

# The Relationship Between Obstructive Sleep Apnea And Acute Miocard Infarct In H. Adam Malik Hospital, Medan

Nurdiansyah<sup>1\*</sup>, Kiking Ritarwan<sup>2</sup>, Raden Ajeng Dwi Pujiastuti<sup>2</sup>

<sup>1</sup>Resident of Neurology Department, Faculty of Medicine, University of Sumatera Utara / Haji Adam Malik General Hospital, Medan, Indonesia

<sup>2</sup>Staff of Neurology Department, Faculty of Medicine, University of Sumatera Utara / Haji Adam Malik General Hospital, Medan, Indonesia

\*Corresponding Author : Nurdiansyah, email : [drnurdiansyah@gmail.com](mailto:drnurdiansyah@gmail.com)

DOI: 10.29322/IJSRP.13.05.2023.p13754

<http://dx.doi.org/10.29322/IJSRP.13.05.2023.p13754>

Paper Received Date: 2<sup>nd</sup> April 2023

Paper Acceptance Date: 24<sup>th</sup> May 2023

Paper Publication Date: 30<sup>th</sup> May 2023

## ABSTRACT

Obstructive sleep apnea (OSA) is a disorder that is part of the complex sleep disorder breathing syndrome. According to the International Classification of Sleep Disorders-Third Edition (ICSD-3) states that OSA does not only include obstructive apnea and hypopnea but also relates to respiratory effort (Sateia, 2014). Actually OSA symptoms often occur, but difficult to detect. Obstructive Sleep Apnea (OSA) is a condition of periodic upper airway obstruction during sleep characterized by repeated episodes of breathing processes (apneas) or partial upper airway obstruction (hypopneas). This event is often associated with a decrease in blood oxygen saturation (Throphy, 2012). Study subjects were taken from the hospital patient population.

The determination of research subjects was carried out according to the non-random sampling method consecutively. Patients with acute myocardial infarction undergoing treatment at the Cardiac Center RSUP H. Adam Malik Medan. A total of 39 samples

Based on the degree of obstructive sleep apnea according to the Apnea-Hypopnea Index (AHI), in the Acute Myocardial Infarct (AMI) group, the most severe degree was 9 people (75%) followed by a moderate degree of 5 people (45.5%) and a mild degree of 2 people (12, 5%). In the non-AMI group, the most mild degrees were 14 people (25%) followed by moderate degrees by 6 people (54.5%) and mild degrees by 3 people (87.5%). Based on the Kruskal Wallis test (table 4.2), there is a significant relationship between the degree of OSA and the incidence of acute myocardial infarction (P0.004).

Based on the analysis of the data obtained in this study, the following conclusions were drawn: There is a relationship between the risk of obstructive sleep apnea and the incidence of acute myocardial infarction with a p value of 0.005, there is a relationship between obstructive sleep apnea and the incidence of acute myocardial infarctwith a p value of 0.001 Based on hypersomnia according to the Epworth Sleepiness Scale, in the AMI group, hypersomnia was found in 6 people (66.7%) and not as many as 10 people (33.3%) 4 Based on the description of the Apnea Hypopnea Index (AHI) score in the AMI group, the most severe degree was 9 people (75%) followed by a moderate degree of 5 people (45.5%) and a mild degree of 2 people (12.5%).

*Keywords: obstructive sleep apnea, acute myocardial infarction*

## INTRODUCTION

Obstructive sleep apnea (OSA) is a disorder that is part of the complex sleep disorder breathing syndrome. According to International Classification of Sleep Disorders-Third Edition (ICSD-3) stated that OSA not only includes obstructive apnea and hypopnea but also related to respiratory effort (Sateia, 2014). Actually OSA symptoms often occur, but difficult to detect. Obstructive Sleep Apnea (OSA) is a state of periodic upper airway obstruction during sleep characterized by repeated episodes of breathing processes (apneas) or partial upper airway obstruction (hypopneas). This event is often associated with a decrease in blood oxygen saturation (Trophy, 2012)

The epidemiology of OSA in the middle-aged adult population in the United States varies widely, namely 24% in men and 9% in women, if there is obesity with a Body Mass Index (BMI) of 25-28 (moderately overweight) it is estimated that 1 in 5 men will experience OSA severe degree, while moderate OSA is 1 in 15 men based on several cohort studies. Various epidemiological studies have been carried out, especially in developed countries, to find the incidence of OSA which is often associated with various diseases or certain conditions as a predisposing factor (Antariksa, 2010). At the age of 30-35 years 20% of men and 5% of women will snore while at the age of 60 years the prevalence increases to 60% in men and 40% in women.

The prevalence of OSA in patients with ischemic heart disease is two times greater than other heart diseases. Conversely, it was also found that OSA resulted in the occurrence and progression of ischemic heart disease, this was the result of decreased oxygen, acidosis, increased blood pressure and coronary artery vasoconstriction for a long time and repeatedly until coronary artery damage occurred. (Mehra et al, 2006: Farahani et al, 2018). The relationship between OSA and CHD can be explained by several mechanisms including hemodynamic changes (bradycardia, episodes of hypertensive hypoxia) and sympathetic hyperactivity which in turn can generate endothelial damage through mechanical strain, vasospasm and thrombogenesis (Damiani et al, 2017; Rivas et al, 2015). Also, repeated hypoxia causes oxidative stress which then results in lipid peroxidation,

**METHODS**

The research was conducted at the Cardiac Center of H. Adam Malik General Hospital Medan from March to May 2020 or until the number of samples was fulfilled. The research will be carried out after being approved by the Research Ethics Committee for the Health Sector of the FK USU/RSUP H. Adam Malik Medan. The research subjects were taken from the hospital patient population. The determination of research subjects was carried out according to the non-random sampling method consecutively. Patients with acute myocardial infarction who underwent treatment at the Cardiac Center of RSUP H. Adam Malik Medan as many as 39 samples that met the inclusion and exclusion criteria.

**RESULTS**

Patients undergoing treatment at the Cardiac Center of H. Adam Malik General Hospital Medan from June 2020 to November 2020, there were 16 patients with acute myocardial infarction and 23 patients who were not acute myocardial infarction who participated in the study. Based on the characteristics of the 39 research subjects, it was found that the ages of all research subjects had an average of 52.43 ± 12.67 years with the largest age range at the ages of 56-70 years, namely 23 subjects (58.9%). Most of the research subjects were male, namely 23 subjects (58.9%). Based on anthropometry, the average body weight in the AMI group was 78 (64-92) kg and the non-AMI group was 83 (54-95) kg. The average height in the AMI group was 163.0 ± 7.6 cm and the non-AMI group was 166.6 ± 8.9 cm. The average BMI in the AMI group was 29.11 ± 2, 75 kg/m<sup>2</sup> and the non-AMI group was 27.76 ± 2.93 kg/m<sup>2</sup>. The average neck circumference in the AMI group was 36 (33-37) cm and the non-AMI group was 34 (32-36).

Characteristics of Research Subjects	Average	AMI	Not AMIs
Age (years)	52.43 ± 12.67	50.06 ± 13.22	54.08 ± 12.29
• 27 – 48 years		8 (50%)	7 (30.4%)
• ≥ 49 – 70 years		7 (43.8%)	16 (69.6%)
• ≥ 71 years		1 (6.2%)	-
Gender			
• Man		10 (62.5%)	13 (56.5%)
• Woman		6 (37.5%)	10 (43.5%)
Weight (kg)		78 (64-92)	83 (54-95)
Height(cm)		163.0 ± 7.6	166.6 ± 8.9
BMI (kg/m <sup>2</sup> )		29.11 ± 2.75	27.76 ± 2.93
Neck Circumference(cm)		36 (33-37)	34 (32-36)

Based on the degree of obstructive sleep apnea according to the Apnea-Hypopnea Index (AHI), in the AMI group, the most severe degree was 9 people (75%) followed by a moderate degree of 5 people (45.5%) and a mild degree of 2 people (12, 5%). In the non-AMI group, the most mild degrees were 14 people (25%) followed by moderate degrees by 6 people (54.5%) and mild degrees by 3 people (87.5%). Based on the Kruskal Wallis test (table 4.2) there is a significant relationship between the degree of OSA and the incidence of acute myocardial infarction (P=0.004). Based on the Kruskal Wallis test there is a significant relationship between the degree of OSA and the incidence of acute myocardial infarction (P=0.004).

OSA Degree Characteristics	AMI n(%)	Not AMIs n(%)	p.s
OSA degree (AHI)			0.004*
• Light	2 (12.5)	14 (87.5)	
• Currently	5 (45.5)	6 (54.5)	
• Heavy	9 (75.0)	3 (25.0)	

Based on hypersomnia according to the Epworth Sleepiness Scale, in the AMI group, hypersomnia was found in 6 people (66.7%) and not in 10 people (33.3%). In the non-AMI group, hypersomnia was found in 3 people (33.3%) and not in 20 people (66.7%). Based on the Fisher's exact test (Table 4.3), there was no significant relationship between hypersomnia and acute myocardial infarction (P=0.123).

Characteristics of Hypersomnia	AMI n(%)	Not AMIs n(%)	P
Hypersomnia			0.123*
• Yes	6 (66.7)	3 (33.3)	
• No	10 (33.3)	20 (66.7)	

Based on the chi square statistical test, there is a relationship between risk of *obstructive sleep apnea* with the incidence of acute myocardial infarction (p = 0.005). Based on this statistical test, the high risk group for obstructive sleep apnea is 4 times more at risk of acute myocardial infarction than the non-OSA group.

OSA Risk Characteristics	AMI n(%)	Not AMIs n(%)	RP	P
OSA High Risk	13 (65)	7 (35)	4,1	0.005*
OSA Low Risk	3 (15,8)	6 (84.2)		

OSA characteristics based on a questionnaire *Epwort Sleepnes Scale* There were 14 subjects (66.7%) with OSA in the AMI group and 7 subjects (33.3%) in the non-AMI group, while 2 subjects (11.1%) were not OSA patients in the AMI group and in the 16 subjects (88.9%) who were not AMIs.

Based on the chi square statistical test, there is a relationship between *obstructive sleep apnea* with the incidence of acute myocardial infarction (p = 0.001). Based on this statistical test, the obstructive sleep apnea group is 6 times more at risk of acute myocardial infarction than the non-OSA group.

OSA According to ESS	AMI n(%)	Not AMIs n(%)	RP	P
OSA	14 (66.7)	7 (33.3)	6.0	0.001*
Not OSA	2 (11,1)	16 (88.9)		

## CONCLUSION

Based on the analysis of the data obtained in this research, the following conclusions are drawn:

1. There is a relationship between risk of *obstructive sleep apnea* with the incidence of acute myocardial infarction with a p value of 0.005

2. there is a relationship between *obstructive sleep apnea* with the incidence of acute myocardial infarction with a p value of 0.001
3. Based on hypersomnia according to the Epworth Sleepiness Scale, in the AMI group, hypersomnia was found in 6 people (66.7%) and not as many as 10 people (33.3%)
4. Based on the description of the score, *Apnea Hypopnea Index (AHI)* In the AMI group, the most severe degree was 9 people (75%) followed by moderate degree as many as 5 people (45.5%) and mild degree as many as 2 people (12.5%)
5. Based on the characteristics of the 39 research subjects, it was found that the ages of all research subjects had an average of  $52.43 \pm 12.67$  years with the largest age range at the ages of 56-70 years, namely 23 subjects (58.9%). Most of the research subjects were male, namely 23 subjects (58.9%). Based on anthropometry, the average body weight in the AMI group was 78 (64-92) kg. The average height in the AMI group was  $163.0 \pm 7.6$  cm. The average BMI in the AMI group was  $29.11 \pm 2.75$  kg/m<sup>2</sup>. The average neck circumference in the AMI group was 36 (33-37) cm.

## BIBLIOGRAPHY

- Amirin, T., 2011, Population and Research Sample 4: Sample Size Slovin Formula, Erlangga: Jakarta.
- Anderson, JL, Adams, CD, Antman, EM, Bridges, CR, Califf, RM, and Casey, DE 2013. 2012 ACCF/AHA Focused Update Incorporated Into the ACCF/AHA 2007 Guidelines for the Management of Patients With Unstable Angina/Non –ST-Elevation Myocardial Infarction A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Journal of the American College of Cardiology*, 61: e179–e347.
- Dahlan, MS 2016. Statistics for medicine and health. Third edition. Salemba Medika : Jakarta.
- Damiani MF, Scoditti C, Bega E, Scoditti A, and Fanfulla F. 2017. Additive effects of osa and hypertension on endothelial damage. *Chest*. 151: 520-21.
- Punjabi, MN 2008. The Epidemiology of Adult Obstructive Sleep Apnea. *Proc Am Thorac Soc*; 5(2): 136–143.
- Quan, SF 2009. Sleep disturbances and their relationship to cardiovascular disease. *Am J Lifestyle Med*; 1(3):55-9