



**ABSTRACT BOOK**

# The 3<sup>rd</sup> International Conference in Health Sciences (ICHS) 2019

## FACING HEALTH CARE 4.0 : IMPACT, OPPORTUNITIES AND CHALLENGES



FACULTY OF HEALTH SCIENCES  
JENDERAL SOEDIRMAN UNIVERSITY  
INDONESIA  
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## The Relationship between eNOS with dyslipidemia in coronary heart disease



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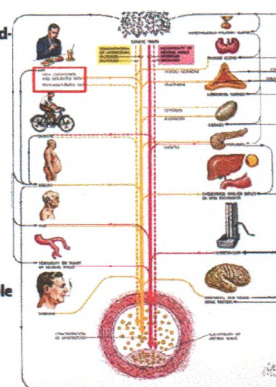
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## Introduction

- Coronary heart disease (CHD) is the leading cause of death worldwide
- High prevalence developed countries, and is seen to increase in developing countries and third world countries
- In Indonesia deaths from CHD has reached 5.1% and more than 30,000 patients are treated each year

## Etiology and Risk Factors of CHD

- Narrowing of the blood vessels that supply blood to the heart by the build-up of plaque
- Risk Factors
  - controlled or modifiable:
    - High blood cholesterol levels
    - Diabetes
    - High blood pressure, Overweight – obesity
    - Smoking
    - Lack of physical activity
    - Unhealthy diet
    - Stress
  - can not be controlled or unmodifiable
    - Age
    - Sex
    - Family history
    - Ethnic.

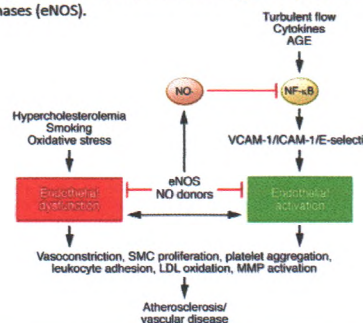


## Dyslipidemia

- Medical condition that refers to an abnormal of blood lipids level, most common is hyperlipidemia.
- Elevation of blood lipid :
  - total cholesterol
  - triglycerides
  - LDL cholesterol
- Low HDL- cholesterol
- Induces endothelial dysfunction
- Trigger the development of atherosclerosis,
- Increases the risk of coronary heart disease

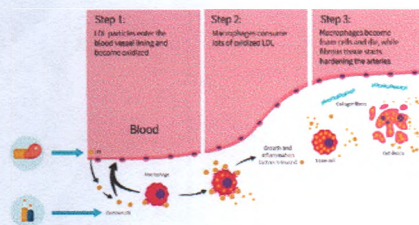
## Endothelial Dysfunction

- Characterized by deficiency in nitric oxide (NO) bioavailability.
- Nitric oxide production is synthesized from L-arginine by endothelial nitric oxide synthases (eNOS).

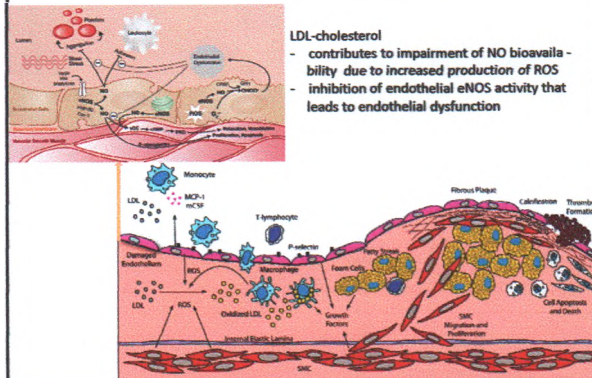


### High LDL-cholesterol in dyslipidemia → Endothelium

- Reduced bioavailability of NO which is synthesized by eNOS
- Endothelial dysfunction occurs mediated through several mechanisms:
  - increased oxidative stress and
  - pro-inflammatory responses.



### Endothelial dysfunction and CHD



### Aim of Study

- To determine the effect of dyslipidemia to the endothelial nitric oxide synthase as one of the markers associated with endothelial function, we studied the relationship between lipid profiles and eNOS levels in CHD patients

### Material and Methods

- Cross sectional study,
- 26 dyslipidemic patients with CHD of the outpatients in Department of Cardiology in the regional public hospitals
- Patients were fulfilled inclusion and exclusion criteria were included in this study.
- Fasting blood samples were collected to measure the lipids profiles among biochemical laboratory standard
- eNOS levels were measured using the ELISA method.
- Data were analysed statistically using Shapiro-Wilk-test and student t test
- Approved by Research Ethic Committee of Faculty of Medicine Andalas University

### Results and Discussion

Table 1: Percentage of Gender in CHD and Control group

Gender	CHD (%)	Control (%)
Men	57	60
Woman	42,3	40

- Both groups were in the age range of 35 to 55 years.
- Men in the aged 35 to 54 years have a higher prevalence of cardiovascular disease than women of the similar age
- the gap tends to be narrower in recent years, which the prevalence has decreased in men and increased in woman → estrogen

Table 2: Trygliceride, LDL-Cholesterol, HDL-cholesterol and total cholesterol levels in patients with CHD (n=26) in compare to normal standars levels

No	Lipid Profile	CHD (mg/dl)	Normal (mg/dl)
1	Triglycerides	211.50±55,53	< 200
2	LDL	136,76±29,39	<100 mg/dl
3	HDL	39,08±10,19	>50 mg/dl
4	Cholesterol	244,03±67,99	<150 mg/dl

- The elevation of total cholesterol, triglyceride, or both, or a low HDL-cholesterol level → dyslipidemia → major risk factor for CHD contributes to the development of atherosclerosis
- Cholesterol level in blood plasma is determined by genetic and by consumption of high fat and cholesterol in the diet.
- Obesity and physical inactivity contribute to an elevation of cholesterol
- Reduction of LDL-cholesterol may reduce the risk for CHD.

**Table 3: Average of eNOS levels (ng/ml) in the coronary heart disease (CHD) patients and control group**

No	Groups	n	Mean±SD	p
1.	CHD	26	24,174±7,136	< 0,05
2	Control	15	72,092±30,065	

- High level of lipids in the blood are physical and biochemical injury to the endothelium
- lead to oxidative stress, eNOS uncoupling, and endothelial dysfunction.
- Low level of eNOS affect to NO production and function or bioavailability, resulting in increased vascular contractions to vasoconstrictors.
- Therefore, decrease of endothelial NO function or increase degradation of NO are associated with cardiovascular disorders
- The important function of eNOS are to keep blood vessels dilated, control blood pressure, vasoprotective and anti-atherosclerotic effects.

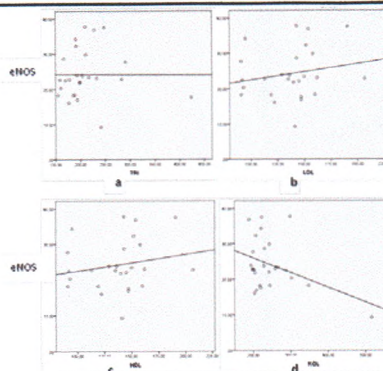
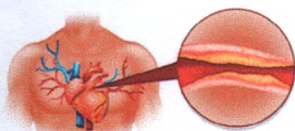


Figure 1: Correlation between eNOS with triglyceride (a), LDL (b), HDL (c), and with Cholesterol (d)

- The of LDL-cholesterol levels has moderately positive correlation with eNOS → High level of LDL-cholesterol seem to contribute to the levels of eNOS,
- High LDL-cholesterol that impair the capacity of NO production is an early step in atherogenesis.
- HDL-cholesterol may decrease the level of eNOS, although were not significant different
- HDL-cholesterol have pleiotropic effects: antioxidant, anti-apoptotic, anti-inflammatory, anti-thrombotic → endothelial protective action.
- Increasing of total cholesterol levels, causing the lower levels of eNOS
- Cholesterol is recognized as a major cause of macrovascular disease. The mechanism by which serum cholesterol elevations cause cardiovascular disease is not completely understood
- There are nonpharmacological and pharmacological therapies to repair vascular endothelial → increase eNOS activity and NO release, inhibit NO degradation

### Conclusion

- Dyslipidemia: important risk factor for coronary heart disease.
- The change of this lipid levels may trigger the production of oxidative stress, that related to deregulation of eNOS enzymatic activity and inactivation of NO.
- eNOS that play a role in vascular protection appears to play an important role in endothelial dysfunction due to buildup of lipid that induce atherosclerosis in coronary heart disease.



**Thank You**





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# CERTIFICATE

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**Prof. Dr. dr. Eryati Darwin**

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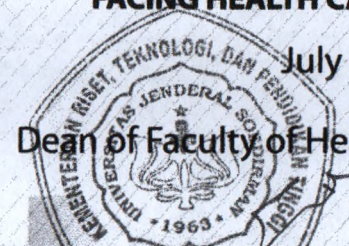
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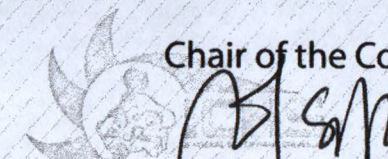
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