MINOCA: Some Patients Survive, Others Don't. What Could Be The Predictors?

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INTRODUCTION: Myocardial infarction with non-obstructive coronary arteries (MINOCA) is a term used for myocardial infarction without any significant obstruction lesion in the coronary artery. MINOCA occurs in 5% patients presenting with Acute Coronary Syndromes (ACS). Pathogenesis and treatment for this group of patients are less clear. Prognosis of patients presenting with MINOCA are currently under investigation. SCIENCE Registry is an ongoing registry that collects data on ACS patients admitted to Intensive Cardiovascular Unit (ICCU) in Sardjito Hospital. The aim for this study is to determine mortality risk in MINOCA patient admitted to ICCU.
METHODS: We conducted a retrospective cohort study using SCIENCE Registry of Sardjito Hospital consisted of 56 patients admitted to ICCU from October 2022 to July 2023 presenting as Acute Coronary Syndrome who were then undergone coroangiography.
RESULT: Out of 7 predictors of mortality including gender, cardiogenic shock, LVEF, TAPSE, NLR ratio, RDW, and creatinin level, we found that cardiogenic shock (HR 9.64, CI 1.1-84.02, p = 0.040) and low EF (HR 11.581, CI 1.34-100.39, p = 0.029) were significant mortality predictors for MINOCA patients. There were 7 (12.5%) patients died with Lenght of Stay ranging from 1-9 days.
CONCLUSION: Increased risk of mortality were seen in MINOCA patient presenting as cardiogenic shock or with low LVEF. There were no significant demographic difference between both groups. Early recognition for hemodynamic instability and timely echocardiography assessment plays pivot role in standard of care patient with MINOCA admitted to ICCU.
Keywords: MINOCA; low EF; cardiogenic shock

One Year Outcome of Acute Coronary Syndrome Patients in Sardjito General Hospital: What Can We Learned?

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INTRODUCTION: Acute coronary syndrome (ACS) is a world health problem with a high mortality rate and is expected to continue to rise in number. The outcome of ACS in the hospital varies widely depends on several factors. The objective of this study was to determine management and outcome of ACS patients at Sardjito Hospital so it can be used for further evaluation.
METHODS: We conducted a study on ACS patients admitted to the intensive cardiovascular care unit (ICCU) at Sardjito General Hospital. All confirmed ACS cases between June 2022 to June 2023 were consecutively recruited. Demographic characteristics, medical history, reperfusion therapy, and major clinical outcome were obtained from ACS registry. Chi Square Test was used to compare categorical variables.
RESULT: A total of 1176 patients with ACS were included in this study consisting of STEMI 63.3%, NSTEMI 23.2%, and UAP 13.4%. A total of 573 STEMI patients underwent reperfusion with primary PCI and fibrinolysis (94.2% and 5.8%, respectively). NSTEACS patients who underwent early intervention were 230 patients (53.8%). There was no significant difference of clinical outcomes (shock, heart failure, and death) in NSTEACS patients who underwent early intervention and those who did not and this also occurs in STEMI patients who underwent fibrinolysis or PCI. Most common complications in STEMI patients were kidney failure (35.5%), cardiac arrest (19.1%), and cardiogenic shock (18.7%), meanwhile in NSTEACS patients were kidney failure (40.7%), cardiac arrest (15%), and mortality (14.1%).
DISCUSSION: Management reperfusion of ACS patients depends on several factors and may affect the outcomes for those patients.
CONCLUSION: From our finding, we need to evaluate management reperfusion of ACS patients so it may improve the outcomes.
Keywords: One Year Outcome, Acute Coronary Syndrome, STEMI, NSTEACS, Acute Heart Failure, Cardiogenic Shock, In Hospital Mortality

Description of Neutrophil Lymphocyte Ratio (NLR) in Coronary Heart Disease Patients at Haji Adam Malik General Hospital Medan

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INTRODUCTION: Cardiovascular disease is the largest cause of death in the world, WHO explains that there are 17.9 million deaths from cardiovascular disease. Of all cases of death by cardiovascular disease, 7.4 million (42.3%) were caused by Coronary Heart Disease (CHD). Neutrophil Lymphocyte Ratio (NLR) is one of the examination biomarkers that aims to assess the level of inflammation that is currently occurring in a disease. NLR has a significant relationship in increasing the Framingham risk score (FRS) in predicting CHD mortality, NHANES-III states that NLR should be used as a biomarker in assessing CHD inflammation.
METHODS: This study is a descriptive study with a cross-sectional approach that uses secondary data from patient medical records with collected using total sampling.
RESULT: The average NLR level of CHD patients was 4,438, the NLR cut-off point in this study was categorized into (<2.5) and (> 2.5). Based on the age group, NLR level increased more in the young adult age group (45-60 years) with a sample of 41 patients (27%), based on gender, the NLR level increased in males with a sample of 62 patients (41%).
DISCUSSION: The average NLR was 4.4, and based on gender the majority of NLR levels increased in patients with male sex. This relevant with the study of Sharma et al.,(2017) where NLR levels were more elevated in patients with male sex with an average of 5.2. NLR levels by age group is dominated by the adult age group, as we get older the function of all organs and the immune system will not work optimally. Research in Europe conducted in Italy said that NLR increased in patients who were severe and older age.
CONCLUSION: The NLR levels at Haji Adam Malik General Hospital Medan in CHD patients is increasing, especially in the young adult age group and patients with male gender.
Keywords: Heart Disease; Coronary Heart Disease; Cardiovascular; Neutrophil Lymphocyte Ratio

Table 1. Frequency Distribution of Characteristics Research Respondents

Characteristics of Respondents	Frequency n(%)	Total(%)
Gender		
• Male	127 (83,6)	152 (100)
• Female	25 (16,4)	
Age		
• 18-45 years old	10 (6,6)	152 (100)
• 45-60 years old	81 (53,3)	
• >60 years old	61 (40,1)	

Table 2. Gender Frequency Distribution by Age Group

	Early Adulthood (n)	Middle Adulthood (n)	Late Adulthood (n)
Male	10	71	46
Female	0	10	15

Table 3. Mean sample difference of NLR levels

	Frequency (n)	Minimum	Maximum	Mean
Neutrophil Lymphocyte Ratio (NLR) levels	152	0,63	47,25	4,4383

Table 4. Sample Frequency Distribution Based on NLR Levels

Neutrophil Lymphocyte Ratio (NLR) Levels	Frequency n (%)
Decreased (<2.5)	73 (48)
Increased (>2,5)	79 (52)

Table 5. NLR in patients with different Gender

Neutrophil Lymphocyte Ratio (NLR) Levels	Frequency n(%)	Total (%)
Male		
• Decreased	65 (43)	152 (100)
• Increased	62 (41)	
Female		
• Decreased	8 (5)	
• Increased	17 (11)	

Table 6. NLR in patients with different age group

Neutrophil Lymphocyte Ratio (NLR) Levels	Frequency n(%)	Total (%)
Early Adulthood		
• Decreased	8 (5)	152 (100)
• Increased	2 (1)	
Middle Adulthood		
• Decreased	40 (26)	
• Increased	41 (27)	
Late Adulthood		
• Decreased	25 (16)	
• Increased	36 (24)	

Determinants to Coronary Artery Calcium Score in Stable Angina Pectoris Patients

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INTRODUCTION: Cardiac computed tomography (CT) scan can provide valuable information to patients with stable angina pectoris. Among the many benefits, the ability to measure coronary artery calcium score (CAC) is essential to understand the degree of severity and the risk of cardiovascular disease. CAC score quantifies plaque build-ups in the coronary artery and has been closely associated with cardiovascular risk factors such as diabetes mellitus (DM), hypertension, and dyslipidemia. This study aims to understand the relationship between these risk factors and CAC score.
METHODS: This cross-sectional study uses the data obtained from stable angina pectoris patients undergoing cardiac CT scan in RSUP Dr. Sardjito between January and March 2023. DM, hypertension, and dyslipidemia were obtained during history taking and were treated as binary variables. CAC score was calculated based on the CT scan. This study uses linear regression to evaluate the association between the risk factors (DM, hypertension, and dyslipidemia) and the outcome which is CAC score.
RESULT: A total of 69 patients were eligible for the analysis. The proportion of the risk factors of DM, hypertension, and dyslipidemia was 19%, 54%, and 6%, respectively. There was no significant association between DM and dyslipidemia to CAC score (mean difference -207, 95% CI: -563–149 for DM; mean difference -178, 95% CI: 779–423 for dyslipidemia). In contrast, patients with hypertension show a higher CAC score by 287 points (95% CI: 14–560) compared to patients without hypertension.
DISCUSSION: Hypertension is closely related with plaque formation, however, the result for other risk factors may be affected by the small sample size.
CONCLUSION: This study found that stable angina pectoris patients with hypertension are at risk of having a higher CAC score compared to patients with other risk factors. Further study may benefit from examining the interaction between risk factors and by using more robust quantitative measurements.
Keywords: cardiac ct, angina pectoris, imaging, risk factors, cac score, calcium

Development of Cardiac 3D Printing of A Fused Heart in Thoracopagus Conjoined Twins Using Fused Deposition Modeling

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INTRODUCTION: Cardiac fusion presents in 75% of thoracopagus twins. It represents a rare case in liveborn conjoined twins. Its anatomical structure is diverse and greatly complex. The limitation of current diagnostic assessment tools results in a poor understanding of such case. Meanwhile, a physical model using 3-dimensional printing may simplify spatial recognition and produce a more decisive perception of complex anatomy. This study aims to construct a 3-dimensional printing model of a conjoined heart as a potential media to improve case understanding and communication in medical practice.

METHODS: Medical images were acquired from cardiac CT scan data of thoracopagus conjoined twins and used to generate digital models through segmentation, reconstruction and mesh processing. Stereolithography format files were used to store the digital model data. The printed model was then produced based on those files using fused deposition modeling. The polylactic acid resin was used as the material.

RESULT: A case of conjoined twins with fused left ventricles was modeled. The first twin had a complex heart structure with coarctation of the aorta while the second twin had a near-normal heart unless the shared left ventricle. Conversion of medical images retrieved from cardiac CT scan to a digital and printed model was successfully carried out. The cardiac and surrounding vascular structure of conjoined hearts were illustrated. A cardiologist checked the model for its accuracy.

DISCUSSION: A three-dimensional printed model can provide new insight into using easily reproduced and cost-effective media to deliver information and improve the understanding of a fused heart of conjoined twins. CT scan is a superior modality to define cardiac anatomy; thus, it serves as a reliable source of medical images for 3-dimensional model construction.

CONCLUSION: The cardiac 3-dimensional printing model of a fused heart of conjoined twins may be an acceptable and tangible media for education and information delivery.

Keywords: Cardiac 3D printing; fused conjoint heart; fused deposition modeling

Main Pulmonary Artery Diameter (mPAD) Derived from Chest CT as a Predictor of Pulmonary Hypertension in Atrial Septal Defect Patients in Sardjito General Hospital Yogyakarta

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INTRODUCTION: Pulmonary Hypertension (PH) can be observed in 10-20% of atrial septal defect (ASD) patients. Increased blood flow into the pulmonary artery (PA) may result in high pulmonary vascular resistance and lead to PH due to significant left-to-right shunt. Several studies in other countries suggest that main pulmonary artery diameter (mPAD) is one of the predictors of PH, but there has not been any related study done in Indonesia yet. This study aimed to determine the use of mPAD for predicting PH in ASD patients using a non-invasive multislice computed tomography (MSCT).

METHODS: A retrospective study was conducted on ASD patients who had undergone chest CT evaluation for cardiopulmonary disease between January and August 2023 at Integrated Cardiovascular Center of Sardjito General Hospital Yogyakarta.

RESULT: Total of 33 patients included in this study (75.8% females and 24.2% males with mean age 40.7±17.01 years). The mean of mPAD was 38.77±11.25. We found that the p-value and the sensitivity of mPAD were 0.041 (cutoff value >29 mm) and 93.8%, respectively.

DISCUSSION: PH complicates numerous heart conditions. It is crucial to confirm the existence of PH in ASD patients with chest CT evaluation since this condition is associated with higher rates of mortality and morbidity. This study revealed significant correlations of mPAD with the incidence of PH.

CONCLUSION: Main pulmonary artery diameter is a routine examination that can be used as a reliable predictor of PH in ASD patients. However, further investigation with more extensive subjects is needed.

Keywords: pulmonary artery diameter; pulmonary hypertension; atrial septal defect

The Ratio of Main Pulmonary Artery Diameter to Ascending Aorta Diameter Derived from Chest CT as a Predictor of Pulmonary Hypertension in Atrial Septal Defect Patients in Sardjito General Hospital Yogyakarta

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INTRODUCTION: Ten-to-twenty percent of individuals with atrial septal defect (ASD) may exhibit pulmonary hypertension (PH). Left-to-right shunt increases blood flow into the pulmonary artery causing elevated pressure and pathological changes of arterioles resulting in high pulmonary vascular resistance which leads to PH. Several studies in other countries have been published regarding the ratio of main pulmonary artery diameter (mPAD) to ascending aorta diameter (AAD) could be a predictor of PH. However, no similar studies have been done in Indonesia. Using a non-invasive multislice computed tomography (MSCT), the objective of this study is to assess the use of mPAD to AAD ratio for predicting PH in ASD patients.

METHODS: A retrospective study was conducted on ASD patients who had undergone chest CT evaluation for cardiopulmonary disease between January and August 2023 at Integrated Cardiovascular Center of Sardjito General Hospital Yogyakarta.

RESULT: A total of 33 patients were analyzed in this study (75.8% females and 24.2% males with mean age of 40.7±17.01 years). The mean ratio of mPAD to AAD was 1.39±0.47. We found that the p-value of correlation between mPAD to AAD ratio and PH incidence was 0.09 (cutoff value >0.9). The sensitivity of this chest CT determinant was 100%.

DISCUSSION: PH worsens cardiac conditions if left untreated. Since PH is linked to greater rates of mortality and morbidity, it is crucial to establish the diagnosis of PH in ASD patients using routine chest CT examination. This study revealed significant correlations between mPAD to AAD ratio and incidence of PH.

CONCLUSION: The ratio of mPAD to AAD can be used as a reliable predictor of PH in ASD patients. However, further research is required with larger subjects needed.

Keywords: pulmonary artery diameter; ascending aorta; pulmonary hypertension; atrial septal defect

Remodelling of the Left Atrium Following Balloon Mitral Valvuloplasty in Mitral Stenosis Patient

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INTRODUCTION: The definitive treatment for mitral valve stenosis is to remove the obstruction. One of the methods that can be chosen is balloon mitral valvulotomy (BMV). The goal of this procedure is to expand the narrowed commissures with the aid of the mechanical propulsion of the balloon so that the mitral valve mean gradient decreases. It is also hypothesized that the expansion of the narrowed commissure can reduce left atrial pressure so that left atrial dimensions become normal. In addition, it is also expected that there will be a decrease in pulmonary artery pressure. This study aims to study left atrium remodeling following balloon mitral valvuloplasty in mitral stenosis patients.
METHODS: Our retrospective study included 49 adult patients with isolated mitral stenosis who had undergone BMV from January 2015 to December 2022. This study assessed changes in left atrium volume index (LAVI), tricuspid valve regurgitation gradient (TVG) and mitral valve mean gradient by echocardiography pre and 6 months after BMV in mitral stenosis patients.
RESULT: There was a significant reduction in the mitral valve mean gradient from 11.74 + 5.07 mmHg to 5.60 + 2.22 mmHg ($p<0.001$). There was also a significant reduction in TVG from 45.92 + 27.35 mmHg to 30.55 + 12.39 mmHg ($p<0.001$). And we also found the LAVI reduced significantly from 59.13 + 18.66 ml.m-2 to 56.82 + 18.17 ml.m-2 ($p<0.001$).
DISCUSSION: The main purpose of BMV is to minimize stenosis thereby decreasing the mitral valve gradient, which in turn can decrease left atrial pressure. The decreased left atrial pressure results in a reduction in left atrial dimensions, as well as a decrease in pulmonary artery pressure which is illustrated by a decrease in TVG.
CONCLUSION: There was a significant reverse remodeling of the mitral valve mean gradient, left atrium volume index, and tricuspid valve regurgitation gradient.
Keywords: balloon mitral valvulotomy; mitral stenosis; left atrium volume index; tricuspid valve regurgitation gradient

Serum Uric Acid Level in Patient with Acute Coronary Syndrome: Treat or Leave It?

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INTRODUCTION: Hyperuricemia is frequently noted in patients with Acute Coronary Syndrome (ACS) and was associated with increased risk of adverse cardiovascular outcomes. The pathophysiology leading to increased risk are still unknown but Serum Uric Acid (SUA) has been significantly associated with endothelial dysfunction, antiproliferative effects, and high oxidative stress. This study is taken up to determine SUA levels in ACS and to compare the incidence of complications in Acute Heart Failure (AHF), Cardiogenic Shock (CS), and In Hospital Mortality.
METHODS: This study involved 477 consecutive patients admitted to Sardjito Hospital Yogyakarta with ACS from January 2023 to early July 2023. SUA was obtained in the first 24 hours on admission and major clinical outcomes were evaluated during the treatment in cardiac intensive care unit. Categorical variables were compared by the Chi-Squared test. Receiver Operating Characteristic (ROC) curve was used to get the cut-off value of SUA. The Spearman test used to assess correlation level of SUA and complications.
RESULT: The mean SUA level in the normouricemia and hyperuricemia was 5.15±1.14 mg/dL and 9.47±2.30 mg/dL, respectively. Mean SUA in AHF patients was 8.09±3.12 mg/dL. Meanwhile, the mean SUA in CS and mortality was 9.55±3.11 mg/dL and 10.94±2.94 mg/dL, respectively. The higher of SUA level was associated with AHF (cut-off ≥8.25 mg/dL; $p<0.05$), CS (cut-off ≥7.35 mg/dL; $p<0.05$), and mortality (cut-off ≥8.65 mg/dL; $p<0.05$).
DISCUSSION: Increased SUA levels was associated with increased risk of adverse ACS outcomes. Then, SUA levels can be considered as a suitable marker for predicting ACS-related future adverse events.
CONCLUSION: Complications of ACS such as AHF, CS, and mortality occurred more frequently in hyperuricemia patients. Higher of SUA was associated with each complication. Comprehensive management of ACS patients including hyperuricemia was expected to decrease the complications.
Keywords: Serum Uric Acid, Acute Coronary Syndrome, Acute Heart Failure, Cardiogenic Shock, In Hospital Mortality

Clinical and Hemodynamic Profile in Connective Tissue Disease-Associated Pulmonary Hypertension: A Study From Yogyakarta Cardiac Referral Hospital

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INTRODUCTION: Connective tissue disease-associated pulmonary hypertension (CTD-PH) is a severe complication constituting 25% of pulmonary hypertension diagnoses. CTD-PH is often misdiagnosed due to unspecific symptoms and signs. Our study is an initial step to investigate the characteristics of Indonesian population diagnosed with CTD-PH.
METHODS: This study is a single-centered, hospital-based, and retrospective study that includes patients >18 years diagnosed with CTD and PH by echocardiography (mPAP > 20 mmHg). Data were collected at Sardjito Hospital, Yogyakarta, from 2018 to June 2023. Data were obtained retrospectively and analyzed statistically with IBM SPSS version 22.
RESULT: Of 13 subjects diagnosed with CTD-PH, 10 (76.9%) were systemic lupus erythematosus (SLE), and 3 (23.1%) were mixed connective tissue disease. Most patients (84.6%) were female, with a median age of 40 ± 9.98 years. The most common chief complaint for patients being sent to cardiology is dyspnea. The median interval between CTD and PH diagnosis was seven months. A total of 11 subjects (84.6%) experienced RA RV enlargement; the median value for EF was 69 (range 34-83) %; the mean TAPSE and mPAP were 19.3 ± 4.49 mm and 34.77 ± 11.48 mmHg, respectively. Most patients received immunosuppressive and PAH-targeted drug therapy. During the follow-up period, four subjects (30.8%) died.
DISCUSSION: We report the clinical and hemodynamic profiles of patients with CTD-PH in Yogyakarta. In this study, the patients were young adults (40 ± 9.98 years old), predominantly female (n = 11, 84.6%), and SLE is the type of CTD with the highest prevalence of PH. This is similar to the findings of Yan-Jie et al.
CONCLUSION: PH is a worse complication of CTD, the majority of our cases occur in women and young adult age. In our study, PH was diagnosed within the first year following CTD diagnosis, and SLE is the most common connective tissue disease underlying PH.
Keywords: Pulmonary Hypertension; Connective Tissue Disease; Systemic Lupus Erythematosus; Mixed Connective Tissue Disease

Table 1. Clinical Characteristics

Characteristics	Total (n = 13)
Age (years) [mean ± SD]	40 ± 9.98
Female, [n (%)]	11 (84.6)
Body Mass Index (kg/m²) [mean ± SD]	20.6 ± 2.91
Duration between CTD and PH diagnosed (months) [median (IQR)]	7 (0 - 43)
Hypertension, [n (%)]	3 (23.1)
Diabetes Melitus, [n (%)]	1 (7.7%)
CTD type	
SLE, [n (%)]	10 (76.9)
Scleroderma, [n (%)]	0 (0)
Sjogren syndrome, [n (%)]	0 (0)
MCTD, [n (%)]	3 (23.1)
Chief Complaint	
Dyspnea, [n (%)]	8 (61.5)
Chest pain, [n (%)]	2 (15.4)
Fatigue, [n (%)]	2 (15.4)
Cough, [n (%)]	1 (7.7)
NT-ProBNP (pg/ml) [median (IQR)]	4819 (926-34617)
Hemodynamic Parameters	
Right Atrial Enlargement, [n (%)]	11 (84.6)
Right Ventricular Enlargement, [n (%)]	11 (84.6)
Ejection Fraction, (%) [median (IQR)]	69 (34-83)
TAPSE (mm) [mean ± SD]	19.3 ± 4.49
mPAP (mmHg) [mean ± SD]	34.77 ± 11.48
Pericardial Effusion, [n (%)]	8 (61.4)
Treatment	
Immunosuppressive drugs, [n (%)]	12 (92.3)
PAH-targeted therapy, [n (%)]	12 (92.3%)
Combination PAH-targeted therapy, [n (%)]	2 (15.4)
Death, [n (%)]	4 (30.8)

CTD, Connective Tissue Diseases; MCTD, mixed connective tissue disease; mPAP, mean Pulmonary Artery Pressure; NT-ProBNP, N-terminal prohormone of brain natriuretic peptide; PH, Pulmonary Arterial Hypertension; SLE, Systemic Lupus Erythematosus; TAPSE, Tricuspid Annular Plane Systolic Excursion;

Ambulatory Blood Pressure Monitoring As Tools Diagnostic And Therapy Of Primary Hypertension In Dr. Sardjito General Hospital Yogyakarata (One Years Observation Study)

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INTRODUCTION: Hypertension is the leading cause of cardiovascular disease and premature death worldwide. In clinical practice, ambulatory blood pressure monitoring (ABPM) tends to be used solely for diagnosing hypertension, especially to identify white‐coat and masked hypertension.

METHODS: This study is an observational study for 1 year (July 2022-June 2023) in patients with suspected primary hypertension and evaluation of therapy in hypertensive patients. Subjects were examined ABPM for 24 hours. In patients with suspected primary hypertension, antihypertensive drugs were given 5 days before the examination. Patients with hypertension evaluation, antihypertensive treatment is still given according to the daily dose. Interpretation of ABPM results is carried out by a cardiologist and cardiac rehabilitation consultant.

RESULT: The research was conducted for 1 year of observation. There were 135 subjects who underwent Ambulatory Blood Pressure monitoring. There were 87 male (64.44%) and 48 female (35.56%) with a mean age of 56+5.4 years. Indications for ABPM examination were divided into indications for diagnosis in 41 subjects (30.37%) and monitoring therapy in 94 subjects (69.63%).

Based on the results of the study, 8 subjects (12.6%) had white coat hypertension, 4 subjects (9.75%) disguised hypertension and 29 subjects (70.7%) primary hypertension. Monitoring therapy obtained controlled hypertension in 65 subjects (69.15%) and uncontrolled hypertension (30.75%).

DISCUSSION: Ambulatory blood pressure monitoring was a standard measurement of blood pressure so that it can be used as a reference for diagnosing hypertension and evaluating the success of therapy

CONCLUSION: Ambulatory blood pressure monitoring helps diagnose patients and evaluate therapy in patients with hypertension Keywords: Hypertension, Ambulatory Blood Pressure Monitoring

Correlation Between Hba1c, Tg, And Ldl Levels With Angiography Results In Chd Patients At Telogorejo Hospital Semarang

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INTRODUCTION: Coronary heart disease (CHD) or coronary artery disease is a heart condition with a formation of atherosclerotic plaques in the lumen of the coronary arteries, causing disruption of blood flow and oxygen supply to the myocardium. This study has novelty value because the correlation between the three independent variables (HbA1C, TG, LDL) and coronary angiography results in CHD patients has never been studied simultaneously before. The aim of this study is to analyze the correlation between HbA1C, TG, and LDL levels with angiography results of CHD patients at Telogorejo Hospital Semarang.
METHODS: The research method used is cross-sectional approach. The study population included patients who underwent coronary angiography in 2020 to 2022 and met the study criteria. A total of 34 patients parcitipated in the study. Data analysis was performed using the Spearman Rank test.
RESULT: Findings showed there was a significant relationship (r = 0.402) between HbA1C levels with the results of angiography in CHD patients, while TG levels and LDL levels were not statistically related to the results of angiography in CHD patients.
CONCLUSION: This study shows that HbA1C levels have a significant relationship with angiography results in CHD patients with a moderate positive correlation rate. LDL and TG levels did not show a statistically significant relationship.
Keywords: coronary heart disease; triglyceride; HbA1C; low-density lipoprotein; coronary angiography

Red Cell Distribution Width (RDW): The Ignored Biomarker to Predict Adverse Outcome in Patient with Acute Coronary Syndrome (ACS)

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INTRODUCTION: The incidence of ACS remains high, therefore predictive marker for adverse outcome is needed. The Mayo Cardiac Intensive Care Unit Admission Risk Score (MCARS) mentions RDW as one of laboratory marker that increased critical-care resource utilization during CICU admission. RDW, platelets and serum albumin are linked as predictor of major adverse cardiovascular events in individuals with ACS.
METHODS: In this retrospective cohort investigation, data were obtained from the SCIENCE registry. We aimed to explore the association between RDW, RDW/Albumin ratio (RAR), RDW/Platelet ratio (RPR) and in-hospital all-cause mortality in CICU patients with ACS. ROC curve was performed to test the capacity of RDW, RAR, and RPR to differentiate between survivors and non- survivors and to determine the optimal cutoff value. To compare the groups, we employed the chi-square test for categorical variables.
RESULT: We enrolled 1285 patients, where 1055 survived and 230 died during the hospitalization at CICU within study period (January 2022-June 2023). The AUCs (95%CI) for RDW was 0.603(0.563-0.653), the cutoff point was 13.050, with specificity 45.3% and sensitivity 71.3% ($p<0.001$). The AUCs (95%CI) for RAR was 0.699(0.663-0.736), the cutoff point was 3.624, specificity 72.8%, sensitivity 59.1% ($p<0.001$). The AUCs (95%CI) for RPR was 0.592(0.548-0.635), the cutoff point was 0.062, specificity 78.4%, sensitivity 39.1% ($p<0.001$). Greater RDW (≥13.05%) and RAR (≥3.62) showed elevated in-hospital mortality ($P<0.001$). Otherwise, elevated RPR value (≥0.062) didn't increase in-hospital mortality ($P<0.001$).
DISCUSSION: On this study, patients with ACS who died had higher RDW and RAR on admission. This study supports the MCARS (RDW ≥14.3%), but different cutoff value (RDW≥13.05%) due to the different study populations. Elevated RPR didn't show association with in-hospital all-cause mortality, this requires further investigation on a larger sample size.
CONCLUSION: RDW and RAR are predictor of the mortality of ACS patients in the CICU and is positively associated with in- hospital all-cause mortality.
Keywords: acute coronary syndrome; red cell distribution width; RDW/Albumin ratio; RDW/Platelet ratio; predictor; mortality

Table 1 The AUC values, cut-off value, sensitivity, and specificity of RDW, RAR, RPR to in hospital mortality

Variables	AUC (95% CI)	Cut off	Specificity	Sensitivity	P-Value
RDW	0.603(0.563-0.653)	13.050	0.453	0.713	<0.001
RAR	0.699(0.663-0.736)	3.624	0.728	0.591	<0.001
RPR	0.592(0.548-0.635)	0.062	0.784	0.391	<0.001

Abbreviation: RDW= Red Cell Distribution Width; RAR= RDW/Albumin ratio; RPR= RDW/Platelet ratio

Table 2 The chi square RDW, RAR, RPR to in hospital mortality

Variables		Survived	Not Survived	P-Value
RDW	<13.050	478	577	<0.001
	≥13.050	66	164	
RAR	<3.624	768	287	<0.001
	≥3.624	93	136	
RPR	<0.062	827	228	<0.001
	≥0.062	140	90	

Abbreviation: RDW= Red Cell Distribution Width; RAR= RDW/Albumin ratio; RPR= RDW/Platelet ratio

The Quality of Life, Knowledge and Awareness among Young Adult Hypertensive Patients: Primary Clinic Setting

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INTRODUCTION: The factors influence hypertension among young adult aged 18-35 years are remain unclear despite the increasing incidence rate. On the contrary, young people tend to be unaware of hypertension. Recent studies also indicated that impaired quality of life (QoL) domains was associated with hypertension.
METHODS: A cross-sectional study was performed to outpatients aged 18-35 years in Diakonia Primary Clinic, Gunungkidul, with blood pressure was higher than 140/90mmHg at the minimal two time periods measurement, and without comorbidities. The subjects were interviewed to assess the Hypertension Fact Questionnaire and WHO's Quality of Life (WHOQOL)-BREF. We analyzed the data in SPSS version 25.
RESULT: A total of 65 young hypertensive patients were included, consisted 66.2% of male, with mean age value was 26.22±3.92. Based on WHOQoL assessment, mean of overall QoL domain was 65.20±12.87 (ranged from 0-100), with 33.8% subjects dissatisfied with their QoL. Descriptively, mean of QoL among active smokers, male patients, obesity, and patients with less physical exercise were lower than the opponent (69.34 vs. 60.37, 70.51 vs. 62.48, 65.73 vs 64.00, 66.51 vs 64.54 respectively). However, there were only active smokers and male subjects that significantly associated with poor QoL ($p=0.04$, $p=0.016$ respectively). We also found that 23.07% subjects disagree of hypertension can onset earlier, and 24,61% disagree of both sexes have equal risk of hypertension.
27.69% unaware of their hypertension status and 41.57% still unaware to change their lifestyle to improve blood pressure.
DISCUSSION: Our study was in line with others, we found that young hypertensive patients tend to have lower QoL, moreover in active smokers. Most of our patient's knowledge about hypertension was fair but they still lacked of awareness of their disease, preventive and treatment.
CONCLUSION: As doctor in primary clinic, we propose to raise hypertension awareness in young adult patients, in action to improve QoL.
Keywords: Young-adult; Hypertension; Quality of Life

Clinical Characteristics of The Patient with ST-elevation Myocardial Infarction (STEMI) : A Single Center Study in Rural Hospital

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INTRODUCTION: STEMI is a spectrum of acute coronary syndrome (ACS) characterized by severe ischemia and large cardiomyocytes necrosis resulting from completely obstructed thrombus. Approximately 3 million people develop STEMI each year, including in the developing countries.1,2
METHODS: This is a cross-sectional study included 139 patients diagnosed with STEMI during 2022. We retrospectively identified the medical records and divide into two groups based on the invasive therapy.
RESULT: This study consists of 56,8% (n=79) patients underwent percutaneous coronary intervention (PCI) and 43,2% (n=60) who have not, the mean age are 57,3 +- 7,4 and 59,9 +- 7,3 respectively. Males are more prevalent counted as much 78% (n=109). Killip class, anatomical area, hypertension, diabetes, complication and TIMI score revealed no difference for both groups. From the coronary studies, the majorities are single and double vessel diseases. In-hospital mortality (15% ; n=9), late presenter (52% ; n=31) and average length of stay (4,2 +- 3,1 days) are observed in non-PCI group prominently. Ejection fraction (EF) finding showed better outcome in PCI group.
DISCUSSION: Our study consistent with the Jakarta ACS registry report looked in the age and gender.3 Dominant Killip class more than equal II in both groups considered to be correlated with onset and anterior location.4 In-hospital mortality is more frequent in patients that PCI undone, also regardless to the strategic therapy 38,5% (n=5) patients have Killip class IV. Although the study design is different, a cohort study from Velagaleti et al stated that improvement in EF can reduce mortality and heart failure (HF) hospitalization in PCI group.5 No further analytical study and limited data provided by the medical records are the limitations of this study.
CONCLUSION: STEMI is still a global burden with high mortality and morbidity. The better outcome is expected since the hospitals with PCI center are evolving even in rural area in Indonesia.
Keywords: Characteristics ; STEMI ; rural ; PCI ; cross-sectional

Table 1. Clinical characteristics of STEMI patients from January – December 2022

Characteristics	PCI group (n=79)	Non-PCI group (n=60)
Sex		
Male, *% (n)*	77% (61)	80% (48)
Female, *% (n)*	23% (18)	20% (12)
Age, mean ± SD	57,3 ± 7,4	59,9 ± 7,3
≤ 40, *% (n)*	3% (2)	3% (2)
41-49, *% (n)*	11% (9)	11% (7)
50-59, *% (n)*	43% (34)	35% (21)
60-69, *% (n)*	34% (27)	38% (22)
≥ 70, *% (n)*	9% (7)	13% (8)
Killip Class		
I, *% (n)*	9% (7)	5% (3)
II, *% (n)*	82% (65)	72% (43)
III, *% (n)*	5% (4)	5% (3)
IV, *% (n)*	4% (3)	18% (11)
Anatomical area		
Anterior, *% (n)*	30% (23)	28% (17)
Inferior, *% (n)*	33% (26)	33% (19)
Anterolateral, *% (n)*	8% (6)	11% (7)
Anteroseptal, *% (n)*	10% (8)	7% (4)
Lateral, *% (n)*	1% (1)	3% (2)
Extensive anterior, *% (n)*	13% (10)	10% (6)
Posterior, *% (n)*	3% (2)	2% (1)
Right ventricle, *% (n)*	4% (3)	7% (4)
Risk factors		
Hypertension, *% (n)*	63% (50)	45% (27)
Diabetes , *% (n)*	23% (18)	23% (14)
Onset		
≤ 12 hours, *% (n)*	68% (54)	48% (29)
> 12 hours, *% (n)*	32% (25)	52% (31)
Complications		
Mitral regurgitation, *% (n)*	20% (16)	10% (6)
Malignan arrhythmia, *% (n)*	3% (2)	5% (3)
AV block, *% (n)*	0% (0)	3% (2)
Shock, *% (n)*	4% (3)	13% (8)
Septal rupture, *% (n)*	0% (0)	0% (0)
Free wall rupture, *% (n)*	0% (0)	0% (0)
TIMI score		
≤ 8, *% (n)*	92% (73)	77% (46)
> 8, *% (n)*	8% (6)	23% (14)
Ejection fraction		
≥ 50%, *% (n)*	40% (31)	12% (7)
41-49%, *% (n)*	35% (27)	33% (20)
≤ 40%, *% (n)*	23% (19)	40% (24)
Outcome		
Discharged, *% (n)*	95% (75)	85% (51)
In-hospital dead, *% (n)*	5% (4)	15% (9)
Length of stay (LOS), mean ± SD	3,8 ± 1,3	4,2 ± 3,1
≤ 3 days, *% (n)*	51% (40)	35% (21)
> 3 days, *% (n)*	49% (39)	65% (39)
Admission process		
Referral, *% (n)*	48% (38)	27% (16)
By self, *% (n)*	52% (41)	73% (44)

Correlation between Selvester Electrocardiogram Score and Wall Motion Score Echo Index in Patient with ST-Segment Elevation Myocardial Infarction

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INTRODUCTION: In 1985, Selvester et al, developed a QRS scoring system for estimating myocardial infarct size. Cardiac magnetic resonance imaging (CMR) is the most reliable modality to evaluate the myocardial infarct size. Wall motion score index (WMSI) by TTE is usually used as surrogate in evaluating the myocardial infarct size. This study aimed to investigate the correlation between the Selvester Electrocardiogram Score and CMR in patient with STEMI who had undergone PPCI.
METHODS: This study was retrospective study that include all STEMI patients with onset less than 12 hours between January 2022 and June 2023. Using standard TTE sequence, the 16 myocardial segments were assigned a score from 1 to 4 (1 = normokinetic, 2 = hypokinetic, 3 = akinetic, and 4 = dyskinetic). The wall motion score index is then calculated by dividing the sum of the aforementioned segmental values by 16.
RESULT: Eighty-two patients, including 71 males (86%) and 11 females (14%) with mean age of 56.84 + 9.57 years. About 46 patients (56%) were anterior STEMI, 8 patients (9%) were anterior extensive, and 28 patients (35%) were non-anterior STEMI, with mean onset was 6.7 + 2.63 hours. Mean ECG Selvester score was 4.13 + 2.54 and mean WMSI was 1.41 + 0.31. There was modest positive correlation between ECG Selvester score and WMSI with p= 0.04 (r= 0.421).
DISCUSSION: We found there was positive correlation between ECG Selvester score and WMSI that measured by echocardiography. In 1985, Selvester et al, found ECG score for estimating myocardial infarct size. The higher score correlated with larger myocardial infarct size. TTE could be used for estimating myocardial infarct size as well for example by using WMSI. The higher WMSI score, the larger myocardial infarct size as well.
CONCLUSION: Higher ECG Selvester score on admission correlated with higher WMSI in STEMI patients who underwent PPCI.
Keywords: Selvester electrocardiogram score; wall motion score index; acute coronary syndrome

Tabel 1. Baseline characteristics

Variables	Total (n = 82)
Demographic Factors	
Age (years)	56.84 ± 9.57
Male (n, %)	71 (86.6)
Body Mass Index (kg/m^2)	22.92 ± 1.82
CV History and Risk Factors, n (%)	
Diabetes Mellitus	29 (35.4)
Hypertension	41 (50)
Dyslipidaemia	24 (29.3)
Current Smoker	58 (70.7)
Family History of CAD	0
Clinical Presentation (n, %)	
SBP	
<90 mmHg	3 (3.6)
90 – 139 mmHg	64 (78.2)
140 – 159 mmHg	10 (12.2)
160 – 179 mmHg	3 (3.6)
≥ 180 mmHg	2 (2.4)
Heart Rate	
< 60 bpm	2 (2.4)
60 – 100 bpm	61 (74.2)
>100 bpm	19 (23.4)
Killip Class	
Class I	67 (81.7)
Class II	12 (14.6)
Class III	2 (2.4)
Class IV	1 (1.2)
Infarct Location	
Anterior	46 (56.1)
Anterior extensive	8 (9.8)
Others	28 (34.1)
Echocardiography Findings	
LVIDD	49.37 ± 6.89
LVEF	48.46 ± 11.7
TAPSE	19.26 ± 3.83
LVMI	107.31 ± 22.11
RWT	0.39 ± 0.12

SBP: Systolic Blood Pressure
LVIDD: Left Ventricle Internal Diastolic Diameter
LVEF: Left Ventricle Ejection Fraction
TAPSE: Tricuspid Annular Plane Systolic Excursion
LVMI: Left Ventricle Mass Indeks
RWT: Regional Wall Thickness

Percutaneous Coronary Interventions In St-Segment Elevation Myocardial Infarction More Than 48 Hours: Do It Or Leave It?

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INTRODUCTION: In patients presenting with an ST-segment elevation myocardial infarction (STEMI), the relative benefit of reperfusion decreases proportionally to the treatment delay. In daily practice, it is common to find STEMI patients with very late onset (>48 h) after the symptom. Based on the existing guidelines, STEMI patients with an onset of more than 48 hours who still have signs of ischemia have an indication of percutaneous coronary interventions.

AIM: We aimed to compare clinical outcomes in an all-comer population of STEMI patients who underwent early, late, or very late percutaneous coronary interventions

METHOD: A hospital-based retrospective, observational study was conducted from January 2022 to May 2023. We compared outcomes of STEMI patients undergoing percutaneous coronary intervention (PCI) according to the onset of STEMI. Patients included in Sardjito Cardiovascular Intensive Care Registry between January 2022 and May 2023 were analyzed. Based on symptom-to-balloon-time, patients were categorized as early onset (<12 h), late-onset (12-48 h), and very late onset (>48 h). STEMI patients Killip Class IV were excluded from the current analysis. The total of 641 STEMI patients undergoing percutaneous coronary intervention admitted to ICCU of Dr. Sardjito Hospital within the period of the study were screened. The patients were divided into 3 groups based on the onset of STEMI, early (<12 h), late (12–48 h), or very late onset (>48 h). Co-primary endpoints were all-cause in-hospital mortality, re-admission in 30 days, cardiogenic shock after admission, and prolonged length of stay (LOS) in the hospital (>5 d).

RESULT: Of 641 STEMI patients undergoing PCI, 57.6% were early, 34.6% late, and 7.8% very late onset. The mean age was 58.79, and 80,8% were male. Based on this study, we found significant differences in mortality rate (among the early 7.3%, late 11.7%, and very late 18% groups, P 0.025), rehospitalization rate within 30 days (early 9.8%, late 13.1%, and very late 24%, P 0.012), and prolong length of stay (early 16.8%, late 22.1% and very late 40%, P 0.001). This study showed an increase in mortality associated with the onset of STEMI, we found a significant mortality rate among the early and late onset of STEMI (P 0.07), and among late and very late onset of STEMI (P 0.026). Whereas the incident of shock did not differ significantly (P 0.166) among the early (7.9%), late (12.6%), and very late (10%) groups.

CONCLUSION: From this study, we found STEMI patients with an onset of more than 48 hours undergoing percutaneous coronary intervention have an increase in side effects, so in daily practice for patients with an onset of more than 48 hours, we should consider whether percutaneous interventions are really necessary.

Exploring the Transformative Role of Artificial Intelligence in Atrial Fibrillation: A 5-Year Bibliometric Analysis of Research Trends and Insights

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INTRODUCTION: Artificial intelligence involves the utilization of machines to process data and perform tasks typically require human cognitive abilities. The aim of this study was to analyze recent trends and publication activity in the field of Atrial Fibrillation (AF) utilizing AI through a bibliometric analysis conducted over the past five years.
METHODS: A systematic search was conducted using the Web of Science Core Collection database to identify pertinent publications on the topic of artificial intelligence in atrial fibrillation over the past five years. Quantitative analysis was performed using the VOSviewer software, employing statistical, data mining, and data visualization techniques to analyze various bibliometric indicators.
RESULT: The most research topics were divided into five distinct clusters: mobile health, machine learning, deep learning, electrocardiography, and stroke. These clusters represent the most common areas of focus in the publications, reflecting the primary research interests and directions in the field.
DISCUSSION: A total of 461 publications related to artificial intelligence in atrial fibrillation were identified over the past five years, with an impressive H-index of 26 and an average of 8.11 citations per paper. The annual publication output showed an upward trend, peaking in 2022. The United States contributed the highest number of publications (175), followed by China (77) and England (61). Among the relevant affiliations, several universities from the USA emerged as the most prominent publications, including Mayo Clinic (60), Harvard University (29), and Massachusetts General Hospital (20).
CONCLUSION: The bibliometric analysis of research articles reveals that the use of AI in AF has become increasingly prominent. The analysis indicates that AI has been successfully integrated with digital devices and diagnostic technologies, allowing for widespread screening and improved diagnostic assessments. These findings suggest that AI has the capacity to revolutionize the field of medicine in relation to AF, providing innovative methods for enhanced patient management and improved outcomes.
Keywords: artificial intelligence; atrial fibrillation; bibliometrics

Health Counseling About Risk Factors And Hypertension Prevention In The Community To Reduce Hypertension Rate In The Work Area Of Sungai Bilu Public Health Center

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BACKGROUND AND AIMS : The results of the 2018 (Riskesdas) survey showed that the prevalence of hypertension in Indonesia reached 34.11%. South Kalimantan Province ranks first the prevalence of hypertension based on the results of blood pressure measurements in people aged > 18 years, which is 44.13%. Banjarmasin itself ranks 4th out of 13 regencies/cities, which is 46.79% of the prevalence of hypertension. At the Sungai Bilu Public Health Center, hypertension has always been ranked first from 2019-2021.
Material and Methods : a survey was conducted on 200 respondents who experienced hypertension in the Sungai Bilu Health Center work area, it can be seen that there are several internal and external factors that cause the high incidence of hypertension. Furthermore, priority problem solving is set in the form of counseling to the public about the risk factors for hypertension with media (leaflets, power point slides) to prevent the occurrence of hypertension in the community.
RESULT: Based on the knowledge level category, at the pretest there were still 96 respondents (48%) who had deficient knowledge. The number of respondents who have fair category is 74 people (37%). After receiving counseling, the category of respondent's knowledge level was 96.3% (193 people) good, only 7 person (3.7%) still had fair category. The normality test used the Shapiro-Wilk test with $p=0.034$ in the pretest value and $p=0.001$ in the posttest value which indicated that the data distribution was not normally distributed because $p<0.05$ so the Wilcoxon test was chosen for data analysis with the results obtained $p = 0.001$ which showed that there was a significant change in the level of knowledge between before and after being given counseling about hypertension.
CONCLUSION: With proper counseling and according to the problems found, it is proven to reduce hypertension rates in certain areas.
Keywords: hypertension, knowledge, counseling

The Cardioprotective Effect Of Statin Therapy In Breast Cancer Patients Receiving Chemotherapy: A Systematic Review

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INTRODUCTION: Breast cancer is one of the most common cancers in the world as well as in Indonesia. The introduction of chemotherapy drug regimens has increased the survival rate of breast cancer patients. However, it comes with potential drawbacks that can be fatal, including cardiac side effects such as left ventricular systolic dysfunction, heart failure, and arrhythmia. Therefore, we aimed to assess the potential of statin therapy in preventing chemotherapy- related cardiovascular complications in breast cancer patients.
DISCUSSION: Literature searching was conducted through five databases: MEDLINE, Embase, EBSCOhost, Scopus, and ProQuest, searching for randomized controlled trials (RCTs) or cohorts assessing the association between statin therapy and various cardiovascular outcomes and echocardiographic features in breast cancer patients undergoing chemotherapy. The quality assessment of included studies was performed using Cochrane Risk of Bias (RoB) 2 for the RCT studies and the Newcastle-Ottawa Scale (NOS) for the cohort studies. Four studies with a total of 4.743 subjects from various countries were included in this review. The review shows that statin therapy is associated with lower incidence of heart failure and arrhythmia in breast cancer patients treated with chemotherapy. The review also shows that the statin group has the less significant decline of LVEF and less significant increase of LA diameter and E/e' ratio than the control group, while the difference of GLS changes between the two groups is not significant.
CONCLUSION: Statin therapy has the potential to prevent chemotherapy-related cardiotoxicity in patients with breast cancer, proven clinically and echocardiographically. Further trials are needed to determine the optimal dose and the type of statin with the best efficacy.
Keywords: statin; breast cancer; cardiotoxicity; chemotherapy; cardiovascular complication; prevention

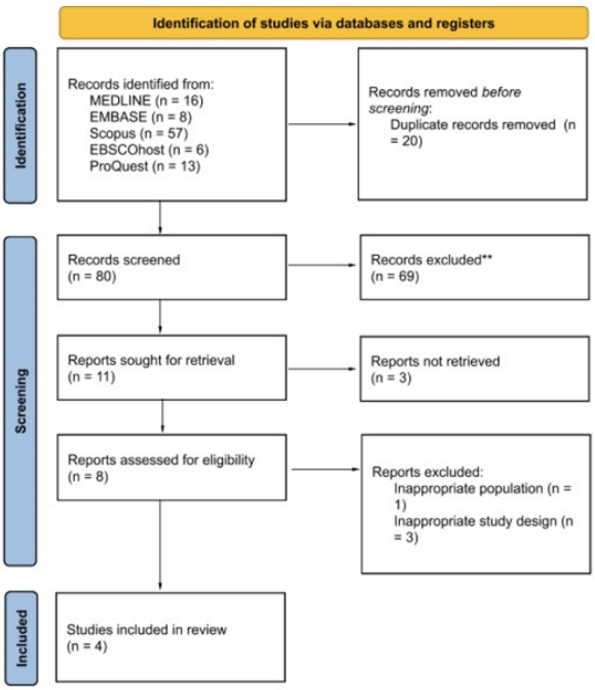

Table 1. Characteristics of included studies

Author and publication year	Design	Location	Sample size	Mean age (years)	Chemotherapy	Statin Therapy	Follow-up time	Outcome	Effect Estimates	P value
Abdel-Qadir H, 2021	Retrospective cohort	Ontario, Canada	2545	69	Anthracycline	Any kind	5 years	HF incidence	HR 0.44 [95% CI 0.22–0.87]	0.02
			1371	70	Trastuzumab	Any kind	5 years	HF incidence	HR 0.41 [95% CI 0.17–0.97]	0.04
Seicean, 2012	Retrospective cohort	Cleveland, the USA	628	51.5 (10.8)	Anthracycline	Any kind	2.6 years	HF incidence	HR 0.3 [95% CI 0.1-0.9]	0.03
Nabati M, 2019	RCT	Iran	83	49.26 (11.20)	6 cycles of anthracycline and cyclophosphamide	Rosuvastatin 20 mg	6 months	LVEF	MD I -1.51 (6.56) MD C -5.16 (5.68)	0.012
								GLS	MD I 1.35 (2.15) MD C 1.97 (2.32)	0.225
								LA diameter	MD I -0.31 (0.29) MD C 0.3 (0.35)	<0.001
								E/e'	MD I 0.25 (1.66) MD C 0.75 (1.95)	0.021
Kwan J, 2023	Cohort	New Haven, the USA	116	64.6 (11.3)	Anthracycline/trastuzumab (AT), non anthracycline/trastuzumab (NAT)	Any kind	30 years	Arrhythmias incidence	HR 0.416 [95% CI 0.229–0.755]	0.004

Abbreviations: HF, heart failure; HR, hazard ratio; RCT, randomized control trial; LVEF, left ventricular ejection fraction; GLS, global longitudinal strain; LA, left atrium; E/e': transmitral Doppler early diastolic velocity/mitral annular early diastolic velocity; MD I, mean difference (intervention); MD C, mean difference (control).

A Systematic Review: The Effect of Acetazolamide Additional Therapy to Loop Diuretic for Improving an Effective Treatment in AHF Patients

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INTRODUCTION: Hospital readmissions are primarily caused by signs and symptoms of congestion in acute heart failure (AHF). Loop diuretics are commonly used to treat volume excess. However, combining acetazolamide with loop diuretic therapy may enhance diuretic effects in diverse ways. It has been suggested by earlier studies in AHF patients that this combination increases the effectiveness of loop diuretics. We examined the impact of acetazolamide addition to loop diuretic therapy in AHF patients and assessed the benefit of the combination.
DISCUSSION:569 patients from a total of four RCTs were included in the study. Acetazolamide additional therapy helped loop diuretic to increase natriuresis (in all of the studies) and urin output (in two studies). The congestion
symptoms also reduced in patient who received acetazolamide additional therapy on dose 500 mg intravenously within three days ($p<0.05$) in two studies. Acetazolamide inhibits the reabsorption of sodium bicarbonate in the renal proximal tubules, providing more sodium to Henle's loop and enhancing the natriuretic impact of loop diuretics, resulting in more and faster decongestion. Additionally, it interferes with the pendrin system in the distal nephron, which may function as a diuretic resistance candidate mechanism. However, it is worth noting that patients who received acetazolamide therapy also had an increase in serum creatinine levels in two studies.
CONCLUSION: This systematic review provides evidence that adding acetazolamide to loop diuretic therapy can increase the effectiveness of loop diuretics to improve decongestion success in AHF patients. Additionally,
acetazolamide-treated individuals exhibited natriuresis and urin output that were higher than those in the control group, despite it also raises serum creatinin level.
Keywords: Acetazolamide, Loop Diuretic, Acute Heart Failure, Systematic Review

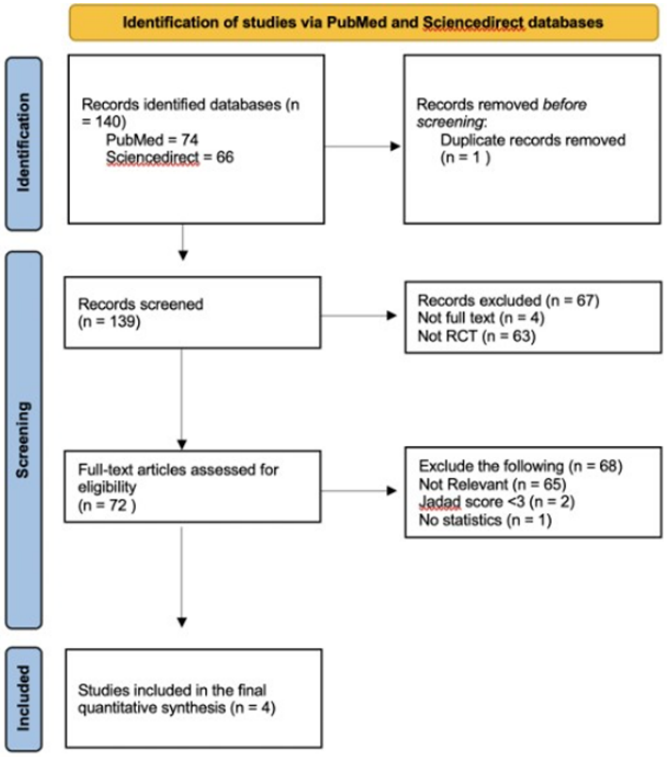

Figure 1. PRISMA flowchart of selection studies

Study	Design	N	Inclusion criteria	Reduce decongestion	Natriuresis	Urine output	Increase Serum creatinin
Verbrugge, F et al, 2023	Multicenter, randomized, parallel-arm, double-blind, placebo-controlled trial	462	Patients from the ADVOR trial with complete data on urine output and urine sodium concentration (UNa) (urine sample >500 mL over 24 hours)	-	a. Acetazolamide (231 of 462 patients) = 476 ± 229 mmol b. Placebo (231 of 462 patients) = 375 ± 229 mmol p < 0.001	a. Acetazolamide (231 of 462 patients) = 4,689 ± 1,667 b. Placebo (231 of 462 patients) = 4,166 ± 1,789 mL p = 0.001	-
Imiela, et al, 2017	Prospective, randomized, unblinded, single-center	20	1.Clinical sign of volume overload 2. EF <50 % 3. Stable dose of diuretics over the next 4 days 4. Age ≥ 18 years	-	a. Acetazolamide (10 of 20 patients) = 253.1 ± 72.6 mmol b. Control (10 of 20 patients) = 240.70± 131.5 mmol p = 0.81	-	-
Verbrugge, F et al, 2019	Prospective, two-centre study, randomised study	34	1. ≥2 clinical signs of congestion 2. EF <50% 3. NT-pro-BNP levels > 1000 ng/L. 4. Maintenance therapy with oral loop diuretics at a ≥ 1 mg equivalent dose of bumetanide for ≥ 1 month prior to enrolment.	a. Acetazolamide = 5 out of 18 patients b. Control = 6 out of 16 patients p = 1.000	a. Acetazolamide = 264 ± 126 mmol b. Control = 234 ± 133 mmol p = 0.515	-	a. Acetazolamide = 5 out of 18 patients b. Control = 0 out of 16 patients p = 0.046
Mullens W, et al, 2022	Multicenter, double blind, randomized, placebo controlled parallel-group	519	1. ADHF 2. ≥ 1 clinical sign of volume overload 3. NT-pro-BNP level >1000 pg/mL or BNP level > 250 pg/mL	a. Acetazolamide = 108 out of 256 patients b. placebo = 79 out of 259 P < 0.001	a. Acetazolamide 468±234 mmol b. Placebo 369±231 mmol	a. Acetazolamide 4.6±1.7 L b. Placebo 4.1±1.8 L	a. Acetazolamide = 2 out of 256 patients b. Placebo = 0 out of 259 p = 0.24

Figure 2. Summary of The Effect of Acetazolamide Additional Therapy to Loop Diuretic

Class III Antiarrhythmic Agents and First-Line Antiretroviral Drugs: A Systematic Review of Interactions

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[1]Mitra Keluarga Kalideres Hospital

INTRODUCTION: Over time, the incidence of HIV-related arrhythmias has increased due to the improved survival rates of HIV-infected patients. Approximately, a third of sudden cardiac deaths in HIV patients are caused by cardiac arrhythmias, and the risk of atrial fibrillation is 80% higher compared to the general population. Hence, there is a need for increased use of antiarrhythmic treatments in the HIV-infected demographic that already has an established use of multiple drugs as part of their antiretroviral (ARV) regimen. This review aims to assess significant drug interactions between the widely available first-line ARV (zidovudin-AZT, stavudin-d4T, tenofovir-TDF, lamivudin-3TC, efavirenz-EFV, and nevirapine-NVP), and three class III antiarrhythmic agents (amiodarone, dronedarone and sotalol). We systematically reviewed available literature to July 2023, following PRISMA guidelines using four different databases. Clinically significant drug interactions were obtained from Lexicomp ® databases. We used the guidelines released by the Indonesian Ministry of Health in 2015 as the basis for this review.
DISCUSSION: The most substantial drug interaction observed was between amiodarone or dronedarone and TDF, leading to increase absorption of TDF hereby elevating the risk of adverse effects. Another significant interaction was between efavirenz and amiodarone or sotalol, with both combinations demonstrating a moderate risk of exacerbating QTc interval prolongation and ventricular arrhythmias (including torsade de pointes). Lastly, a minimal risk of reduced amiodarone or dronedarone concentration was noted with efavirenz or nevirapine co-administration.
CONCLUSION: The ARV currently accessible in Indonesia demonstrate several substantial interactions with class III antiarrhythmic drugs. Given that the majority of first-line drugs offered in health centers are in the form of fixed drug combinations, adverse effects must be considered in the context of the entire treatment regimen rather than individual drugs. Clinicians need to be mindful of the potential risk of drug interactions for each component to preserve patient safety and optimize patient recovery.
Keywords: Drug-drug interaction; ARV; antiarrhythmic; HIV

Reduced Dose Fibrinolysis As A Non Inferiority And Considerable Treatment For ST Elevation Myocardial Infarction In Acute Settings: A Systematic Review And Metanalysis

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[2]Dabo Regional General Hospital, Kepulauan Riau
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INTRODUCTION: The current standard therapy for patients with ST-segment elevation myocardial infarctions (STEMI) is primary percutaneous coronary intervention (PPCI). However, immediate PPCI is not feasible for all patients with STEMI. Pre-PCI Fibrinolysis has been proposed as an alternative for patients with STEMI either in pharmacoinvasive or facilitated strategy. Due to the concerns for any favorable risk i.e. fatal bleeding, researchers explored the option of reducing the dosage of fibrinolysis. Therefore, we performed this meta-analysis to compare the efficacy and safety of reduced or half-dose fibrinolytic versus PPCI in patients with STEMI.

DISCUSSION: We gathered literature from Pubmed, ScienceDirect, and Scholar, identifying clinical trials of reduced or half-dose fibrinolytic regimens versus PPCI in patients with STEMI. Reinfarction, intracranial bleeding, significant non-intracranial bleeding, all-cause mortality, and all-cause of stroke are the primary outcomes. The results were presented as pooled-risk ratios (RR). Our analysis comprised 7 studies involving a total of 7276 participants. The reduced/half-dose fibrinolysis pre-PCI significantly has a lower incidence of reinfarction (RR: 0.66; 95% CI: 0.44-0.99; p=0.05), and all-cause of death (RR: 0.69; 95% CI: 0.51-0.93; p=0.01). However, major non-intracranial hemorrhage was found higher in reduced/half-dose fibrinolysis groups (RR: 2.71; 95% CI: 1.54-4.75; p=0.0005). The incidence of intracranial hemorrhage and all-cause of stroke were found higher, but not significant (RR: 2.19; 95% CI: 0.25-19.19; p=0.48; RR: 1.49; 95% CI: 0.84-2.63; p=0.17).

CONCLUSION: We found reduced/half-dose fibrinolysis pre PCI was a non-inferiority intervention to PPCI. While the possibility of the bleeding remains a concern, the administration of a reduced/half-dose fibrinolysis prior to PPCI holds substantial promise as an alternative approach, which is preferable to delaying treatment solely to prioritize PPCI. Nevertheless, specific safety doses related to fibrinolytic agents required additional large-scale studies to address the potential bleeding risk.

Keywords: Reduced/half-dose fibrinolysis; primary PCI; ST elevation myocardial infarction; MACE; safety; mortality.

Figure 1. Reduce dose fibrinolysis and reinfarction events

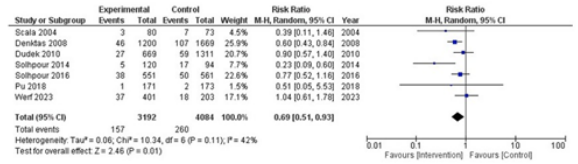

Figure 2. Reduce dose fibrinolysis and all cause of death events

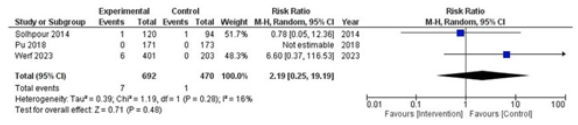

Figure 3. Reduce dose fibrinolysis and Intracranial hemorrage events

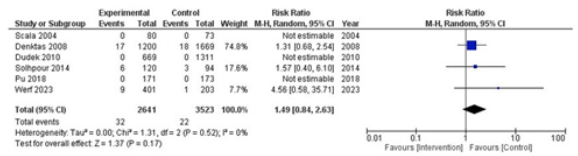

Figure 4. Reduce dose fibrinolysis and stroke of any cause events

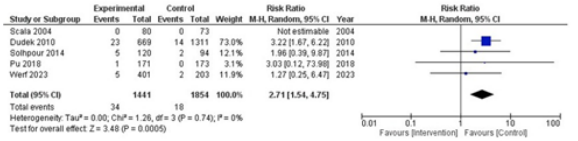

Figure 5. Reduce dose fibrinolysis and Major non ICH events

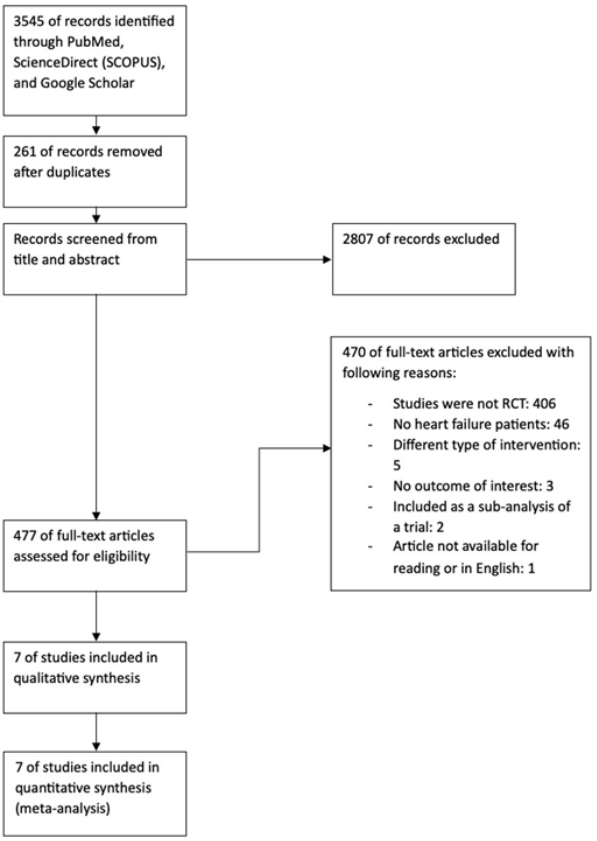

Figure 6. Preferred Reporting Item for Systematic Reviews and Meta-Analysis Flowchart

6-minute Walk Test and NT-proBNP Levels in Heart Failure Patients Under Daily vs. Weekly Vitamin D Supplementation: A Systematic Review and Meta-analysis

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INTRODUCTION: Studies have verified that vitamin D supplementation (VDS) plays a critical role in improving the renin-angiotensin activation system (RAAS) and clinical outcomes in heart failure (HF) patients, such as 6-minute walk test (6MWT) and NT-proBNP levels, with variations in outcomes based on daily and weekly dosages. We aim to advance the understanding of the VDS in HF patients, which involves selecting between daily and weekly dosages.

DISCUSSION: We conducted a thorough literature search on PubMed, Cochrane, and Scopus databases, identifying clinical trials of VDS in HF patients with 6MWT, NT-proBNP, ejection fraction changes (EFC), and rehospitalization as the outcomes. Subgroup analysis was performed to distinguish between daily and weekly dosages, with pooled-risk ratio (RR) to quantitatively analyze the combined evidence. Our analysis comprised 15 studies involving a total of 1,412 participants. VDS significantly improved the 6MWT (RR: -17.77; 95% CI: -34.68-(-0.86); p=0.04) and EFC (RR: 2.81; 95% CI: 0.14-5.49; p=0.04), reduced rehospitalization (RR: 1.13; 95% CI: 1.03-1.25; p=0.01), but not significantly reduced NT-proBNP level (RR: -143.08; 95% CI: -333.94-47.78; p=0.14). Daily VDS significantly reduced rehospitalization (RR: 1.13; 95% CI: 1.03-1.24; p=0.01), but did not reduce the 6MWT (RR: -18.48; 95% CI: -39.01-2.05; p=0.08), NT- proBNP level (RR: -279.03; 95% CI: -713.05-155.00; p=0.21) and EFC (RR: 4.95; 95% CI: -2.22-12.13; p=0.18) significantly. Weekly VDS did not significantly reduce the 6MWT (RR: -16.28; 95% CI: -46.12- 13.56; p=0.28), rehospitalization (RR: 1.72; 95% CI: 0.37-7.99; p=0.49), NT-proBNP level (RR: -80.00; 95% CI: -312.39-150.63; p=0.49) and EFC (RR: 1.63; 95% CI: -1.14-4.40; p=0.25).

CONCLUSION: VDS undoubtedly enhances HF outcomes, particularly in 6MWT, rehospitalization rates, and EFC, but not NT-proBNP levels. While weekly VDS offers better convenience for patients, we did not find any notable advantages. Future research should concentrate on identifying the ideal daily dosage of vitamin D to minimize the risk of potential adverse effects.

Keywords: heart failure; vitamin D; daily; weekly; 6-minute walk test; NT-proBNP;

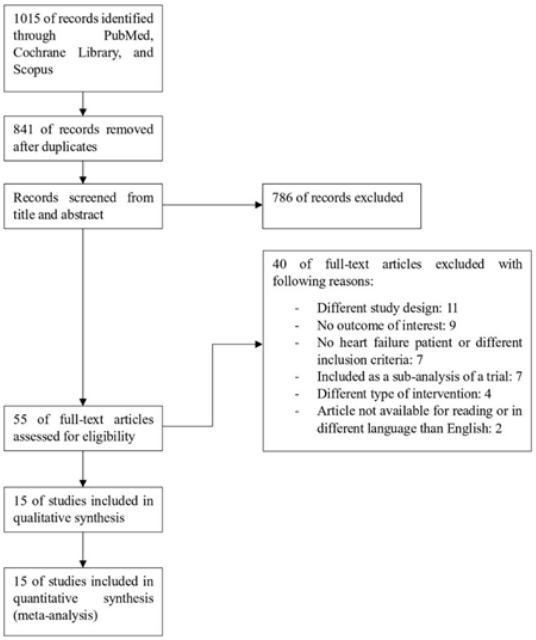

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses Flowchart

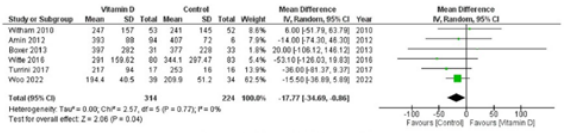

Figure 2. Effect of VDS in 6MWT

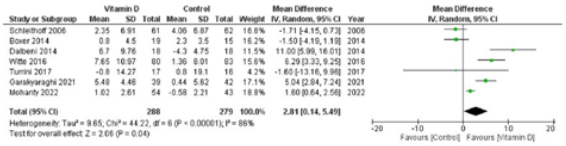

Figure 3. Effect of VDS in ejection fraction

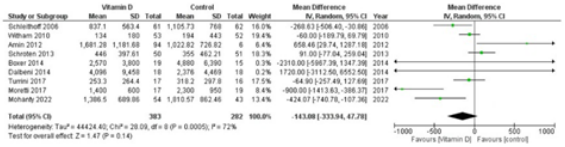

Figure 4. Effect of VDS in NT-proBNP

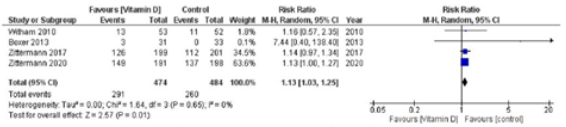

Figure 5. Effect of VDS in rehospitalization

Congenital Heart Disease Screening Method Accuracy in Pediatric Population: A Systematic Review and Meta-Analysis

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INTRODUCTION: Early detection of congenital heart disease (CHD) is required to improve patients' outcomes and reduce the burden of disease. This study explores current CHD screening methods in the pediatric population and estimates their accuracy. We conducted a comprehensive literature search on Medline, Scopus, The Lancet, CENTRAL, and hand searching for studies evaluating CHD screening methods in pediatric subjects published between 2018 and 2023. We performed meta-analysis on the accuracy for each index test. We also assessed risk of bias in included studies using the QUADAS‑2 tool. Narrative synthesis was carried out for studies ineligible for meta-analysis.
DISCUSSION: Twenty studies met the inclusion criteria. For detecting critical CHD in newborns, overall sensitivity for pulse oximetry (POX), cardiac auscultation, and combination of both methods were 84.8% (95%CI 75.7–90.9), 87.5% (95%CI 73.3–94-7), and 95.8% (95%CI 94.2–96.9) respectively, while their specificity were 99.8% (95%CI 99.3–100), 99% (95%CI 97.8–99.6), and 98.8% (95%CI 94.2–96.9) respectively. For detecting non-critical CHD in newborns, overall sensitivity for POX, cardiac auscultation, and combination of both methods were 38.2% (95%CI 11.7–74.3), 74.8% (95%CI 24–96.5), and 99.2% (95%CI 81.6–100), respectively, while their specificity were 98.9% (95%CI 89.5–99.9), 99.8% (95%CI 99.5–99.9), and 99.1% (95%CI 95.9–100) respectively. Meanwhile, CHD screening methods in children including pocket-sized echocardiography, combination of physical examination and electrocardiography, and artificial intelligent-assisted diagnosis showed moderate accuracy.
CONCLUSION: POX, cardiac auscultation, and their combination demonstrate moderate-to-high accuracy in CHD screening for newborns. Current evidence favors routine screening for healthy newborns. Whereas in children, we found insufficient evidence regarding screening methods' accuracy.
Keywords: accuracy; congenital heart disease; pediatrics; screening

Tolvaptan Add-on Therapy for Diuretic Resistance Heart Failure (DR-HF): Systematic Review and Meta-analysis

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INTRODUCTION: Congestion on heart failure is a leading cause for admission to the emergency department. Diuretic resistance is an indicator or predictor of mortality. The aim of this meta-analysis was to evaluate the effects of the addition of tolvaptan on diuretic resistance heart failure (DR-HF) and compare them with the effects of conventional therapy or placebo.
DISCUSSION: Seven randomized controlled trials with a total of 1031 patients, were included for analysis. Six out of seven studies define diuretic resistance as congestion or volume overload despite the use of daily diuretic or conventional therapy with diuretic. One define diuretic resistance as urine output ≤125 ml/h during during the initial 8 h after administration IV diuretics. Compared with the control, tolvaptan reduced body weight from baseline (SMD −0.48, 95% CI −0.71 to −0.25, $p < 0.00001$, I2=64%), increased urine volume (SMD 1.02, 95% CI 0.34 – 1.71, P = 0.003, I2 = 87%), and ameliorated symptoms of dyspnea in 48 h (RR 1.20; 95% CI 1.06 – 1.36, P = 0.004, I2 = 0%). However, tolvaptan did not improve incidence of clinical events worsening renal function (RR 0.71, 95% CI 0.38 to 1.33, p=0.29) and all-cause mortality (RR 0.96; 95% CI 0.49–1.87), with diuretic resistance heart failure. Discussion: Diuretic resistance is defined as a failure to decongest despite adequate dose of diuretics. Change in congestion sign strongly related to patient- assessed quality of life and, further, was prognostic for future events. Tolvaptan, which induces aquaresis, is effective for decongestion. It is clear from the results of decreased weight, greater urine output, and relief from dyspnea.
CONCLUSION: The addition of Tolvaptan can decrease body weight, increase urine volume, and ameliorate some of the congestion symptoms in patients with diuretic resistance heart failure, but not exacerbate worsening renal failure.
Keywords: Diuretic Resistance; Heart failure; Meta-analysis; Tolvaptan; Review

Comparison of Percutaneous Mechanical Support Impella and Intraaortic Balloon Pump in Myocardial Infarction Complicated by Cardiogenic Shock: A Systematic Review and Meta-Analysis

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INTRODUCTION: Acute myocardial infarction complicated by cardiogenic shock (AMICS) is associated with high mortality rates. The Impella percutaneous ventricular assist device (PVAD) rapidly deploys superior mechanical circulatory support (MCS) in patients with AMICS. However, the safety and efficacy of Impella in AMICS is a matter of ongoing investigation, and its role in AMICS management is not yet fully established.

DISCUSSION: The databases of Pubmed and Google Scholar databases were searched from inception to January 2008. Relevant randomized trials and cohort studies comparing Impella versus IABP in AMICS were identified and a meta-analysis was performed using the random effect model. The efficacy endpoint of interest was short-term mortality (defined as in hospital or 30-day mortality). The safety endpoints of interest were major bleeding, limb complications, stroke and hemolysis within 30 days. A total of 3 randomized trials and 3 cohort studies with 33,963 patients were included. No difference in short-term mortality between the two groups [RR 1.00, 95% CI 0.76–1.30, P=0.99] was found. For safety endpoints, Impella was associated with significantly higher incidence of major bleeding [RR: 2.02, 95% CI 1.23–3.31, P=0.006], limb complications [RR: 2.26, 95% CI 0.98–5.20, P = 0.05] as well as hemolysis [RR: 17.00, 95% CI 7.19–40.21, P <0.00001] compared with IABP. No significant difference was observed for the incidence of stroke [RR: 1.58 95% CI 1.35–1.85, P <0.00001].

CONCLUSION: Impella support in AMICS patients was associated with a significantly increased risk of bleeding, limb complications and hemolysis without an improved short-term survival advantage compared with IABP.

Keywords: AMICS; Impella; IABP; cardiogenic shock

Effects of Remote Ischemic Conditioning in Stable and Unstable Angina Patients Undergoing Percutaneous Coronary Intervention: A Systematic Review and Meta-Analysis

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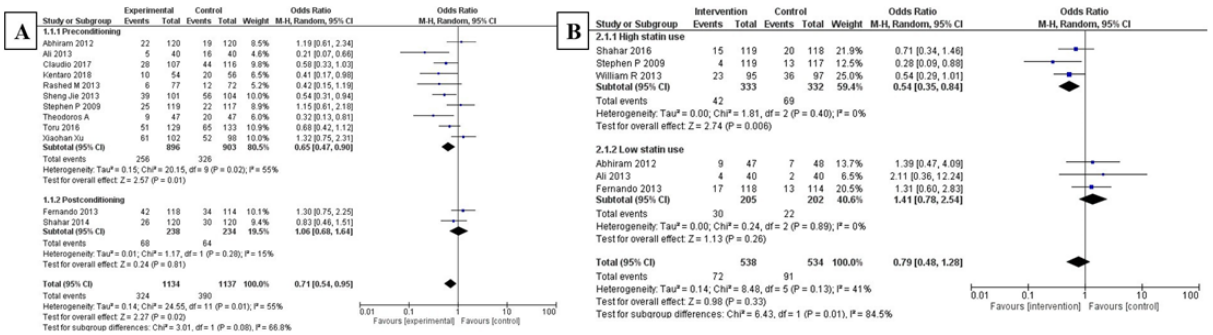
[1]Padjadjaran University

INTRODUCTION: Myocardial injury associated with PCI defined as type 4a myocardial infarction (T4aMI) is associated with adverse prognosis and there is conflicting evidence regarding the effectiveness of remote ischemic conditioning (RIC) in its prevention. This study aims to determine the effect of RIC on elective PCI patients.
DISCUSSION: A systematic review is conducted from PubMed and Cochrane Library until July 2023. Inclusion criteria are RCTs enrolling elective PCI patients with RIC intervention. Outcome measured are changes in peak troponin (I/T), CKMB, and CRP level, incidence of T4aMI, and major adverse cardiovascular events (MACEs). Data are pooled using random effects model and reported as standardized mean difference (SMD) and OR with 95% CI and risk of biases assessed with RoB2 tool. 15 studies (12 preconditioning and 3 postconditioning intervention) with no significant risk of biases are included with all except 3 studies undergoes intervention on upper arms with similar protocol. A total of 2596 patients with mean of 64.1 ± 5.02 years are involved. SMD of troponin cannot be pooled due to skewed data while CRP level between group resulted in non-significant SMD 0.03 (-0.26 – 0.33, p=0.817). Incidence of T4aMI is significantly lower in the intervention group with OR 0.714 (0.531 – 0.960, p = 0.026). Incidence of MACEs did not reach statistically significant result initially. However, subgroup analysis based on proportion of statin use shows that high statin use resulted in OR 0.54 (0.35 – 0.84, p = 0.006), while low statin use appears to be harmful. Statistically significant result is also found in elective PCI group and preconditioning group. No substantial heterogeneity is found and funnel plot and Egger's test did not show publication bias.
CONCLUSION: Remote ischemic conditioning in elective PCI patients is proven to be beneficial in reducing risk of T4aMI and MACEs.
Keywords: Remote ischemic conditioning ; type 4a MI ; elective PCI



A) Incidence of Type 4a MI in control vs intervention with RIC in subgroup of preconditioning and postconditioning intervention groups B) Incidence of MACEs in control vs intervention with RIC in subgroup of high statin use and low statin use groups

Is Myocardial Iron Overload Still Relevant as The Main Pathophysiology of Heart Failure in Thalassemia Major? A Systematic Review and Meta-Analysis

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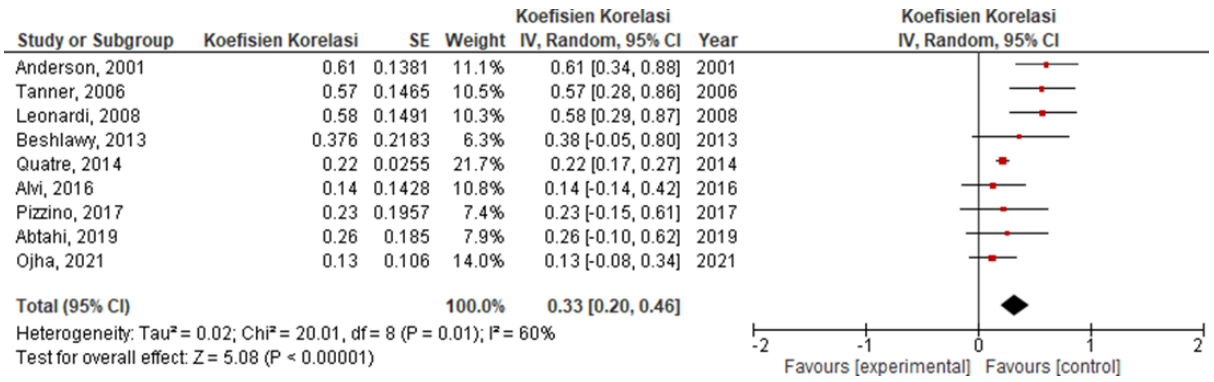
[1]Universitas Muhammadiyah Yogyakarta

INTRODUCTION: Thalassemia is a global health issue, with an estimated 300-400 thousand thalassemia infants born each year, necessitating lifelong blood transfusions. Prolonged transfusions and increased iron absorption cause myocardial iron overload which is believed to be the primary cause of heart failure in these individuals. The purpose of this study is to determine the correlation between myocardial iron overload and left ventricular dysfunction in thalassemia major patients through meta-analysis.
DISCUSSION: This study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020. Systematic search was conducted in several international databases including Google Scholar, PubMed, EBSCOhost, and Proquest from 2000 to 2023. After applying Fisher's r-to-z transformation, correlation coefficient (r) values were extracted from each study and meta- analysis of the pooled correlation coefficient were calculated using RevMan 5. Newcastle-Ottawa Scale to measure the risk of bias. Egger's test funnel plot was used to assess the potential publication bias for this study. Nine studies were eligible for the meta-analysis, comprising 515 patients. Based on the meta-analysis of the pooled correlation coefficient of the included studies, the authors found that the overall effect size of the study was 0.33 (95% CI: 0.20-0.46) and exhibited a notable heterogeneity (I2 = 60%; P = 0.01).
CONCLUSION: The correlation between myocardial iron overload and left ventricular dysfunction in thalassemia major is weak. The pathophysiology of heart failure in thalassemia focusing on myocardial iron overload may need to be reconsidered.
Keywords: Thalassemia; Magnetic resonance imaging; Cardiomyopathies



The Impact of Low Dose Dopamine in Patient with Acute Decompensated Heart Failure – A Systematic Review and Meta-Analysis

Leo Deddy Pradipta[1], Bahrudin[1]
[1]RSUP Dr. Kariadi Semarang

INTRODUCTION: Acute decompensated heart failure (ADHF) can be life-threatening if not treated promptly. Over the past few decades, several studies have attempted to determine the benefit of low-dose dopamine (LDD) therapy in ADHF patient. However, the result of the studies remains controversial. The purpose of this meta-analysis is to appraise the renal effects of LDD in patient with ADHF.
DISCUSSION: Method: Multiple databases including PubMed, Scopus, and ScienceDirect database were searched for relevant studies in English before June 2023. Full-text articles that meets the eligibility criteria of studies are used to evaluate the effect of LDD in patients with ADHF. Review Manager 5.4 was used to estimate the effects of the results among eligible articles. Application of Mantel-Haenszel formula with random-effect models, regardless of heterogeneity was employed to calculate odd ratio and 95% confidence interval (95% CI) for the outcome. The quality assessment of included studies was evaluated using Newcastle Ottawa Scale. Funnel plot analysis was utilized to assess the qualitative risk of publication bias. Results: Initial screening yielded 471 studies, 10 studies involving 1318 patients met the inclusion criteria in this study. We found that LDD administration was related with reduce creatinine level (OR= 1.78, 95%CI [1.25 – 2.5], p= 0.04, I2= 47%, random-effect modelling) and increase estimated glomerulus filtration rate (eGFR) (OR= 2.18, 95%CI [1.07 – 1.64], p= 0.03, I2= 72%, random-effect modelling). Interestingly, there was no impact in urine output, weight reduction, in-hospital mortality, length of stay, and BNP level, with administration of LDD. Funnel plot analysis for each outcome showed a relatively symmetrical plot, showing no indication of publication bias.
CONCLUSION: Low dose dopamine was associated with reduce the creatinine level and increase the eGFR during hospitalization, with no effect in urine output, weight reduction, and in-hospital mortality.
Keywords: low dose dopamine; acute decompensated heart failure; diuretic

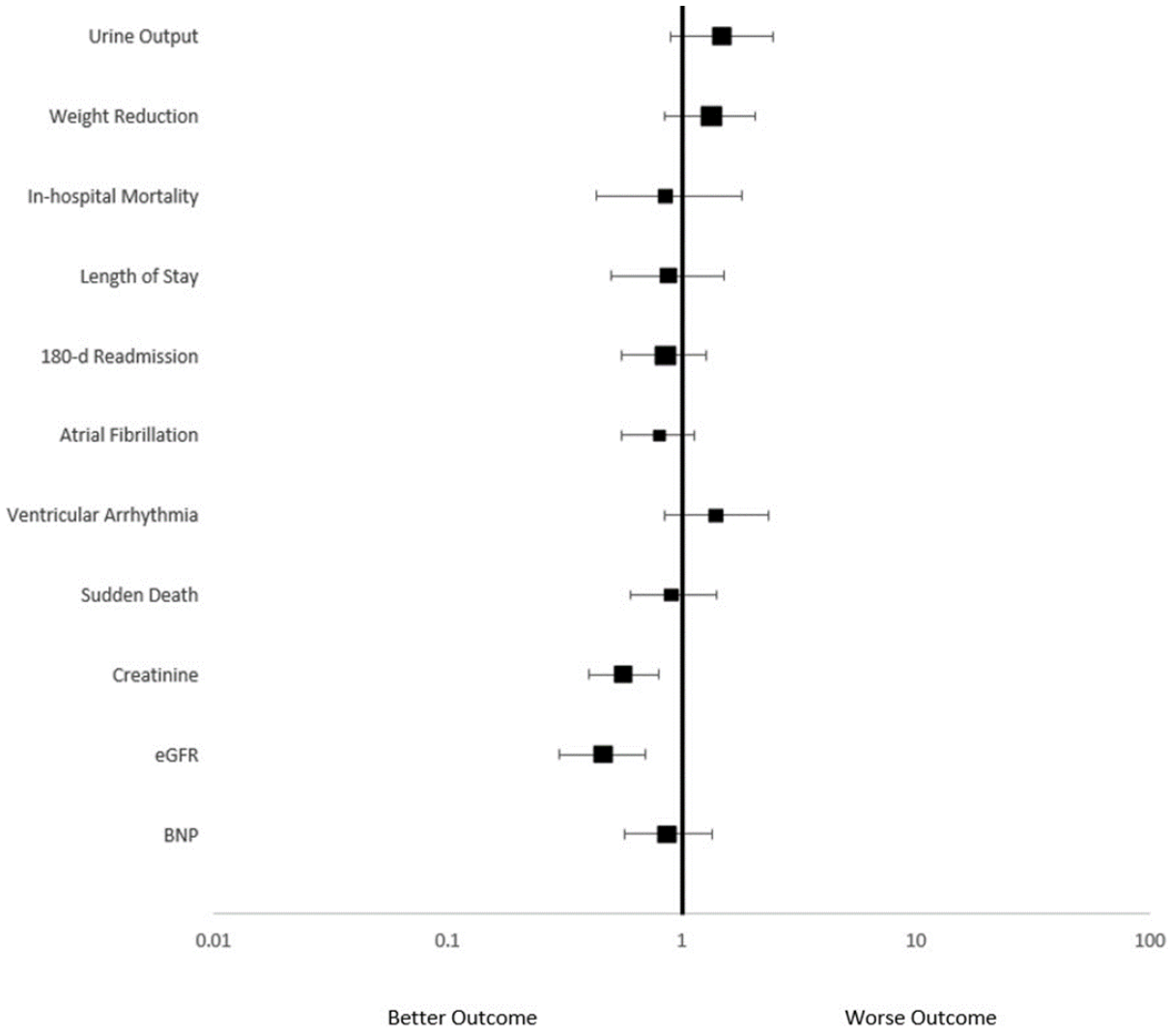


Figure 1. Forest plot of low dose dopamine clinical outcome in ADHF