were 61 patients (64.9%) of all ACS patients and only 5 patients (5.3%) with high HDL cholesterol level (≥ 60 mg/dl) (Table 6).

Table 6: Distribution of HDL cholesterol level in ACS based on NCEP/ATP III criteria

HDL Cholesterol (mg/dl)	Number of Patients	Percentage (%)
≥ 60	5	5.3
40-59	28	29.8
< 40	61	64.9
Total	94	100

Among of all patients ACS, there were 78 patients (83%) with triglycerides level less than 150 mg/dl, 10 patients (10.6%) with triglycerides level between 150 – 199 mg/dl, 6 patients (6.4%) with high triglycerides level (200 – 499 mg/dl), and no one patient with very high triglycerides level (> 500 mg/dl) (Table 7).

Table 7: Distribution of triglycerides level in ACS based on NCEP/ATP III criteria

Triglycerides (mg/dl)	Number of Patients	Percentage (%)
>500	0	0
200-499	6	6.4
150-199	10	10.6
< 150	78	83
Total	94	100

4. Discussion

Heart problems are serious issue as for as health care facilities concern. South East Asia has a very high inidence of coronary artery disease prevalence in comparison to western wolrd population. This may due to different risk factors, genetic factors, and dietary habits.[4] The early knowledge of lipid profile of patients with ACS might allow an early classification of eventual dyslipidemia and will be helpful in selection of lipid lowering therapy.[6]

This study was noted that in patients with ACS, the majority of patients are male (74.5%) and a mean age of 63.56 ± 10.602 years. Our study population showed that the main alteration in lipid levels was low HDL cholesterol in a high percentage of patients (64.9%). Interestingly the percentage of patients with low LDL cholesterol (<100 mg/dl) was 58,5%, about 78,7% patients had total cholesterol less than 200 mg/dl, and about 83% patients had triglycerides level less than 150 mg/dl. This results are consistent woth previous studies. In one of those studies, according study of Sachdeva and his colleagues, patients hospitalized with some type of CAD approximately half had LDL cholesterol levels <100 mg/dl at admission and more than half had HDL cholesterol levels <40 mg/dl at admission. These findings have clinical relevance for the observations shown by previous studies in patients with stable ischemic heart disease, in which a low HDL cholesterol was associated with increased risk for death and nonfatal myocardial infarction, even among statin-treated patients who achieve LDL cholesterol <70 mg/dl.[7-8]

Low HDL levels have been considered to be an important risk factor for development of cardiovascular disease. According study of Khalid Al-Rasad and his colleagues,

approximately 62% of ACS patients had low HDL cholesterol levels. The strongest contributors to low HDL cholesterol noted in this study were smoking, diabetes mellitus, morbid obesity, previous cardiac event and renal dysfunction.[9-12]

The National Cholesterol Education Programme (NCEP) has focused on reduction of serum levels of LDL cholesterol for better primary and secondary ischaemic heart disease prevention and cure. LDL cholesterol is major cause of coronary artery atheroma formation. A patient of ACS has a very high risk of future cardiovascular events and requires a very low target level of LDL cholesterol. Many studies including meta analyses and sub-analyses have proven the clinical benefits of lowering LDL cholesterol < 70 mg/dl and triglycerides < 150 mg/dl. The benefit of LDL cholesterol lowering has been achieved with the use of combination of lifestyle modification and drug therapy.[4,6]

There are several limitations in this study. We did not excluded patients with history of statin therapy, thus the results of lipid profile in patients ACS incompatible with literature. This study was done with small study population. Further research can be carried out with different research methodologies and more samples.

5. Conclusion

This study concluded that male and age range between 51 – 60 years are in a high percentage of patients. Among 94 ACS patients, it is found that the most common patients are total cholesterol less than 200 mg/dl, optimal LDL cholesterol(<100 mg/dl), low HDL cholesterol (<40 mg/dl), and triglycerides less than 150 mg/dl.

References

[1] Bhatnagar P, Wickramasinghe K, Williams J, *et al*.,"The epidemiology of cardiovascular disease in the UK 2014", BMJ, 101, pp. 1182 – 1189, 2015.

[2] Perhimpunan Dokter Spesialis Kardiovaskular Indonesia,"Pedoman Tata Laksana Sindrom Koroner Akut Edisi Keempat", Jurnal Kardiologi Indonesia, pp. 2-71, 2018.

[3] Timmis A, "Acute coronary syndromes", BMJ,351, pp. 1 – 13, 2015.

[4] Muzaffar H, "Acute Coronary Syndrome; Frequency of Raised LDL Cholesterol in Patients", The Professional Medical Journal, 24(12), pp. 1818-1822, 2017.

[5] Manurung D, "Lipid Profile of Acute Coronary Syndrome Patients Hospitalized in ICCU of Cipto Mangunkusumo Hospital", Acta Med Indones-Indones J Intern Med, 38(4), pp. 196-201, 2006.

[6] Malik MN, Malik SN, Rahman MU, *et al*., "Association of Dyslipidemia and Acute Coronary Syndrome in Patients Admitted to Ccu, PIMS", Ann Pak Inst Med Sci, 10(3), pp. 155-161, 2014.

[7] Sachdeva A, Cannon CP, Deedwania PC, *et al*.,"Lipid levels in patients hospitalized with coronary arterry disease: an analysis of 136.905 hospitalizations in Get With The Guidelines", Am Heart J, 157(1), pp. 111-117e2, 2009.

[8] Pacheco HG, Barron JV, Vallejo M,*et al*., "Prevalence of Conventional Risk Factors and Lipid Profiles in Patients with Acute Coronary Syndrome and Significant Coronary Disease", Dovepress, 10, pp. 815-823, 2014.

[9] Khan MN, Khan TU, Din SU, "Frequency of Low Levels of High Density Lipoprotein Cholesterol in Patients with Acute Coronary Syndrome", The Professional Medical Journal, 26(12), pp. 2054-2057, 2019.

[10] Al-Rasadi K, Al-Zakwani, Zubaid M, *et al*.,"Prevalence, predictors, and impact of low high-density lipoprotein cholesterol on in-hospital outcomes among acute coronary syndrome patients in the middle east", Open Cardiovasc Med J, 5, pp. 203-209, 2011.

[11] Zahara F, Syafri M,Yerizel E, "Gambaran Profil Lipid pada Pasien Sindrom Koroner Akut di Rumah Sakit Khusus Jantung Sumatera Barat Tahun 2011-2012", Jurnal Kesehatan Andalas, 3(2), pp. 167-172, 2013.

[12] Diputra MD, Wita W, Aryadana W, "Karakteristik Penderita Sindroma Koroner Akut di RSUP Sanglah Denpasar Tahun 2016", E-Jurnal Medika, 7(10), pp. 1-10, 2018.

Author Profile

Cokorda Istri Padmi Suwari, received MD degrees in Faculty of Medicine and Health Sciences Warmadewa University in 2018.

Cokorda Bagus Nurparma Putra, received MD degrees in Faculty of Medicine Udayana University in 2017.