



# PROCEEDINGS

## The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

Cutting Edge Innovations for Sustainable Development Goals

Universitas Muhammadiyah Yogyakarta (Indonesia)

October 13 - 14 2020

<https://icosi.umy.ac.id/>

## Focal Conferences



- ✔ (ICPU) The 2nd International Conference on Pharmaceutical Updates
- ✔ (ICOMS) The 6th International Conference on Management Sciences
- ✔ (ICLAS) The 9th International Conference on Law and Society
- ✔ (ICMHS) The 4th International Conference Medical and Health Sciences
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- ✔ (IConARD) International Conference on Agribusiness and Rural Development
- ✔ (ISHERSS) The 2nd International Symposium on Social Humanities Education and Religious Sciences
- ✔ (ICONPO) The 10th International Conference on Public Organization
- ✔ (DREAM) The 5th Dental Research and Exhibition Meeting
- ✔ (ICHA) The 5th International Conference on Hospital Administration
- ✔ (ICOSA) The 3rd International Conference on Sustainable Agriculture





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## Preface by the Chairperson of the 4<sup>th</sup> ICoSI 2020



**Dr. Yeni Rosilawati, S.IP. S.E., MM.**

Assalamu'alaikum Wr. Wb.

All praise is due to Allah, the Almighty, on whom we depend for sustenance and guidance. Prayers and peace be upon our Prophet, Muhammad SAW, his family and all of his companions.

On behalf of the organizing committee, it is my pleasure and privilege to welcome the honourable guests, distinguished keynote & invited speakers, and all the participants.

With the main theme of “Cutting-Edge Innovations on Sustainable Development Goals (SDGs)”, the 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020 serves as a forum to facilitate scholars, policy makers, practitioners, and other interested parties at all levels from Indonesia and abroad to present their novel ideas, promote cutting-edge research, and to expand collaboration network. The conference has about 1373 participants participating from more than 8 countries 4 continents all over the world, making this conference a truly international conference in spirit.

This multidisciplinary conference was first held in 2012 and has undertaken various changes and adopted to the current technological trends of our education system. From having this conference with just 175 participants back in 2012 we have come a long way in making the conference a huge success with more than 1373 participants participating in this two-day conference.

Formerly, this conference consisted of only 9 (nine) focal conferences. This year, there are 14 focal conferences from various disciplines, namely: 1) The 2<sup>nd</sup> International Conference on Pharmaceutical Updates (ICPU), 2) The 6<sup>th</sup> International Conference on Management Sciences

(ICoMS), 3) The 9<sup>th</sup> International Conference on Law and Society (ICLAS), 4) The 4<sup>th</sup> International Conference Medical and Health Sciences (ICMHS), 5) The 6<sup>th</sup> International Conference for Accounting and Finance (ICAF), 6) The 2<sup>nd</sup> International Language and Education Conference (ILEC), 7) The 2<sup>nd</sup> International Conference on Nursing (ICONURS), 8) The International Conference on Information Technology, Advanced Mechanical and Electrical Engineering (ICITAMEE), 9) The 2<sup>nd</sup> International Conference of Agribusiness and Rural Development (IConARD), 10) The 10<sup>th</sup> International Conference on Public Organization (ICONPO), 11) The 2<sup>nd</sup> International Symposium on Social Humanities Education and Religious Sciences (ISHERSS), 12) The 5<sup>th</sup> Dental Research and Exhibition Meeting (DREAM), 13) The International Conference on Hospital Administration (ICHA), and 14) The 3<sup>rd</sup> International Conference on Sustainable Agriculture (ICoSA).

Accordingly, We are proud to announce that this year, the 4<sup>th</sup> ICoSI 2020 breaks the Museum Rekor-Dunia Indonesia (MURI) record as the Virtual Multidisciplinary Conference with the Largest Number of Area of Fields in Indonesia

In addition, this year, this conference holds special value since this is the first conference in the history of our university where the entire conference is taking place remotely on a digital platform through the use of advance technologies due to the Covid-19 Pandemic.

I would take this opportunity to express my highest respect to the Rector of Universitas Muhammadiyah Yogyakarta, Dr. Gunawan Budiyanto who gave approval and ensured the maximal support from all the faculty members of Universitas Muhammadiyah Yogyakarta (UMY) that made this event a big success. In addition, my appreciation goes to all the support teams who have provided their valuable support and advice from planning, designing and executing the program.

Let me conclude my speech by encouraging the delegates to participate with an increasing number in all the activities and discussions through the digital platforms for the next two days. I wish everyone a successful, safe, and fruitful conference.

Thank you!

Wassalamu'alaikum Wr. Wb.

Yogyakarta, Indonesia, 14 October 2020





## Welcoming Remarks by the Rector of Universitas Muhammadiyah Yogyakarta



**Assoc. Prof. Dr. Gunawan Budiyanto**

Innovation is the beginning of the development of technology, and technology is a development machine that is expected to provide benefits to humans and provide the smallest possible impact on environmental quality. In the concept of sustainable development, development must improve the quality of human life without causing ecological damage and maintain the carrying capacity of natural resources.

International Conference on Sustainable Innovation (ICoSI) is an international conference which is an annual conference held by the University of Muhammadiyah Yogyakarta (UMY), Indonesia. In 2020 this raises the issue of "Cutting-Edge Innovations on Sustainable Development Goals." Therefore, on behalf of all UMY academics, I would like to congratulate you on joining the conference, hoping that during the Covid-19 Pandemic, we can still provide suggestions and frameworks for achieving sustainable development goals.

# About The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

## *Cutting Edge Innovations for Sustainable Development Goals*

The 2030 Agenda for Sustainable Development is enacted by the United Nations as a shared blueprint for peace and prosperity for people and the planet, now and into the future. It consists of strategies to improve health and education, reduce inequality, and spur economic growth while also conserving natures by 2030.

This year, however, at the first one-third of its timeline, the SDG Reports shows that the outbreak of COVID-19 did hinder the achievement, or at least decelerate the progress of achieving the 17 goals. In fact, according to the report, “some number of people suffering from food insecurity was on the rise and dramatic levels of inequality persisted in all regions. Change was still not happening at the speed or scale required”, accordingly.

Therefore, in this event of pandemic, the quantity and quality of research, innovation, and more importantly multi-disciplinary collaboration are indispensable. Furthermore, there needs to be clear ends of those works. That is how those research are applicable and benefits directly to the society. That is how those research is incorporated as the drivers of policy making, and used practically in the society. Hence, the stakeholders especially the triple helix of higher education institution, government, and industry must be re-comprehended and supported to reach the common goal of the SGD.

International Conference on Sustainable Innovation (ICoSI) has been essentially attempting to strengthen this regard since its first establishment. One of the goals of ICoSI is to provide primarily a platform where scholars, practitioners, and government could grasp the development and trends of research. Hopefully, meeting these actors altogether would result in stronger collaboration, sophisticated and advantageous research, and brighter ideas for further research. Based on these reasoning, this year, the 4th ICoSI 2020 UMY is themed ‘Cutting-edge Innovations for Sustainable Development Goals’.

Improving from last year conference which brought nine focal conference, this year ICoSI 2020 UMY brings 14 disciplines, from social sciences, natural sciences, and humanities. ICoSI 2020 received as much as 1005 papers. The paper works submitted in ICoSI 2020 UMY will be published in Atlantis Proceedings, IOP Proceedings, National/International Journals, and ICoSI ISBN-indexed Proceedings.

Nevertheless, ICoSI believes that publication is only the beginning of research dissemination. The publications will enhance the chance of the research known by wider audience, and then used, applied, and incorporated at either system, institutional, or personal level of human lives.



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# TRACK ECONOMICS, LAW, EDUCATION, SOCIAL, AND HUMANITIES



# Level of Lipoprotein (a) as A Predictive Factor for Coronary Thrombus

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## ABSTRACT

Cardiovascular disease (CVD) is the number one cause of death in the world, which is estimated to claim 17.9 billion lives each year. Four out of 5 deaths from CVD are caused by heart attack and stroke, one third of those deaths occur under the age of 70. Traditional risk factors such as smoking, hypertension, diabetes, dyslipidemia are reported to affect only 50% of the prevalence and degree of coronary heart disease. Researchers have demonstrated other non-traditional risk factors for CVD; fibrinogen, homocysteine, tissue plasminogen activator (t-PA), and lipoprotein (a). It is also interesting that higher Lp (a) levels also trigger coronary thrombus and restenosis after balloon angioplasty intervention. This study aims to determine the relationship between Lp (a) levels and the presence of coronary thrombus in coronary heart disease patients at Dr. Sardjito Yogyakarta. This is a cross-sectional study. Study subjects were patients aged 20-60 years who underwent coronary angiography for STEMI, NSTEMI, unstable angina pectoris, and stable angina pectoris. The correlation between Lp (a) levels and the presence or absence of thrombus was tested using the Chi square test. The research subjects were 77 subjects (60 men and 17 women). The results showed differences in Lp(a) levels in subjects with coronary thrombus, although not statistically significant.

**Keywords :** *coronary heart disease, lipoprotein (a), coronary thrombus*

## 1. INTRODUCTION

Cardiovascular disease (CVD) is the number one cause of death in the world, which is estimated to claim 17.9 billion lives each year. Four out of 5 deaths from CVD are caused by heart attack and stroke, one-third of those deaths occur before age 70<sup>1</sup>.

Traditional risk factors such as smoking, hypertension, diabetes, dyslipidemia are reported to affect only 50% of the prevalence and degree of coronary heart disease. Researchers have demonstrated other non-traditional risk factors for CVD; fibrinogen, homocysteine, tissue plasminogen activator (t-PA), and lipoprotein (a)<sup>2</sup>.

Lipoprotein (a) is a plasma lipoprotein consisting of cholesterol-rich LDL particles with one molecule of apolipoprotein B100 and an additional protein, apolipoprotein (a), attached by disulfide bonds. Potentially increased Lp (a) levels increases the risk of CVD (i) via prothrombotic / anti-fibrinolytic effects because apolipoprotein (a) has structural homology with plasminogen and plasmin but lacks fibrinolytic activity and (ii) via accelerated atherogenesis as a result of optimal Lp (a) deposition with cholesterol, or both<sup>3</sup>.

Its pathophysiological uncertainty, and its varying levels according to different groups / races / ethnicities, Lp (a) have consistently aroused the interest of researchers. Although still not fully explained, Lp (a) may have a link between the atherosclerotic process and thrombosis. New facts about the interaction between Lp (a) and other risk factors such as LDL, HDL and homocysteine have also emerged in recent studies<sup>4</sup>.

Orneck *et al.*, (2011) mentioned other interesting things about Lp (a); higher levels of Lp (a) also induce

coronary thrombus and restenosis following interventional balloon angioplasty<sup>5</sup>.

This study aims to determine the relationship between Lp (a) levels and the presence of thrombus in coronary heart disease patients at Dr. Sardjito Yogyakarta. We hypothesize that elevated Lp (a) levels are positively associated with the presence of coronary thrombus.

## 2. MATERIALS AND METHODS

This research is research *cross-sectional*. The study subjects were patients with coronary heart disease with clinical presentation: acute coronary syndrome (STEMI, NSTEMI, UAP) who were treated at ICCU Dr. Dr. Sardjito and APS patients undergoing coronary angiography.

Criteria for study subjects were 20-60 years old, willing to participate in the study, not suffering from chronic renal failure requiring renal replacement therapy, severe congestive heart failure (NYHA class III-IV), liver cirrhosis, previous heart valve disease, acute stroke, acute complications. diabetes mellitus (KAD and HHS), acute exacerbation of COPD and pneumonia, sepsis, chronic inflammatory diseases, malignancies, blood clotting disorders, and autoimmune diseases and patients who are pregnant.

All patients who met the inclusion and exclusion criteria were enrolled in this study, blood serum samples were taken and immunohistochemical examinations were performed to determine Lp (a) levels. All patients then underwent coronary angiography. Thrombus presence was assessed by the SYNTAX Score.

The SYNTAX score was generated from a 12-question assessment of the characteristics of coronary angiography. The first three questions are the predominant



location of the lesion, the number of lesions and the number of blood vessels involved. The remaining nine questions concerned significant lesion complexity ( $\geq 50\%$ , length  $\geq 1.5$  mm), the length of the lesion, the position of the lesion, tortuous lesions, lesions on bifurcation, lesions on trifurcation, calcification, thrombus, and small or diffuse coronary vessels. Score calculation using the SYNTAX Score Calculator online at <http://www.syntaxscore.com/calc/syntaxscore/frameset.htm> to facilitate researchers and minimize score calculation errors.

History of disease, risk factors, laboratory data were obtained from patient interviews and medical records.

Data is presented in the form of mean and standard deviation. Data distribution test with Kolmogorov-Smirnov, while the relationship between Lp (a) levels and the presence or absence of thrombus was tested by Chi Square.

### 3. RESULTS AND DISCUSSION

The subjects of this study consisted of 60 (77.9%) male and 17 (22.1%) female, mean age  $54.48 \pm 7.63$  year. Most of the subjects were men, with the largest clinical presentation APS. Most of them are not in acute coronary syndrome condition. The most common risk factors for the subjects were: BMI which was not ideal ( $25.03 \pm 3.32$ ), hypertension (63.7%), dyslipidemia actually in 16.8% subjects only, ex-smokers in 41.5%, mostly without a family history of CAD. Although 31 subjects had triple coronary artery involvement (3VD) but most of them (66%) had low syntax scores  $<22$ . The average level of Lp (a) is  $32.78 \pm 11.28$  which is relatively high ( $> 20$  mg / dl) according to standard reference.

Therefore, we tried to analyze the basic characteristics of these subjects whether there is a difference between subjects with or without coronary thrombus.

Table 1. Univariate Analysis

Risk factor	Thrombus		p
	Yes	Not	
Age (years)	$54.54 \pm 12.8$	$57.48 \pm 8,057$	0.438
Gender			
Men	11	49	0.721
Women	2	15	
Clinical presentation			
STEMI	3	5	0.212
NSTEMI	1	5	
STEAM	2	3	
APS	5	43	
Recent Infarc	2	8	*
BMI (kg / m <sup>2</sup> )			
$<18.5$	0	1	0.091
$18.5 - 22.9$	2	20	
$23-24.9$	3	12	
$25 - 29.9$	5	24	

$> 30$	3	1	
Diabetes			
Yes	3	15	0.9
No	10	49	
Hypertension			
Yes	7	43	0.270
No	6	21	*
Dyslipidemia			
Yes	8	5	0,000
No	32	32	*
Smoke			
Active smoker	3	11	.331 *
Former smoker	3	29	
Not	7	24	
Family history of CHD			0.742
Yes	4	17	*
No	9	47	
Syntax Score			
$<22$	8	43	0.460
23-33	4	10	
$> 33$	1	8	
Coronary artery disease			
1 VD	3	14	0.532
2 VD	3	13	*
3 VD	7	24	
CAD	0	8	
Lp (a) level			
$<20$	0	11	0.108
$> 20$	13	52	*

\* = Kolmogorov-Smirnov test (Chi-Square test alternative test), \*\* = Mann-Whitney test (unpaired alternative t test)

Note: STEMI: ST Elevation Miocard Infarc; NSTEMI: Non ST Elevation Miocard Infarc; Steam: Unstable Angina Pectoris; APS: Stable Angina Pectoris; LATEST AMI: History of Acute Coronary Syndrome in 28 days; BMI: Body Mass Index; CAD: Coronary Artery Disease; 1 VD: One Ship Disease; 2 VD: Two Ship Diseases; 3 VD: Three Ship Diseases; NCAD: Non Coronary Artery Disease (normal coronary arteries).

The results of the univariate analysis based on the presence or absence of thrombus and the baseline characteristics of the study subjects are shown in Table 1. The baseline characteristics did not differ significantly in age., gender, race, clinical presentation, BMI, comorbid diabetes, hypertension, history of smoking, vascular disease, and family history of coronary heart disease ( $p > 0.05$ ). The Lp (a) level did not show a significant difference between patients with or without thrombus ( $p < 0.05$ ). Although we can see that all of the patients with thrombus (13 patients) had Lp (a)  $> 20$  (baseline height). Dyslipidemia was a comorbid which showed significant association ( $p 0.000$ ) with the presence or absence of thrombus.

Lipoprotein levels (a) varies and differs among populations, black populations have higher Lp (a) levels

than whites and asians. Apo (a) polymorphism affects Lp (a) levels. Lp (a) is strongly influenced by the synthesis of apo (a) which is predominantly genetically influenced. Various studies have also established different cut-offs, Buldassarre *et al.*<sup>6</sup>, Jurgens *et al.*<sup>7</sup>, each setting the cut-off for Lp (a) to be 32 mg / dl, 30 mg / dl, > 24mg / dl and 20 mg / dl. In this study, the cut-off for Lp (a) refers to the study of Shokanvar *et al.*<sup>8</sup>, where the Lp (a) level that shows an association with coronary stenosis is  $\geq 20$ mg / dl.

Lp (a) in this study has not been proven to be an independent factor in the presence of thrombus as in the study of Guerra *et al.*<sup>9</sup>, which states that there is no consistent independent relationship between plasma levels of Lp (a) and coronary artery thrombosis in white or black ethnic groups. .

Lp (a) levels provide additional information on cardiovascular risk and are currently an important component of lipid profile testing. The independent and ongoing relationship between Lp (a) and other CAD risk factors has been firmly established by a number of studies. Lp (a) levels are very stable in individuals over many years. Although the mechanism of the relationship is still unclear, the fact of the existence of LDL and plasminogen, Lp (a) can form a link between atherosclerosis and thrombosis. Because Lp (a) levels differ significantly between different racial / ethnic groups, multi-ethnic studies are needed in different populations to provide insight into the variability of Lp (a) levels. Until now, no therapeutic drug has selectively decreased Lp (a) levels, but recently, factors have been identified to alter the synthesis of apo (a). Routine screening of Lp (a) levels in the blood together with the apo (a) phenotype can help in identifying individuals with a high genetic predisposition to CAD<sup>10</sup>.

On the other hand, dyslipidemia shows a significant association with the presence of thrombus. Dyslipidemia, characterized by elevated serum LDL-C levels, is a major risk factor for CVD. Previous randomized clinical trials have shown that decreasing LDL-C levels with statins is useful for preventing cardiovascular events. However, several studies have shown that even though LDL-C levels are within the target range, some patients still have recurrent cardiovascular events. It is thought that other cholesterol components such as Lp (a) may be associated with recurrent CVD events<sup>4</sup>.

#### 4. CONCLUSION

Lp (a) is a non-traditional risk factor for CAD, not yet shown to be significantly correlated with the presence of thrombus in this body.

Finally, further research is needed to help better understand the polymorphisms of apo (a) and Lp (a), their role as unique independent biomarkers to CAD.

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