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Analysis Of Troponin T Examination Results In Acute Myocard Infark Patients In Santa Elisabeth Hospital Medan, 2022

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ABSTRACT

Infarction Acute Myocardial (AMI) is damage to myocardial tissue due to severe ischemia that occurs suddenly. The incidence of heart disease undergoing inpatient and outpatient treatment in hospitals in Indonesia in 2019 was 239,548 people (WHO). IMA is included in the top 10 categories of non-communicable diseases that are the cause of death in hospitals throughout Indonesia, around 6.25%. Troponin T is a cardiac contractile regulatory protein molecule that can measure normal and abnormal levels to help diagnose AMI. The purpose of this study was to analyze troponin-T levels in AMI patients, and the average (percentage) results of troponin-t examinations in AMI patients at St.Elisabeth Hospital Medan 2022. This type of research is an observational descriptive designed. The sampling technique in this study is *retrospective*. The population are 240 people and the research sample are 93 people. The results of this study conduc on 93 patients show an average troponin T level of 13.07 ng/ml, SD 17.44949, most of the patients were 64 men (68.8%) and 29 women (31 ,2%) with the lowest age are 37 years and the highest are 79 years. The results show that 94.6% of AMI patients experienc an increase in troponin T levels. Patients with acute myocardial infarction when an infarction occurred, it will experience increased levels due to the release of the troponin T enzyme through membrane leakage due to necrosis, so it will show a peak value on examination.

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1. INTRODUCTION

Acute Myocardial Infarction (AMI) is myocardial necrosis due to an imbalance between the supply and demand for oxygen to the heart muscle. Acute Myocardial Infarction is the medical term for a heart attack. When an artery becomes blocked, blood flow can stop instantly and cause an infarction of the heart muscle (myocardium). Infarction is tissue damage that occurs due to lack of oxygen supply (ischemia). The most common cause of AMI is thrombosis associated with ruptured and ruptured atheromatous plaques. Acute myocardial infarction is characterized by an increase in biomarkers, especially cardiac troponin. According to the World Health Organization, it was recorded that more than 7 million people died from myocardial infarction worldwide in 2002. This figure is estimated to increase to 11 million people by 2020. The incidence of heart disease undergoing inpatient and outpatient treatment in hospitals in Indonesia in in 2019 was 239,548 people (WHO). IMA is included in the category of the top 10 non-communicable diseases that are the cause of death in hospitals throughout Indonesia, around 6.25%. Patients with heart disease in Indonesia reached 4.5% followed by stroke 4.4%, kidney failure 0.8%. The diagnosis of myocardial infarction is often still wrong. Therefore, measurement of the levels of biochemical markers and cardiac enzymes becomes important for diagnosing acute myocardial infarction. Cardiac troponin-T (cTnT) is a protein

specific to the heart muscle, and is released into the circulation when cardiac muscle damage occurs. Troponin T levels are only found in myocardial cells so that circulating troponin T becomes a sensitive and specific marker when there is damage to myocardial cells. Troponin T will not be detected in healthy people because the amount is very low. Thus, even a small increase in troponin T levels can indicate heart muscle damage, this can be shown through Troponin T laboratory examinations so that researchers are interested in analyzing the results of troponin T in AMI patients to see what the average increase in troponin T levels is in AMI patients.

2. METHOD

The type of research in this study is an observational study designed descriptively with retrospective sampling technique to describe troponin T levels based on the mean (mean) increase in troponin T levels. This study was conducted from January 2022 to April 2022 at St. Hospital. Elisabeth Medan, Jl. Hajj Misbah No. 7 Medan Maimun District, North Sumatra Province. The population in this study was taken from the medical record data of the Santa Elisabeth Hospital Medan for the last 5 years (2018-2022) the total population was 240 people. The sample is acute myocardial infarction patients with patient inclusion criteria, namely acute myocardial infarction patients with inpatient and outpatient status who perform troponin T laboratory examinations. AMI patients, age, gender, hospitalization status, results of troponin-T examination. The data were processed using SPSS (Statistica) Package for Social Sciences computerized software, Chicago, IL, USA). The results of the troponin T examination (mean examination results) along with the age, sex, and treatment status (frequency distribution) of the research subjects were presented in tabulated form and described then the results were analyzed by assessing the average troponin T results in AMI respondents.

3. RESULTS AND DISCUSSION

Based on the initial data survey, it was found that the total AMI patients in the 2018-2022 period were 240 patients. By calculating using the lameshow formula, the number of samples required for this study was 26 patients, and during the study, a sample of 93 patients was obtained.

Table 3.1 Distribution of Frequency Analysis of Troponin T Examination Results in Patients with Acute Myocardial Infarction in 2022 by Gender and Age of Patients.

Sample characteristics	Frequency	Percentage (%)
Gender		
Male	64	68,8%
Female	29	31,2%
Total	**93**	**100,0**
Age		
37-42 years	2	2,2
43-48 years	8	8,6
49-54 years	10	10,8
55-60 tahun	18	19,4
61-66 years	24	25,8
67-72 years	18	19,4
73-78 years	11	11,8
79-84 years	2	2,2
Total	**93**	**100,0**

Based on table 3.1 it can be seen that most of the AMI patients who were sampled in this study were male, as many as 64 people (68.8%) and women as many as 29 people (31.2%). In this

study, the age of AMI patients varied with the lowest age being 37 years and the highest is 79 years. The mean age of AMI patients in this study

Table 3.2 Distribution of Frequency Analysis of Troponin T Examination Results in Patients with Acute Myocardial Infarction in 2022 Based on Treatment Status

Sample characteristics	Frequency	Percentage (%)
Treatment Status		
Inpatient <5 Days	40	43,0%
Inpatient >5 Days	26	28%
Outpatient	27	29%
Total	**93**	**100%**

Table 3.2 shows that inpatients <5 days were 40 people (43.0%), >5 days were 26 people (28.0%) while outpatients were 27 people (29.0%).

Table 3.3 Frequency Distribution of Troponin T Examination Results in Patients with Acute Myocardial Infarction in 2022 Based on Troponin T Levels

Troponin T Levels	Frequency	Percentage (%)
Normal <0,1ng/ml	5	5,4%
Abnormal >0,1 ng/ml	88	94,6%
Total	**93**	**100,0**

In Table 5.3 it can be seen that most of the AMI patients sampled in this study had abnormal troponin T levels >0.1 ng/ml as many as 88 patients (94.6%) and normal troponin T levels as many as 5 people 5.4% entered with normal troponin levels.

Table 3.4 Statistical Analysis of Troponin T Examination Results in Patients with Acute Myocardial Infarction in 2022 Based on Troponin T Levels

Category	N	Min-Max	Mean	SD	CI 95%
Troponin T	93	0,0756-87,8920 ng/ml	13,07	17,44949	9,41-16,60

which was performed on 93 patients, the Min-Max value was 0.0756-87.8920 ng/ml, mean 13.07, SD 17.44949. The results of the interval estimation at the level of confidence are believed that the mean value of troponin T levels in patients at Santa Elisabet Hospital Medan is 9.41 – 16.60%.

Based on the research, it was found that most of the patients were male as many as 64 people (68.8%) and women as many as 29 people (31.2%). This is similar to a study conducted by Yulia Eka Hastuti et al at Dr.M.Djamil Padang Hospital which reported that more male patients with AMI than women, as many as 43 people (86.0%). Santoso suggested that men are more at risk of this disease than women, because women have the hormone estrogen, where the estrogen hormone protects the walls of blood vessels from fat that causes blockages in blood vessels, at the time of menopause women become as vulnerable as men. the cause is due to the protective effect of estrogen Heart disease in women occurs about 10-15 years later than in men and the risk increases after menopause. In this study, the age of AMI patients varied with the lowest age being 37 years and the highest being 79 years. The mean age of AMI patients in this study was 62.05 years. This study is also the same as the research conducted by Shendy G. L Sagala et al. who stated that based on age, the most common age group was 55-64 years as many as 10 people (38.5%). Based on the length of treatment, it showed that the AMI patients who were the samples in this study were mostly hospitalized <5 days, namely 40 people (43.0%) > 5 days as many as 26 people (28.0%) and 27 people (29.0) outpatients. %) outpatients are only given therapy and control by specialist doctors accompanied by medical support so patients are asked to perform an examination of troponin T to see an increase in cardiac biomarkers, especially cardiac troponin. The results of this study are in line with research by Armada Kamira et al. Most of the Acute Myocardial Infarction patients underwent moderate length of hospitalization > 5 days as many as 17 respondents (56.7%), fast hospitalization days <5 days as many as 13 respondents (43.3%), and none of the respondents underwent treatment for more than 17

days (Karima & Setyorini, 2017). Based on the results of the study, examination of troponin T levels in AMI patients showed that as many as 88 people (94.6%) of AMI patients experienced a very drastic increase in troponin T with troponin T levels > 0.1 ng/ml and as many as 5 people (5.4%) AMI patients with troponin T levels <0.1 ng/ml. This is similar to the research conducted by Ni Gusti Ayu Putu Lestari Santika Dewi et al. The results showed that from 153 samples of AMI patients, about 77.8% of the samples had increased levels of TnT. This increase in TnT levels indicates heart muscle injury in AMI patients (Gusti Ayu Putu Lestari Santika Dewi et al., 2018).

Based on the results of the study, the examination of troponin T levels in AMI patients showed the average increase in troponin T levels from all study samples was 13.07 ng/ml and the percentage increase in troponin T levels in AMI patients was 14.422%. In general, patients with acute myocardial infarction when an infarction occurs, there will be a drastic increase in the rate of washout of the troponin T enzyme fraction through membrane leakage due to necrosis, so that it will show peak values on examination. In this study, 94.6% of AMI patients experienced a very drastic increase in troponin T, as evidenced by the mean (mean) of troponin T examination results, which was 13.07 ng/ml and the percentage increase in troponin T levels in AMI patients, which was 14.422%. This study is similar to the study conducted by Khaavenaa Simatharee in 2016 which stated that Troponin T increased when the value was 0.1 ng/ml which indicated that there had been damage to heart muscle cells, the results of the study obtained from 35 AMI patients there were 30 people with troponin T values >0.1 ng/mL and 5 people with troponin T values <0.1 ng/mL with an average troponin T value of 5, 94 ng/ml. The results of Prasetyo's research (2015) also showed the same results, namely from 54 AMI patients who had a troponin T value of 0.1 ng/ml as many as 44 people and who had a troponin T value of <0.1 ng/mL as many as 10 people (Henri , 2018).

According to the research revealed by Nur Samsu, it was stated that an increase in troponin T levels within 4-6 hours after an acute myocardial infarction, can show a sensitivity of up to 100% to damage to the myocardium. Troponin levels are only found in myocardial cells so that circulating troponin T becomes a very sensitive and specific marker when there is damage to myocardial cells. Troponin T will soon be released by the myocardium cells and enter the circulation. Troponin T will not be detected in healthy people because the amount is very low. Thus, even a small increase in troponin T levels can indicate damage to the heart muscle.

4. CONCLUSION

Based on the results of the study with a sample of 93 patients with acute myocardial infarction at St. Elisabeth Hospital, Medan in 2022, it was found that there was an increase in troponin T levels in patients with acute myocardial infarction. Overall, it can be described as follows: The normal value of troponin T <0.1ng/ml the results of the study were 5 people (5.4%), while the results of the study with abnormal values> 0.1 ng/ml were 88 patients 94 ,6%. The smallest value of troponin T examination is 0.0756 ng/ml, the largest value is 87.8920 ng/ml troponin T examination, the mean value is 13.07, SD is 17.44949. In general, patients with acute myocardial infarction when an infarction occurs, it will be increase in the washout rate of the troponin T enzyme fraction through membrane leakage due to necrosis, so it would show a peak value on examination.

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