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BLOOD PRESSURE CORRELATION WITH IN-HOSPITAL MORTALITY ST-ELEVATION MYOCARDIAL INFARCTION PATIENT CASE STUDY IN RSUP DR. KARIADI

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ABSTRACT

Background: Blood pressure had been suspected to correlate with in-hospital mortality on ST-Elevation Myocardial Infarct (STEMI) patients. **Aim:** To prove the correlation between blood pressure with short-term in-hospital mortality on STEMI patients. **Methods:** This study was a retrospective analytic observational qualitative study with a cohort design. The data collecting technique used STEMI patient medical records at the RSUP dr. Kariadi and took blood pressure data when the patients admitted to the hospital, after that divided into three groups, namely hypertension, normotension, and hypotension, then analyze the data on the output of patients alive or dying when they were discharged from the hospital using Fisher exact test. **Results:** Hypertension ($p=0,428$; $OR=0,355$), Normotension ($p = 1$; $OR=1,267$), and Hypotension ($p=0,687$; $OR=1,500$) along with hypertension history ($p=0,785$; $OR=1,200$) was not correlated with in-hospital mortality of STEMI patient in RSUP dr. Kariadi. **Conclusion:** There was no correlation between blood pressure at admission with in-hospital mortality in STEMI patients.

Keywords: STEMI, blood pressure, in-hospital mortality.

PREFACE

Heart disease is a non-transmitted disease which is one of the most deadly diseases in the world. According to WHO, heart disease is the number one cause of death in the world with 17.900.900 lives in 2016.¹ Ischemic heart disease is number 2 disease that causes the most deaths in Indonesia with a drastic increase every year until the number of deaths increases by 29% in the period 2007-2017.² Deaths due to acute coronary syndrome in Indonesia is increasing every year. ACS deaths in 2015 amounted to 3% while in 2016 it reached 5%.⁴

There are several death predictors found in STEMI patient in the hospital such as old age, gender, hypertension, smoking, stroke, dyslipidemia, increased lipoprotein, previous STEMI history, anterior STEMI, diabetes mellitus, Killip class I-IV, microalbuminuria, and hypotension.⁹⁻¹¹ In the studies of in-hospital deaths that

occurred in Romania, there were 15,076 STEMI patients with hypertension history is 6.7% of deaths and non-hypertension is 6.5% of deaths.¹²

The number of STEMI patients used as study material in Belgium is 8,073 patients with 1,605 patients having a history of hypotension. In all patients there were 6.1% deaths in the hospital, according to the research there is 3 times greater chance of in-hospital mortality in patients who had a history of hypotension than non-hypotensive patients.¹⁴

The inclusion of blood pressure as one of the factors that can also affect mortality in patients with acute myocardial infarction. Several studies have found that STEMI patients who have a history of hypertension have a higher mortality chance than patients who are not having hypertension.^{15,16} there are irrelevance numbers of patients in-hospital mortality between normotension and hypertension



patients.¹⁷ But it is still controversial because several studies prove STEMI patients with a history of hypotension tend to have higher mortality.

RESEARCH METHOD

Sample and Treatment

A substance that has been used in this research is medical records from blood pressure checks when STEMI patients admitted into the emergency room then we look at data of in-hospital mortality. Data is taken following the minimum amount of medical record needs that are divided into 3 groups that are hypotension, normotension, and hypertension. The collected data is analyzed to test the hypothesis. To see the

dependency between the independent and dependent variables, using the Fisher exact test.

STUDY RESULTS

Research has been done to search for information from secondary data in the medical records form contained in Medical record installation RSUP dr. Kariadi. Data collected using consecutive sampling with the total number of patients that have been taking from STEMI patient medical record as much as 61 that can be found in medical record installation. Data that have been obtained from STEMI patient consist of 12 hypertension patient, 36 normotension patient, and 13 hypotension patient

Tabel 1. Characteristics of Samples Research

Variable	F	%	Mean ± SD	Median (min-max)
Age			59,26 ± 10,29	59 (36 – 81)
Gender				
Male	47	77,0		
Female	14	23,0		
Blood pressure				
Hypertension	12	19,7		
Normotension	36	59,0		
Hypotension	13	21,3		
Hypertension History				
Yes	31	50,		
No	30	49,2		

STEMI patient age that enters dr. Kariadi hospital has the mean age of 59.26± years with 10.29 ± years as a standard deviation, it was found that

patients age median is 59 years with minimal patient age that enter the hospital is 36 years and the maximum is 81 years.

Table 2. Bivariate analysis

Variable	Output				p	OR	CI 95%
	Death (11)		Live (50)				
	n	%	n	%			
Blood pressure							
Hypertension	1	9,1	11	22,0	0,438 [£]	0,355	0,041 – 3,080
Normotension	7	63,6	29	58,0	1,000 [£]	1,267	0,328 – 4,892
Hipotension	3	27,3	10	20,0	0,687 [£]	1,500	0,336 – 6,702
Hypertension history							



Variable	Output				p	OR	CI 95%
	Death (11)		Live (50)				
	n	%	n	%			
Yes	6	54,5	25	50,0	0,785 ^Y	1,200	0,324 – 4,447
No	5	45,5	25	50,0			

Explanation: * Significant $p < 0,05$; ^Y Pearson chi square; ^Z Fisher's exact

According to existing data, there is no significant relation in STEMI patients between blood pressure and in-hospital mortality.

DISCUSSION

In this study, data analysis was obtained regarding the correlation of blood pressure with the incidence of in-hospital mortality in STEMI patients who entered the RSUP dr. Kariadi that is hypertension ($p=0,428$; $OR=0,355$), normotension ($p = 1$; $OR=1,267$), dan hypotension ($p=0,687$; $OR=1,500$). From these data, it can be interpreted that there is no significant correlation found between blood pressure and short-term in-hospital mortality in STEMI patients who were admitted to RSUP dr. Kariadi.

Acute coronary syndrome is a collection of symptoms and clinical signs that correspond to acute myocardial infarction. The acute coronary syndrome can be a myocardial infarction with ST-elevation and myocardial infarction without ST elevation. Acute myocardial infarction is the formation of necrosis in myocardial muscle cells due to inadequate blood supply to an area that begins with ischemia. An acute coronary syndrome is an acute manifestation of a ruptured coronary atheromatous plaque. This matter is related to the changes of plaque composition and thinning fibrous hood that covers the plaque. This case will be followed by the platelet aggregation process and coagulation pathway activation. A platelet-rich thrombus (white thrombus) is

formed. Thrombus can interfere with coronary arteries. Furthermore, vasoactive substance release occurs which causes vasoconstriction thereby aggravating coronary blood flow disorders then the body compensates using blood pressure to ensure blood can arrive into the target organ. Reduced coronary blood flow causes myocardial ischemia. Oxygen supply that stops for about 20 minutes causes myocardium to undergo a necrosis.⁸

It was found that blood pressure is more correlated with long term mortality. In STEMI patients, it tends to have mortality out-of-hospital long-term mortality. Blood pressure is considered an independent predictor of 5-year follow-up mortality because blood pressure awareness on patients is usually low.¹⁹ Blood pressure on STEMI patients is often associated with a metabolic syndrome so it has higher long-term mortality than on short-term mortality. Blood pressure can't be an independent predictor for in-hospital mortality of STEMI patients.

Previous studies have shown that STEMI patients with a history of hypertension are more likely to have long-term out-of-hospital mortality.²¹ Studies that have been done previously obtained data that a history of hypertension in STEMI patients does not correlate with the incidence of short-term and long-term mortality.²² In this study of the correlation between the incidence of short-term in-hospital mortality with a history of hypertension ($p = 0.785$; $OR = 1,200$) in



STEMI patients has no significant relationship with the incidence of short-term in-hospital mortality STEMI patients in RSUP dr. Kariadi Semarang possibly because of a hypertension history is more influential with the incidence of long-term mortality.

Many factors can affect the in-hospital mortality of STEMI patients. The factors that can be considered as an independent in-hospital factor are Pulmonary edema, arrhythmias, diabetes mellitus, and infarct location^{23,24,13 25,26 27,36,37}

CONCLUSION AND SUGGESTIONS

There was no correlation between blood pressure at admission with in-hospital mortality in STEMI patients. Further research is needed using other variables to be able to detect and obtain other predictors in-hospital mortality of STEMI patients.

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