The Prevalence of Cardiovascular Comorbidity in COVID-19 at West Nusa Tenggara General Hospital from March to December 2020

Yusra Pintaningrum[1,2,*] and Imam Fadhullah Pratama[1]

[1]*Faculty of Medicine, University of Mataram, Mataram, Indonesia*
[2]*Cardiology and Vascular Department of West Nusa Tenggara General Hospital, Mataram, Indonesia*
[*]*Corresponding author. Email: yusra@unram.ac.id*

ABSTRACT
The SARS-CoV-2 virus as the cause of COVID-19 has been declared a pandemic since March 2020. The clinical signs of COVID-19 are heterogeneous, such as 20–51% of patients were accounted have at least one comorbidity, with diabetes melitus (10–20%), hypertension (10–15%) and other cardiovascular and cerebrovascular complications (7–40%). This was a descriptive retrospective research design that collected data from all patients with COVID-19 at West Nusa Tenggara General Hospital, Mataram, Indonesia This study is approved by the ethics committee of the West Nusa Tenggara Hospital. We compiled the clinical data from medical record. The COVID-19 diagnosis and CVD diagnosis was made based on ICD X. Statistical analyses were conducted with Microsoft Excel. Of the 826 cases, 84 (10%) reported having CVD comorbidity. The prevalence of specific CVD according to ICD X was : hypertension (n=50, 6%), coronary artery disease (n=10, 1.21%), congestive heart failure (n=10, 1.21%), hypertensive disease with heart failure (n=4, 0.5%) , hypertensive disease without heart failure (n=4, 0.50%), secondary hypertension due to endocrine disorders (n=1, 0.12%), renal hypertension with renal failure (n=1, 0.12%), complete atrioventricular block (n=1, 0.12%), ischemic cardiomyopathy (n=1, 0.01%), left bundle branch block (n=1, 0.12%), sick sinus syndrome (n=1, 0.12%). Case fatality rate was 1.2%. On the other hand, information from the China's national health commission reports that 35% have comorbid hypertension and 15% have coronary heart disease. Case fatality rate in patients with comorbid heart disease is reported to be 6% in hypertension and 10.5% in heart disease. This mechanism is related to the increased expression of angiotensin-converting enzyme which is bind to the corona virus. Among patients with CVD comorbidity have a higher risk of COVID-19. A thorough assessment of comorbidities might assist to establish the risk of patients at hospital admission.

Keywords: *COVID-19, cardiovascular disease, comorbidity, case fatality rate.*

1. INTRODUCTION

The SARS-CoV-2 virus as the cause of COVID-19 has been declared a pandemic since March 2020. As of March 10, 2020, 4296 people worldwide have died from COVID-19. One month later, i.e., as of April 10, 2020, 1.6 million people were confirmed positive and over 100,000 people died [1]. The mortality rate for COVID-19 cases in general is highly dependent on the country concerned and depends on demographics, the scope of examinations, reporting, epidemic phase, health services and government policies [2].

SARS-CoV-2 causes manifestations of viral pneumonia, but it can also affect the cardiovascular system. Patients with CV risk factors, including comorbid hypertension, obesity, diabetes mellitus, advanced age, and male gender as well as patients with a history of CVD and cerebrovascular disease (PSV) are known to be at risk populations with higher mortality and morbidity in COVID-19 [3].

The clinical signs of COVID-19 are heterogeneous, such as 20–51% of patients were accounted have at least one comorbidity, with diabetes melitus (10–20%), hypertension (10–15%) and other cardiovascular and cerebrovascular complications (7–40%). Therefore, researchers want to know the prevalence of cardiovascular (CVD) comorbidity in patients with

COVID-19 at West Nusa Tenggara General Hospital, especially from March to December 2020.

2. MATERIALS AND METHODS

This was a descriptive retrospective research design that gathered information from all COVID-19 patients at West Nusa Tenggara General Hospital, Mataram, Indonesia This study is accepted by the ethics committee of the West Nusa Tenggara Hospital. We compiled the clinical data from medical record. The COVID-19 diagnosis and CVD diagnosis was made based on ICD X. Statistical analyses were conducted with Microsoft Excel

In this study, we processed data from medical records of COVID-19 patients to identify comorbid heart disease. The data is then grouped based on the disease and the percentage is calculated.

3. RESULTS AND DISCUSSION

Of the 826 cases, 84 (10%) reported having CVD comorbidity. The prevalence of specific CVD according to ICD X was : hypertension (n=50, 6%), coronary artery disease (n=10, 1.21%), congestive heart failure (n=10, 1.21%), hypertensive disease with heart failure (n=4, 0.5%) , hypertensive disease without heart failure (n=4, 0.50%), secondary hypertension due to endocrine disorders (n=1, 0.12%), renal hypertension with renal failure (n=1, 0.12%), complete atrioventricular block (n=1, 0.12%), ischemic cardiomyopathy (n=1, 0.01%), left bundle branch block (n=1, 0.12%), sick sinus syndrome (n=1, 0.12%).

Table 1 Distribution of heart disease in COVID-19

Comorbid Heart Disease	N	N%
Hypertension	50	6
Coronary Artery Disease	10	1,2
Congestive Heart Failure	10	1,2
HHD with Congestive Heart Failure	4	0,5
HHD without Congestive Heart Failure	4	0,5
Secondary Hypertension	1	0,1
Renal Hypertension	1	0,1
Complete Atrioventricular Block	1	0,1
Ischemic Cardiomyopathy	1	0,1
Sick Sinus Syndrome	1	0,1
Total	84	

*HHD = Hypertension Heart Disease.

Case fatality rate (CFR) in this study 1.2%. Information from the China's national health commission reports that 35% have comorbid hypertension and 15% have coronary heart disease. Case fatality rate in patients with comorbid heart disease is reported to be 6% in hypertension and 10.5% in heart disease. This mechanism is related to increased expression of angiotensin-converting enzyme (ACE-2) which is associated with hyperactivity to renin-angiotensin [4].

It is realized that ACE is an enzyme that assumes a part in catalyze the change of angiotensin I to angiotensin II which plays a role in vasoconstriction and increment the blood pressure. In the last two decades, a new ACE homologue, ACE2, has been discovered [5]. ACE2 also acts as a functional coronavirus receptor that can bind directly to the spike protein on the viral surface. SARS-CoV-2 infected the host cells via entering the receptor called ACE2 receptor which is abundant in the lungs (alveolar cells type II) and also in the heart [2].

Previous studies have shown that the SARS-CoV genome was detected in the heart in 35% of patients with SARS-CoV infection [6]. This raises the doubt that the virus can contaminate the myocardium directly and cause inflammation of mtocardium called myocarditis and can complicate to myocardial damage

4. CONCLUSION

Among patients with CVD comorbidity have a higher risk of COVID-19. Due to the reason that there are many COVID-19 patients who have comorbid heart disease, A thorough assessment of comorbidities might assist to establish the risk of patients at hospital admission.

AUTHORS' CONTRIBUTIONS

In this study, Yusra Pintaningrum has contributed to the origination or design of the article, critical revision of the article, and last approval of the version to be published. Imam Fadhlullah Pratama has contributed to information collection, analysis and interpretation the information or data, and drafting the article.

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