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Abstract: Research



Cardiac Computed Tomography-Derived Left Atrial Volume Index as an Independent Predictor of Late Recurrence After Catheter Ablation of Atrial Fibrillation

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Background and aims: Pulmonary vein isolation (PVI) is the main target for AF ablation. Despite advances in the radiofrequency catheter ablation of patients with atrial fibrillation (AF), the risk of AF recurrences remains significant. An increased left atrial volume index (LAVI) reflects left ventricular diastolic dysfunction, deterioration of the LA function, and structural change of the LA and predicts recurrence rate of post ablation AF. Cardiac computed tomography (CCT) provides an accurate evaluation of anatomical assessment and estimates the degree of atrial remodeling. To date, there is still no agreement on how to measure LAVI using CT. This study aimed at elucidating the influence of the LAVI, derived from cCT data, on the late recurrence of ablation-naïve AF patients, after their first PVI.

Materials and methods: Patients with non-valvular AF who underwent a cCT and their subsequent radiofrequency catheter ablation from January 2015 to August 2020 were included in this single-center retrospective data analysis. A composite endpoint was defined (AF on electrocardiogram/Holter and/or electric cardioversion and/or re-do) within 3 to 12 months after ablation was conducted to evaluate late recurrence.

Results: 77 patients met the inclusion and exclusion criteria. During the observation period, 23 patients (30%) experienced late recurrence post-ablation. Both CCT-derived and TTE-derived LAVI differed significantly between AF recurrence outcome group (59.42 ml/m² vs 79.09 ml/m²; $p < 0.001$ and 35 ml/m² vs 47 ml/m²; $p = 0.004$). Yet, multivariate logistic regression analysis revealed two variables were independent predictors of late recurrence after AF ablation, *i.e.* CCT LAVI ≥ 65.5 ml/m² (OR 3.91; CI 95% 1.140-13.393; $p = 0.030$) and the type of AF (non-paroxysmal) (OR 5.00; CI 95% 1.552-16.150; $p = 0.007$). Interestingly, amiodarone administration post-ablation had protective effect toward late recurrence (OR 0.13; CI 95% 0.024-0.719; $p = 0.019$).

Conclusion: Despite its accuracy, LAVI is an underutilized predictor of AF recurrence after pulmonary vein isolation and scores for calculating AF recurrence or progression risks should implement the importance of CCT-derived LAVI, but not TTE-derived LAVI, as a predictive factor.

Keywords: Ablation, Atrial Fibrillation, Cardiac Computed Tomography, Late Recurrence, Left Atrial Volume Index.

Postoperative Complications of Permanent Pacemaker Implantation: A Retrospective Study of the Makassar Pacemaker Registry

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Background and aims: To determine the indications, type of pacemakers and complications in patients undergoing the permanent pacemaker implantation using mobile app-based pacemaker registry.

Materials and methods: This was a single-center, retrospective study conducted in at a tertiary-care center in East Indonesia. The records of 128 patients who had undergone implantation of permanent pacemakers in the period of May 2019 to August 2021 were reviewed.

Results: Total 128 patients with mean age of 63 years were paced. Of these 62 (48.4%) were males.. Total AV block (78 patients, 60.9%) was the most common indication for permanent pacemaker insertion, followed by SND and AF slow response (30.5% and 8.6% respectively. Single chamber (VVIR) pacing mode (70 patients, 54.6 %) was found to be the most common pacing mode used for pacemaker insertion. The incidence of postoperative complications in 128 patients 90 days-after implantation was 10,9% including 6 cases with capsular hematoma (4.7%), 3 cases with capsular infection (2.3%) and 5 patients died during hospitalization (3.9%), unfortunately 5 patients (3.9%) re-hospitalized during 90-days follow up.

Conclusions: The incidence of postoperative complications in patients with PPI was moderately high, most complications happened in elderly population due to poor hygiene and low education level. Total AV block due to degenerative disease is the most common indication for pacemaker implantation. Single chamber (VVIR) pacing mode is commonly used followed by dual chamber (DDDR) due to National health coverage system in Indonesia. This study applied the use of mobile app pacemaker registry to provide solutions in the implantation of medical registries to constitute a re-useable framework.



Moderate to Severe COVID-19 Confirmed Patients' Characteristics with Fragmented QRS finding in Hermina Daan Mogot Hospital period August 2020 – February 2021

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Background and aims: In previous studies, it has revealed that COVID-19 patient's prognosis were influenced by comorbidities such as cardiovascular problem like fragmented QRS (fQRS) finding in electrocardiogram (ECG). fQRS is an indicator of ventricle conduction disorder which is an indication of myocardial fibrosis. The purpose of this study is to describe the moderate to severe COVID-19 confirmed patients' characteristics with fQRS finding in Hermina Daan Mogot Hospital (HDMH) period August 2020-February 2021.

Materials and methods: Cross-sectional descriptive study was done from May 1st to June 3rd 2021 in whom were afflicted with moderate to severe COVID-19 confirmed patients with fQRS finding in HDMH.

Results: Twenty-six patients (100%) were included in this study with 17 (65.4%) patients were male. The average age was 53.65 ± 9.69 years old. There were 19 (73.1%) severe and 7 (26.9%) moderate COVID-19 patients.

Mean systolic and diastolic pressure were 130.00 ± 21.17 mmHg and 78.46 ± 8.80 mmHg, respectively. Oxygen saturation median value was 90.5% (IQR 87.5% – 93.25%). Mean heart rate was 94.50 ± 13.98 bpm. Median hospital length of stay (LoS) this study was 11 days (IQR 4.00 – 18.25 days). Total intubated patients were 17 (65.4%) and 16 (61.5%) patients died overall.

There were 17 (65.4%) patients with fQRS in inferior lead which 1 (3.8%) had LBBB, 7 (26.9%) patients had anterior fQRS, 1 (3.8%) patient in lateral and 1 (3.8%) patient in infero-lateral.

Conclusion: Based on the data above, the similarity in the data with previous studies was found. The limitation in collecting data and time consumed are a few factors of this result.

Keywords: fQRS, COVID-19.



Connection Between NLR, CRP, D-dimer and the Mortality of Moderate to Severe COVID-19 Confirmed Patients with Fragmented QRS Finding in Hermina Daan Mogot Hospital Period August 2020-February 2021

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Background and aims: Fragmented QRS (fQRS) is a ventricle conduction disorder caused by myocardial fibrosis with presence of notching in QRS complex. In previous studies, COVID-19 mortality was shown to be higher in patients with fQRS. Furthermore, it also showed that other inflammatory markers such as NLR, CRP and coagulation factor like D-dimer had a role in COVID-19 mortality. The purpose of this study is to describe the characteristics of NLR, CRP, D-dimer based on the mortality of moderate to severe COVID-19 confirmed patients with fQRS finding in Hermina Daan Mogot Hospital (HDMH) period August 2020-February 2021.

Materials and methods: Cross-sectional descriptive study was performed in HDMH from May 1st to June 3rd 2021 in whom were afflicted with moderate to severe COVID-19 patients with fQRS finding. Normal cut-off value of NLR, CRP and D-dimer was <3.17, <10mg/L and <230ng/mL, respectively. D-dimer was grouped into <230ng/mL, 230-500ng/mL, 501-2000ng/mL and >2000ng/mL.

Results: Twenty-six (100%) patients were included in this study and 17 (65.4%) patients were male. Mean age was 53.65 ± 9.69 years old. Nineteen (73.1%) patients were diagnosed with severe COVID-19 and 7 (26.9%) patients were moderate. There were 17 (65.4%) intubated patients and 16 (61.5%) patients died overall. From the fQRS location, there were 17 (65.4%) patients with fQRS finding in inferior lead and 1 (3.8%) patient with LBBB. Seven (26.9%) patients had it in anterior, 1 (3.8%) in lateral and 1 (3.8%) in infero-lateral. There were 23 (88.5%) and 24 (92.3%) whose NLR and CRP were increased, respectively. From those, 14 (60.9%) and 16 (66.7%) patients died. D-dimer was grouped into <230ng/mL, 230-500ng/mL, 501-2000ng/mL and >2000ng/mL. Each group had 3 (11.5%), 3 (11.5%), 15 (57.7%) and 5 (19.2%) patients. The numbers of deceased patients were 0 (0%), 1 (33.3%), 10 (66.7%) and 5 (100%), respectively.

Conclusion: From the analyzed data, the overall mortality is 61.5% which is higher based on the results of inflammatory markers and D-dimer levels. This suggests a possible connection between fQRS and these parameters of interest.

Keywords: fQRS, COVID-19, CRP, NLR, D-dimer.

Comparison of the Cardiometabolic Profiles with the History, EKG, Age, Risk factors, and Troponin (HEART) Score in Predicting Malignant Ventricular Arrhythmia in Non-ST Segment Elevation Acute Coronary Syndrome (NSTEMI-ACS) Patients.

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Background and aims: Malignant ventricular arrhythmia is one of the major cardiac events (MACE) with a grave prognosis in acute coronary syndrome (ACS) patients. The risk prediction models for this event are still scarce, especially in Non-ST Segment Elevation ACS. The purpose of this study is To determine the excellence of laboratory cardiometabolic profiles in predicting malignant ventricular arrhythmia in NSTEMI-ACS patients compared to HEART score.

Materials and methods: Data of hospitalized NSTEMI-ACS patients at Murni Teguh and Susana Wesley Hospital from January – Agustus 2021 were collected. Cardiometabolic and other laboratory parameters were acquired. The HEART score was calculated for each patient. Correlation analysis was done using the Chi-Square test for categorical data and Mann-Whitney or Independent T-test for continuous data. Each variable was analyzed using the receiver operating characteristic curve (ROC) method.

Results: Eighty-five samples were acquired. Leucocyte ($P=0.009$), fasting blood glucose ($P=0.008$), two hours post-prandial blood glucose ($P=0.002$), Blood Urea Nitrogen ($P=0.022$), Creatinine ($P=0.035$) level, Triglyceride-glucose index (TyG) ($P=0.002$) and HEART score ($P=0.001$) were higher in malignant ventricular arrhythmia group. Logistic regression analysis showed two hours post-prandial blood glucose ≥ 206.5 mg/dL ($P=0.018$; OR=23.672; 95%CI 1.723-325.285) and leucocyte $\geq 13,360$ cells/mm³ ($P=0.11$; OR=13.087; 95%CI 1.812-94.519) were independent factors for developing malignant ventricular arrhythmia. ROC analysis showed leucocyte $\geq 13,360$ cells/mm³ (AUC= 0.719), fasting blood glucose ≥ 143 mg/dL (AUC= 0.720), two hours post-prandial blood glucose ≥ 206.5 mg/dL (AUC= 0.764), Blood Urea Nitrogen ≥ 19.5 mg/dL (AUC= 0.695) creatinine ≥ 1.21 mg/dL (AUC= 0.682), and TyG index ≥ 9.34 (AUC=0.757) had good sensitivity and specificity in predicting malignant ventricular arrhythmia when compared to HEART score (AUC= 0.766; $P=0.002$; 95%CI 0.641-0.890).

Conclusion: Cardiometabolic and leucocyte parameters can be used individually to assess the risk of malignant ventricular arrhythmia with similar power to the HEART score.

Keywords: Ventricular Arrhythmia, Cardiometabolic Syndromes, Acute Coronary Syndromes.



Correlation between Body Mass Index and Ejection Fraction in Atrial Fibrillation Patients who Hospitalized in Prof Kandou General Hospital.

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Background and aims:

In the general population, obesity is associated with an increased risk of adverse outcomes. Obesity increases the risk of atrial fibrillation (AF) while it may affect the outcome of patients with AF. However, studies of patients with chronic disease suggest that obese patients may paradoxically have better outcomes than lean patients. Obesity adversely impacts cardiac structure and function. This phenomenon known as the obesity paradox has also been found evident in AF cohorts. This study aims to determine the correlation between body mass index (BMI) and ejection fraction (EF) in AF patients who were hospitalized in Prof Kandou General Hospital. This study also aims to provide an overview of obesity and EF in hospitalized AF patients using simple markers such as body mass index.

Materials and Methods: The study included 50 patients with AF who were hospitalized in Prof Kandou General Hospital. Body mass index is defined as an individual's body weight divided by the square of an individual's height (standard unit of measure is kg/m²) and EF was measured by echocardiography using the teicholz formula during hospitalization. The correlation between both measurements was analyzed using Pearson Correlation Test.

Results: The mean BMI of the patients was $24,26 \pm 5,7$ kg/m² and the mean EF of the patients was $49,97 \pm 16,97\%$. The gender category of the study participants was equal. There was a significant positive correlation ($p < 0,05$) between BMI and EF ($p = 0.007$, $r = 0.376$) in this study.

Conclusion: There was a statistically significant positive correlation between BMI and EF in patients with AF who were hospitalized in Prof Kandou General Hospital. This study showed an EF was preserved in obese patients.



SERUM POTASSIUM PROFILE OF PATIENTS WITH ATRIAL FIBRILLATION IN CARDIAC WARD OF M. DJAMIL HOSPITAL

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Background and aims: Atrial Fibrillation is the most common sustained arrhythmia in the elderly. Atrial fibrillation is associated with a higher risk of stroke, heart failure, cardiac mortality and total mortality. A few studies previously has investigated the association of serum potassium with the risk of atrial fibrillation. The aim of this study was to investigated serum potassium profile of patients with atrial fibrillation in M. Djamil Hospital between January to December in 2020

Materials and methods: Data were taken from the medical record of those patients that diagnosed as atrial fibrillation within the period of January 1st to December 31st 2020. All of the patients were included in this study (total sampling). Data was analyzed by using univariate analysis.

Results: As the result, male were more affected than female patients (61% vs 39%). Among Atrial fibrillation, 12 % were aged 3-39, 27% were aged 40-59, and 61% were aged 60 or older. Hypokalemia (K⁺ serum < 3.5 mmol/L) was 13%, Normokalemia (K⁺ serum 3.5-4.5 mmol/L) was 63%, Hyperkalemia (K⁺ serum > 4.5 mmol/L) was 24%. Hypertension (32%) was the highest number of cardiovascular risk factor for atrial fibrillation. Bisoprolol was the most used for the rate control (59%) and warfarin (92%) was the most used for oral anticoagulant in atrial fibrillation.

Conclusion: The greatest number of potassium serum was normokalemia in patient with atrial fibrillation.

Keywords: atrial fibrillation, potassium, hyperkalemia, normokalemia, hypokalemia

Correlation between Circadian Variation of Idiopathic Ventricular Arrhythmia and Left Ventricular Intrinsic Systolic Function assessed by Speckle Tracking EchocardiographyB. H. Nugroho¹, S. B. Raharjo², R. Sukmawan³, Y. Yuniadi², D. A. Hanafy², D. Y. Hermanto², H. Andriantoro³, O. Lelya³, B. Dwiputra³

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Background and aims: Idiopathic ventricular arrhythmias (IVA) including premature ventricular complex (PVC) or ventricular tachycardia (VT) can cause left ventricular (LV) dysfunction which may lead to cardiomyopathy. The mechanisms of this cardiomyopathy remain elusive, many factors are believed to contribute. Lack of PVC circadian variability was proposed as one mechanism of LV dysfunction. The purpose of this study is to investigate the correlation between circadian variation of IVA and left ventricular intrinsic systolic function assessed by speckle tracking echocardiography.

Materials and methods: The subjects of this cross sectional study were 67 consecutive patients with PVC originated from ventricular outflow tract based on 12 lead electrocardiogram. All patients underwent 24-hour holter monitoring and speckle tracking echocardiography examinations. The circadian variation of PVC burden and global longitudinal strain (GLS) were determined and statistical analysis was conducted to evaluate their correlation.

Results: A total 31 patients (46.3%) had impaired LV systolic function by GLS (worse than -18%). Patients with impaired LV systolic function had a less negative GLS ($-15.1\% \pm 1.8\%$ vs $-21.3\% \pm 2.0\%$; $p < 0.001$), a higher PVC burden ($22.2\% + 11.1\%$ vs $13.9\% + 8.3\%$; $p = 0.001$), less variation in circadian PVC distribution (coefficient of variation 6 hourly $26.8\% \pm 15.6\%$ vs $52.0\% \pm 28.2\%$; $p < 0.001$), and more frequent episode of non-sustained VT (10 patients [76.9%] vs 3 patients [23.1%]; $p = 0.019$). Total 70.6% patient with male gender experienced impaired LV systolic function ($p = 0.002$). Independent predictors for impaired systolic LV function were less variation in circadian PVC distribution [(coefficient of variation $\leq 35\%$), odds ratio (OR)=3.89, 95% confidence interval (CI)= 1.09-13.80, $p = 0.036$], episode of non-sustained VT (OR=14.4, 95%CI=2.36-88.55, $p = 0.008$), PVC burden $> 9\%$ (OR=6.81, CI 95%=1.35-34.41, $p = 0.020$), and male gender (OR=14.4, CI 95%=2.02-101.1, $p = 0.004$).

Conclusion: Lack of circadian variation of IVA is associated with impaired LV systolic function by GLS. Coefficient of variation PVC burden $\leq 35\%$ has 3.89 times higher risk for development of left ventricular systolic dysfunction. The finding of this study suggested that chronotherapy of antiarrhythmia medication may prevent the development of LV dysfunction.

Keywords: idiopathic ventricular arrhythmia, circadian variation, premature ventricular complex, global longitudinal strain.



Development and Validation Study : Association between Aortoseptal Angulation on Echocardiography with the Origin of Outflow Tract Ventricular Arrhythmias

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Background and aims: Radiofrequency ablation has become therapeutic modality with high success rate for outflow tract ventricular arrhythmia (OTVA). Determining the origin of OTVA before ablation is important to choose the appropriate approach, avoiding multiple complications, and saving fluoroscopy time. Previous studies suspected that the occurrence of left OTVA is due to aortic root anatomical changes. We develop a study to create a diagnostic tool in differentiating OTVA origin that can be measured by aortoseptal angulation. This study is intended to seek the accuracy of aortoseptal angulation in differentiation of OTVA location.

Material and methods: The study comprise of development and validation stage to see the association and accuracy aortoseptal angulation in differentiating OTVA origin. In the development stage, we collected 60 medical record of patients from January 2016 to October 2019 who underwent successful OTVA ablation at the National Cardiovascular Center Harapan Kita. In the validation stage, we studied prospectively 41 patients underwent OTVA ablation in the same hospital from October 2020 to June 2021. Sensitivity, specificity, and predictive values were calculated to measure the accuracy of the aortoseptal angle based on the cut-off value determined through the development study.

Results : The aortoseptal angulation of $<129.2^\circ$ was related to the left OTVA origin with OR 10.1. In validation study, overall accuracy is 82.93% to predict an LVOT origin, with 71.4 % sensitivity and 85.29% specificity.

Conclusion: The aortoseptal angulation of $<129.2^\circ$ is a valid diagnostic tool to differentiate left from right OTVA origin.

Keywords: outflow tract ventricular arrhythmia, aortoseptal angulation, echocardiography, radiofrequency ablation.



Correlation between Frontal QRS-T Angle and Ischaemic Burden Assessed by SPECT Myocardial Perfusion Imaging in Patient with Stable Coronary Artery Disease

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Background and aims: The frontal QRS-T angle is one of the markers of ventricular repolarization. QRS-T angle abnormalities was associated with increased mortality in patient with coronary artery disease. Ischaemic burden which assessed by Single Photon Emission Computed Tomography Myocardial Perfusion Imaging (SPECT- MPI) is an established modality to determine the management strategy of patient with coronary artery disease. The objective of this study was to investigate the correlation between frontal QRS-T angle and ischaemic burden which assessed by Single Photon Emission Computed Tomography Myocardial Perfusion Imaging (SPECT-MPI) in patient with stable coronary artery disease.

Materials and methods: This was cross-sectional study of patients with stable coronary artery disease who underwent stress and rest SPECT-MPI in Dr Kariadi General Hospital from October 2020 and March 2021. 12-lead- electrocardiogram (ECG) was performed to obtain the frontal QRS-T angle according to QRS-wave and T-wave vectors, prior to the MPI. Ischaemic burden was measured by stress and rest SPECT-MPI using semiquantitative scores of 17 segments assessment.

Results: A total of 25 patients were enrolled. Baseline characteristic showed age $60,52 \pm 7,01$ years old, 23 males (92%), 12% patients with single vessel disease, 12% patient with two vessels disease, 76% patients with three vessels disease, and 80% patients had CTO lesion. There was moderate negative correlation between QRS-T angle and ischaemic burden in patient with stable coronary artery disease ($r = -0.466$, $p = 0.019$).

Conclusion: Frontal QRS-T angle is feasible parameter from 12-lead-electrocardiogram which correlated with ischaemic burden in patient with stable coronary artery disease. This parameter is able to be applied for management strategy in patient with coronary artery disease.

Keywords: *Frontal QRS-T Angle, Ischaemic burden, SPECT MPI, stable coronary artery disease*



Electrocardiography Scoring System to Diagnose Typical Atrioventricular Nodal Reentrant Tachycardia (AVNRT)

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Background and aims: Atrioventricular nodal reentrant tachycardia (AVNRT) is the most common form of supraventricular tachycardia (SVT), where 90% of AVNRT cases are typical AVNRT. The gold standard modality for diagnosing AVNRT is electrophysiology (EP) study. However, EP study is invasive, specialistic, and not widely available. A 12-lead electrocardiography (ECG) recording during sinus rhythm and tachycardia could act as a diagnostic tool because of its feasibility and availability. Currently, ECG criteria for typical AVNRT are being researched and developed. However, there is no study that combines the parameters in the form of a scoring system. The purpose of this study is to evaluate the diagnostic value of ECG scoring system in diagnosing typical AVNRT.

Materials and methods: A total of 115 patients with SVT who underwent EP study in Sardjito General Hospital, Yogyakarta were enrolled in this study. ECG recordings during sinus rhythm and SVT were blindly analysed by two cardiologists. Bivariate analysis and multivariate analysis were carried out to obtain independent predictors of typical AVNRT. A scoring system model was developed. Subsequently calculation of probability, determination of optimal cut-off point, sensitivity, and specificity were performed. Area under the curve analysis of the scoring system was performed to determine the scoring system's diagnostic strength.

Results: On multivariate analysis, the three independent predictors of typical AVNRT were the combined criteria in V₁, the classical ECG criteria, and pseudo r' wave in aVR. The scoring system generated from those parameters had values ranging from 0 to 3 with optimal cut-off point of ≥ 2 . An ECG score of ≥ 2 had sensitivity of 61%, specificity of 97%, positive predictive value of 98.3%, negative predictive value of 35.1%, positive likelihood ratio of 24, and negative likelihood ratio of 0.4 in diagnosing typical AVNRT.

Conclusion: ECG scoring system with score of ≥ 2 has excellent diagnostic value in diagnosing typical AVNRT.

Keywords: Atrioventricular nodal reentrant tachycardia, electrocardiography, scoring system.



Correlation between Liver Function and Left Atrium Diameter in Patients with Atrial Fibrillation

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Background and aims: The presence of morbidities (e.g., hypertension, heart failure) and antiarrhythmic medications (e.g., amiodarone) cause patients with atrial fibrillation (AF) at higher risk of developing elevated liver enzymes. Enlargement of the left atrium (LA) is a sensitive indicator of LV filling pressure and reflects the severity of diastolic heart failure that may also elevate liver enzyme. However, the correlation between liver function and LA diameter in patients with AF has not yet been established. The aim of this study was to determine the correlation between liver function (either aspartate aminotransferase [AST] or alanine aminotransferase [ALT]) and left atrial diameter in patients with atrial fibrillation

Materials and methods: The study included 41 patients with atrial fibrillation. Patients that have hepatitis A, B or C positive were excluded from the study. Correlation between liver function (measured with AST & ALT level) and left atrial diameter (measured with 2D echocardiography) were analyzed using Pearson Correlation Test.

Results: The study subjects were 52% (n=21) female and 48% (n=20) male with the mean age 60.63 ± 13.171 years old. We found a significant positive correlation between LA diameter with AST & ALT ($p = 0.022$, $r = 0.358$ and $p = 0.019$, $r = 0.364$, respectively).

Conclusion: There was a positive and statistically significant correlation between both liver function test (AST & ALT) and left atrium diameter in patients with AF.



Role of Risk Prediction Score for Ventricular Arrhythmias in Arrhythmogenic Right Ventricular Cardiomyopathy

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Background and aims: Arrhythmogenic right ventricular cardiomyopathy (ARVC) is an inherited heart muscle disease in which there is fatty infiltration of the right ventricular free wall, predisposing to ventricular arrhythmias and potentially causing sudden cardiac death. Our aims are to analyse and validate the new prediction scoring system proposed by ESC for determining the prognosis of ventricular arrhythmia

Materials and methods: Nineteen patients (42% men and 58% women; age 46 ± 10 years old) with ARVC diagnosis were enrolled. Scoring system using ARVC Risk Calculator use several parameters such as age, sex, history of syncope, number of inverted T-waves, maximum PVC burden during Holter, history of non-sustained VT, and RVEF by MRI.

Results: During follow-up 5 (26%) patients had ventricular tachycardia event. Linear regression analysis showed epsilon wave (10.5%) is a significant marker of poor prognosis for having ventricular arrhythmia ($p=0.029$), compared with other parameters such as female sex (37.9%; $p=0.89$), younger age (31.6%; $p=0.91$), inverted T wave in right precordial lead (52.6%; $p=0.90$), ejection fraction $<54\%$ (5.3%; $p=0.88$), and terminal activation delay ECG (44.8%; $p=0.33$) didn't show any significance correlation. ESC scoring system for analysing sudden cardiac death risk and for predicting progression of sustained ventricular tachycardia were analysis using ROC curve with cut off 5.20% (AUC=0.543; $p=0.78$, CI 0.19-0.89) and 12.65% (AUC=0.800; $p<0.05$ CI 0.54-0.99) respectively. Bivariate analysis showed patients with high scoring risk for sudden cardiac death (40.0%) didn't have significance prognostic of ventricular arrhythmia ($p=0.08$) but those with high scoring risk for ventricular arrhythmia event (80.0%) were more likely having progression of ventricular arrhythmia ($p=0.007$).

Conclusion: Amongst some clinical parameter criteria in ARVC diagnosis, a simple ECG feature such as Epsilon wave is a marker of poor prognosis. A scoring system prediction model can be used for estimate VA risk and guide decision regarding primary prevention ICDs.

Keywords: ARVC, ventricular arrhythmia, epsilon wave, ESC scoring for ARVC



P Wave Peak Time and E/A Ratio: Does It Have Correlation in Diastolic Dysfunction on Ischemic Heart Failure Patient

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Background and aims: In patient with reduced EF, E/A ratio could use as one of several echocardiography parameter, to asses diastolic dysfunction. Stretch of the atrial cardiomyocyte would cause reduced conduction velocity that could as prolongation P wave peak time (PWPT) on the electrocardiogram. In rural area, with no access of echocardiography, we need simpler tool to asses diastolic dysfunction. We proposed PWPT as alternative tool.

Materials and methods: This study was a prospective with method cross-sectional study in heart failure with coronary arterial disease patients at dr. M. Djamil General Hospital from June – September 2021. The patient underwent echocardiography then followed by electrocardiography to assess systolic and diastolic dysfunction and measure PWPT, respectively.

Result: The study population was made up of 32 patients, with mean age was 58 ± 11 years, male (78.1%), hypertension (62.5%) and smoking (50%) were the most common risk factor in baseline characteristic. Using the Pearson correlation test, no significant correlation was found between the duration of PWPT and E/A ($r = 0.03$; $p = 0.87$)

Conclusion: This study showed that prolonged PWPT ad E/A ratio was no significant correlation. But, further study that include all echocardiography parameter to asses diastolic dysfunction could be conducted.

Keyword: P Wave Peak Time, E/A ratio, Diastolic Dysfunction

Diagnostic Value of JT Interval Ratio between Right to Left Precordial Lead to Detect Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) in Patient with Right Ventricular Outflow Tract (RVOT) Ventricular Arrhythmia

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Background and aims: Arrhythmogenic right ventricular cardiomyopathy (ARVC) is a genetic cardiomyopathy that mostly affects young adults. The most common reason of death in patients suffering from ARVC is sudden cardiac death. On the other hand, idiopathic ventricular arrhythmia (VA) with no evidence of structural abnormality usually has a benign course. Both may have VA from RVOT with left bundle branch block (LBBB) pattern and inferior axis. Fibrosis in ARVC will interfere right ventricular repolarization which is likely to lengthen JT interval. The aim of this study was to find out whether ratio of JT interval between right to left precordial leads has a good diagnostic value in detecting ARVC in patients with VA from RVOT

Materials and methods: This was an analitical observational study using cross sectional design. We reviewed medical records of patients admitted to Sardjito Hospital between 2016 and 2021 with LBBB morphology and inferior axis VA who undergone series of examination including electrocardiography and cardiac magnetic resonance to establish the diagnosis of ARVC. Ratio of JT interval between right and left precordial obtained by dividing the sum of JT interval in lead V1-V3 with the sum of JT interval in lead V4-V6. Diagnosis of ARVC was established by implementing PADUA criteria.

Result: A total of thirty nine patients (20 Idiopathic VA and 19 ARVC) were enrolled. Bivariate analysis of baseline characteristics didn't show demographic and clinical different (including age, sex, and symptoms) between 2 groups with p-value >0,05 each. Ratio of JT interval between right to left precordial leads were significantly higher in ARVC group when compared to idiopathic VA patients with mean 1.07 and 0.91, respectively ($p < 0.001$). ROC curved analysis showed JT interval ratio between right to left precordial leads was 1.01 with 17 patients (43.58%) had JT interval ratio > 1.01. This cut off value of JT interval ratio had a good diagnostic value for detecting ARVC with 89.74% accuracy, 84.21% sensitivity, 95% specificity, 94.11% positive predictive value, and 86.36% negative predictive value.

Conclusion: JT interval ratio between right to left precordial lead >1.01 had a good diagnostic value to establish ARVC diagnosis in patient with VA from RVOT.

Table 1. Bivariate analysis of demographic, clinical status and JT interval ratio between 2 groups

Variable	ARVC n = 19	Idiopathic VA n = 20	p value
Age (yrs) mean \pm SD	46.5 \pm 10.2	43.8 \pm 11	0.42
Sex male (%)	8 (42.1)	7 (35)	0.74
Symptoms (%)	14 (73.6)	15 (75)	0.92
JT interval ratio Right/Left lead (mean \pm SD)	1.07 \pm 0.08	0.91 \pm 0.05	< 0.001



Peguro Lo Presti Criteria Modified by QRS Duration as an ECG Predictor of Heart Failure with Preserved Ejection Fraction: Crossectional Retrospective Study in Sanglah General Hospital Bali

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Background and aims: ECG markers as a predictor for heart failure (HF) with preserved ejection fraction (HFpEF) are not specific. A recent study found Cornell Product (CP) can be an ECG marker for HFpEF but has low sensitivity and specificity. Peguro Lo Presti is an LVH criterion with good sensitivity compared to other criteria. Since increasing LV mass also prolongs QRS duration, the Peguro Lo Presti modified with QRS (PMQ) duration can potentially be a good ECG marker for HFpEF. The aim of this study was to find out the relationship between PMQ ECG parameters and HfpEF, also finding the optimal cutoff in predicting HFpEF.

Materials and methods: This study was a cross-sectional retrospective using medical records that include ECG and Echo data at Sanglah General Hospital from March 2019 until March 2021, and 190 patients were enrolled. Subjects were divided into HFpEF and non-HFpEF subjects (Hypertensive subjects without HF); subjects with IVCD were excluded. PMQ is defined: (S wave amplitude in V4 + deepest S amplitude in any precordial lead) x QRS duration. The Mann-Whitney test was used to compare the mean ECG parameters and mean echocardiographic parameters between the HFpEF and non-HFpEF groups. An optimal cutoff value for PMQ and CP to predict the presence of HFpEF was evaluated using receiver operating characteristics (ROC).

Results: Based on data, subjects with HFpEF were 52.1%, and non-HfpEF was 47.9%. The HFpEF group had higher LVMI (136.13 ± 34.55 vs 76.23 ± 14.11), higher mean E/E' (16.97 ± 6.71 vs 13.25 ± 2.62), higher LAVI (52.46 ± 42.63 vs 28.97 ± 6.95) with all p-value < 0.05 . On ECG parameters, the HFpEF group had a significantly longer QTc duration (486.53 ± 75.78 vs 437.33 ± 24.08), higher CP outcome (1823.6 ± 429.6 vs 1476.9 ± 273.8), and higher PMQ outcome (2919.8 ± 732.8 vs 2097.9 ± 535.2) with better sensitivity and specificity of PMQ cutoff than CP (PMQ > 2655 , sensitivity 54.2%, specificity 92.6% vs CP > 1770 , sensitivity 36.5%, specificity 91.5%). Subjects with a cutoff of PMQ ($> XXX$) were also significantly associated with HFpEF (PR 1.773; 95%CI 1.170–2.687; $P < 0.001$).

Conclusion: Modified Peguro Lo Presti by QRS duration is an easy-to-apply ECG marker for HFpEF and has relatively good sensitivity and specificity reflecting the severity of diastolic dysfunction and LV hypertrophy.

Conclusion: We found high TPTE and QTc in all categories of HF when compared to non-HF, but not related to EF categories. However, beta-blockers have been shown to be effective in normalizing TPTE and QTc in all HF categories, which potentially prevent ventricular arrhythmias.

Simvastatin as Primary Prevention to Reduce New-Onset Atrial Fibrillation and Ischemic Stroke in Hypertensive Patients: Retrospective Cohort Study in Sanglah General Hospital Bali

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Background and aims: Hypertension is a major risk factor for new-onset atrial fibrillation (AF). Studies have found that statin drugs have potent anti-inflammatory and antioxidant effects that have the potential to prevent AF. Because patients often come with ischemic stroke complications due to episodes of AF whose symptoms are not recognized, primary prevention of AF in hypertensive patients is very important. This study aims to determine the effectiveness and safety of simvastatin in reducing the incidence of new-onset AF and ischemic stroke complications in hypertensive patients.

Materials and methods: This was a retrospective cohort study using medical records at Sanglah General Hospital from 2018 to 2020, and 180 subjects were included. Subjects were divided into hypertensive subjects who were treated with simvastatin and hypertensive subjects who were not given statins, and then we tracked for the incidence of new-onset AF. The Pearson chi-square test was used to determine the association of baseline characteristics, comorbidities, and medications, including simvastatin, on the outcome of new-onset AF, ischemic stroke, and side effects of simvastatin. The progression of new-onset AF between groups was also compared with the Kaplan Meier curve.

Results : Our subjects with simvastatin were 39.4%, the mean age for all was 51.51 ± 12.31 with 28,3% new-onset AF, 7,2% ischemic stroke, and 2.2% all-cause death. We found that in hypertensive patients, simvastatin administration significantly reduced the incidence of new-onset AF. (PR 0.174; 95%CI 0.079–0.38; $P < 0.001$) with a longer AF-free period (19.16 ± 2.57 vs 13.68 ± 0.67 months; 95%CI 5.01-5.84; $P = 0.014$) and ischemic stroke-free period (23.72 ± 0.71 vs 16.57 ± 1.06 month; 95%CI 5.01-5.84; $P = 0.003$) if given simvastatin, without a significant relationship with the adverse effect of simvastatin. The incidence of AF was also found to be significantly high in hypertensive subjects with comorbid heart failure (HF); however, the AF-free period remains longer if hypertensive patients with HF are given simvastatin (19.16 ± 2.57 vs 13.68 ± 0.67 month; 95%CI 5.01-5.84; $P = 0.014$).

Conclusion: Simvastatin administration has the potential to be an effective treatment for primary prevention of the incidence of new-onset AF and ischemic stroke in hypertensive patients without significant side effects.



Alternative Electrocardiographic Parameters to Assess the Successful of Revascularization in STEMI Patients

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Background and aims: STEMI patients who have been revascularized, either with PPCI or thrombolytic, should be evaluated for successful of revascularization to determine further management. ST segmen resolution was widely used as an electrocardiography (ECG) parameter to determine successful of revascularization. This study provides R-wave peak time (RWPT) as an alternative ECG parameter to assess successful of revascularization. The aim of this study was to determined the use of RWPT to analyze successful of revascularization in STEMI patients underwent revascularization

Materials and methods: A cross-sectional study was performed prospectively in STEMI patient at Dr. M. Djamil Hospital Padang during May-August 2021. RWPT was measured from first Q wave to R wave in infarcted surfacing lead. Success revascularization was defined as QUBE score (as objective parameter $\geq 9,3$). Statistical analysis was performed using SPSS Ver. 23. Bivariate analysis was applied to RWPT and QUBE.

Result: Among 34 patients, most patients was male (86%). The mean age was $58,47 \pm 7,6$ year old. The average of R-wave Peak Time was higher in patients with failed revascularized STEMI (53,3 ms) compared with success revascularized STEMI (25,0 ms) ($p = 0,001$)

Conclusion: R-wave peak time can be used as an alternative in predicting the successful revascularization in STEMI patients.

Keyword: STEMI, R-wave peak time, QUBE, ECG



Correlation of treatment using azithromycin and levofloxacin with prolongation of corrected QT-Interval and arrhythmia incidence in heart failure patients

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Background and aims: Azithromycin and levofloxacin have been shown to be efficacious in treating infections. The adverse drug events of these drugs can cause severe prolongation of QT-interval. Prolongation of corrected QT (QTc) interval is associated with a risk of severe and even life-threatening arrhythmias. Several studies shown increasing risk of sudden cardiac death due to arrhythmia incidence after treatment using these drugs. Although administration of these drugs poses a risk of cardiovascular events, but there are lack of data available in patients with heart failure. The purpose of this study is to determine correlation of azithromycin and levofloxacin treatment with prolongation of corrected QT-interval and arrhythmia incidence in heart failure patients

Materials and methods: A retrospective study was conducted on 91 heart failure patients hospitalized in M Djamil Hospital during June-December 2020 treated using azithromycin, levofloxacin and combination of these drugs for 5 days. Patients were divided into 3 group that receive azithromycin, levofloxacin, and combination. The ECG was obtained before and after antibiotic treatment. QTc-interval was measured and compared before and after antibiotic treatment. Statistical analysis was performed using SPSS.

Results: Of 91 patients, most patients was male (n=65,9%), with baseline Qtc $401,03 \pm 21,35$. The highest prolongation of QTc-Interval occurred in combination group, followed by azithromycin and levofloxacin ($534,00 \pm 33,64$, $482,5 \pm 38,59$, $427 \pm 43,08$ respectively) ($p=0,000$). The most common comorbidity was renal disease (n=11,0%, $p=0,013$). Interestingly, The incidence of arrhythmia found highest in azitromicin group ($p=0,015$).

Conclusion: In heart failure patients, treatment using combination of azithromycin and levofloxacin can induce prolongation of QTc interval and increase the incidence of arrhythmia.

Keyword: azithromycin, levofloxacin, QTc-interval, arrhythmia



Symptom Burden And Quality Of Life After Successful Ablation In Patient With Low Burden Symptomatic Premature Ventricular Complexes

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Background and aims: Improving the quality of life using Radiofrequency (RFA) in patients with Premature Ventricular Complex (PVC) was important. Previous studies have objectively demonstrated the benefit of ablation in the high burden PVC. However, at this time there is still not much data regarding the benefit of ablation on low burden subject, especially on burden symptoms and quality of life. The study aimed to measure symptom burden and quality of life after RFA in patients with low burden PVC.

Materials and methods: A total of 31 respondents with low Burden PVC planned for ablation and eligible were recruited. The arrhythmia-specific questionnaire in tachycardia and arrhythmia (ASTA) scale score was calculated at the baseline before the ablation procedure and 12 months after that. Holter monitoring was used to assess PVC recurrence after 12 months of ablation.

Results: There was an improvement in symptom burden and quality of life in low burden PVC patients. ASTA symptom burden, ASTA symptom near syncope, Physical subscale health-related quality of life scale (HRQOL), mental subscale HRQOL, and total scale HRQOL had significantly decreased after 12-month ablation ($p < 0.001$) and ASTA symptom syncope ($p < 0.05$). The average PVC burden was significantly reduced from 8.0% to 0.8% ($p < 0.001$).

Conclusion: These findings describe a long-term outcome in patients with low Burden PVC after RFA, which is shown by improvement in symptom burden and quality of life and similar with PVC burden.

Keyword : ASTA Scale, RFA, PVC burden



Cardiac Arrhythmias in Critically Ill Patients with COVID-19: Retrospective Observational Study in DR M Djamil Hospital, Padang

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Background and aims: Arrhythmias have been reported frequent in COVID19 patients. But, the incident of arrhythmia in critically ill patient is remain unclear. This study aimed to assess the incidence of cardiac arrhythmias among critically ill COVID-19 patients admitted to DR. M. Djamil hospital and to understand the underlying prognostic implications.

Materials and methods: This retrospective cross-sectional study observed patients with COVID-19 infection with incident cardiac arrhythmias who were hospitalized in intensive and high care unit in June until August 2021. Patients with documented atrial fibrillation, atrial flutter, supraventricular tachycardia, nonsustained or sustained ventricular tachycardia, ventricular fibrillation, atrioventricular block, or marked sinus bradycardia (heart rate<40 bpm) were defined as having of arrhythmia.

Results: The arrhythmia were analyzed and compared between survivor and non-survivor. Among 430 patients, the incident of arrhythmia was 61 (8.85%). Overall in-hospital mortality was 22 (42%) during the observation. The clinical appearances in survivor group were better. Survivors had lower white blood cells (9760 VS 23.730 ;P<0.05) and lower D-dimer (3380 vs 5271; P=0,06). ARDS patient was also lower in survivor group (4 vs 18 ;P<0.05). Atrial fibrillation is the most common arrhythmias (44%), occurred more frequently in survivors (16 vs 11 in survivor, p= 0.81). Premature ventricular complexes occurred in 6 patients (9,8%), atrial tachycardia occurred in 5 patients (8%), total AV block occur in 4 patients (6%). Documented ventricular tachycardia was occur in 2 (3%) patients. Overall mortality was higher in patients with atrial fibrillation (40%)

Conclusions: In critically ill COVID-19 patients, the incidence of cardiac arrhythmias is high but not associated with increased mortality although it is frequently occur in this population. Atrial fibrillation are the most prevalent arrhythmias.

Keyword: Arrhythmias, COVID19, Atrial fibrillation



Age And Sex-Related Differences In QTc-Interval And Hr Average In Patients Monitored By 24-Hour Holter

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Background and aims: The correlation between heart rate-corrected QT (QTc) interval and the risk of both all-cause and cardiovascular death has been well known. Several studies demonstrated age- and sex-related differences in QTc-interval and HR average, which is potentially due to changes in sex-specific hormones. We aim to analyse differences of QTc-interval and heart rate average (HRavg) related to age and sex in patients undergoing with 24-hour Holter monitoring.

Materials and methods: We collected 24-hour Holter monitoring (BTL-08 Holter) results of patients in Cardiovascular Department DR. M. Djamil Hospital Padang between September 2020 and August 2021. Furthermore, we grouped the sample population to normal QTc-interval and long QTc-interval (female: >460 ms, male: >450 ms), as well as by age-group (children <18 years old (yo), adult 18-64 yo, elderly 65+ yo). No patient with short QTc-interval (female: <370 ms, male: <360 ms) in this study. Differences between groups were compared using chi-squared test for categorical variables and 2-tailed t-test or one-way Anova for continuous variables. Statistical analyses were performed using SPSS Ver.27.

Results: We evaluated 168 patients aged 12-88 yo monitored with 24-hour Holter (male: 56, female: 112, mean age 44.45±16.63 yo). In this study, 22.6% of the patients had long QTc-interval. Our results showed significant differences of QTc-interval and HRavg between female and male groups, with females have longer QTc interval and higher HRavg compared to males (QTc-interval female: 444.48±24.84 ms, male: 427.80±29.01 ms, p-value <0.001, 95% CI 8.18-25.17; HRavg female: 78.54±10.72 ms, male: 74.50±11.93, p-value 0.028, 95% CI 0.45-7.64). Furthermore, we found a significant differences of HRavg related to age (children: 82.78±8.43 bpm, adults: 78.05±10.66 bpm, elderly: 70.29±12.82 bpm, p-value 0.002, 95% CI 0.01-0.15). However, there were no differences of QTc-interval related to age-group. In addition, we found no differences in age and sex between normal and long QTc-interval groups.

Conclusion: Our study demonstrates the differences of QTc-interval related to sex only, while HRavg related to both sex and age. Additionally, our study showed no differences related to age and sex between normal and long QTc-interval groups.

Keywords: QTc-interval, HRavg, age, sex

Electrocardiography Examination Result in Preeclampsia Patient in Cililin General Public Hospital: A Descriptive Studies

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Background and aims: Preeclampsia (PE), advanced maternal age, and multiple gestation is proposed reason for increasing peripartum cardiomyopathy (PPCM), cardiovascular factor for mortality and morbidity both during pregnancy and after labor. Electrocardiography (ECG) is safety and widely available tool even in district area for evaluating cardiac function for pregnancy. The objective of this study is to describe results from ECG examination in PE patient in Cililin general public hospital.

Materials and method: Peripartum pregnancy woman comes to emergency setting in Cililin public hospital, patient diagnose as PE and never have history of cardiovascular disease selected during April 2019 – March 2020. Patient's clinical manifestation are assessed, patient underwent laboratory test for routine blood exam, and ECG test. ECG result interpreted by attending internist because there are no cardiologist in our hospital. Our internist reveals every abnormalities in ECG result as suspected for cardiomyopathy, it includes axis deviation, poor R wave progression, sinus tachycardia, atrial fibrillation, and inverted T wave.

Result: A total of 125 selected patients range from 17-45 years old, with the mean age of 32.83 ± 7.33 years were included in this study. Minimum number of gestation is 1st pregnancy and maximum is 8th pregnancy, with the mean number of gestation is 3 ± 1.58 . From 125 patients, 117 diagnose as PE, 3 as impending eclampsia, and 5 as eclampsia. Documented ECG finding was 43.2% (54 of 125) suspected for cardiomyopathy, and 56.8% (71 of 125) was normal sinus rhythm.

Conclusions: More than half of PE patients has normal ECG result. Based on this findings, ECG, maternal age, and number of gestation alone did not reflect any reliable value for predicting possibility for disease such as cardiomyopathy in PE patient. Future study may consider echocardiography as routine examination for PE patient.

Keywords

Electrocardiography, Preeclampsia, Gravida, Hypertension, Cardiomyopathy

VARIABLE	FREQUENCY	MEAN	SD
Age (years)			
<21	3	18.4	1.0
21-36	70	28.7	5.1
>36	52	39.8	2.25
Gravida			
1st gravida	29	1.0	0.0
2nd - 4th gravida	74	3.01	0.85
5th gravida - more	22	5.45	0.75

Cardiorespiratory Fitness Level as Atrial Fibrillation Risk Factor : Systematic Review

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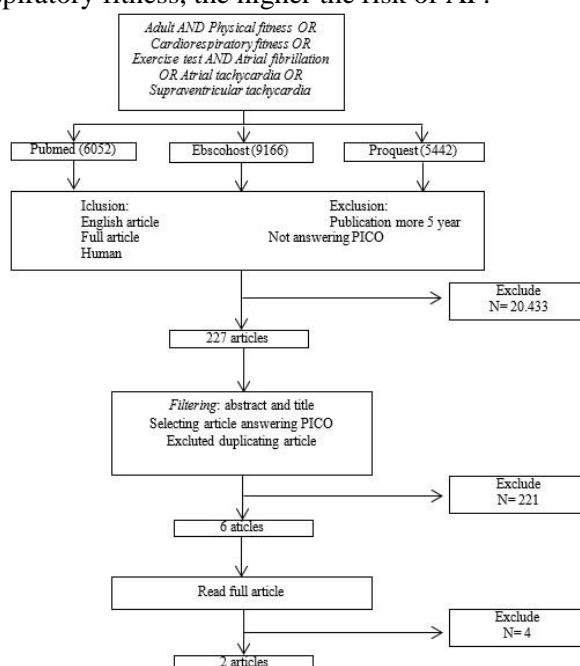
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Background and aims: Atrial fibrillation (AF) is a typical supraventricular arrhythmia, with uncoordinated activation of the atrial resulting in worsening of atrial mechanical function. Atrial fibrillation leads to increased mortality and morbidity. Comprehensive lifestyle modification, including management of several risks of heart disease, and exercise are needed to control AF. The purpose of this study is to conduct a systematic review of the literature on cardiorespiratory fitness level as atrial fibrillation risk factor.

Material and method: Electronic databases were searched. The search was conducted using Pubmed, Proquest, and Ebscohost database. The keywords used are Adult AND Physical fitness OR Cardiorespiratory fitness OR Exercise test AND Atrial fibrillation OR Atrial tachycardia OR Supraventricular tachycardia. Two reviewers independently screened articles, scored methodologic quality, and extracted data.

Result: Continuous variable analysis shows an increase in physical fitness of one METs will lower the risk of AF occurring by 9% (RR: 0.91; 95% CI: 0.84-1.00; P =0.05). Category variables show three levels of physical fitness: low level, medium level, and high level. Analysis of category variables showed high levels of physical fitness increased AF risk compared to low physical fitness levels (RR: 0.51; 95% CI: 0.28-0.91; P =0.02) (figure 2.3), and the physical fitness level lowering the AF's risk compared to low physical fitness levels (RR: 0.72; 95% CI: 0.56-0.93; P =0.01). Any higher cardiorespiratory fitness estimate of 1-METs, associated with a 5% lower AF risk in men (HR: 0.95; 95% CI, 0.89-1.00) and 16% lower AF risk in women (HR: 0.84; 95% CI, 0.77-0.92). An estimated increase in cardiorespiratory fitness of 1-METs in 10 years was associated with a 7% lower AF risk (HR: 0.56; 95% CI, 0.36-0.87).

Conclusion: Physical fitness, or rather cardiorespiratory fitness, is one of the risk factors for the onset of AF. The lower cardiorespiratory fitness, the higher the risk of AF.



Picture1. Literature searching flow

Short-term Improvement in Symptom Burden and Quality of Life After Radiofrequency Ablation of Low Burden Premature Ventricular Complexes

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Background and aims: The management of low burden PVC (< 10%) is currently still a matter of debate among clinicians. Several small studies show increased risk of left ventricular dysfunction on lower PVC burden. Radiofrequency ablation known to have favorable effect on reducing PVC frequencies and improvement of left ventricular dysfunction. However, there are not enough data or studies regarding ablation in patients with low burden PVC, especially its benefits on symptom burden and quality of life. The aim of this study was to compare symptom burden and quality of life before and 6 months after radiofrequency ablation in patient with low burden PVC.

Materials and methods: We conclude 31 low burden PVC patients undergoing radiofrequency ablation. The ASTA Score was used to assess symptom burden and quality of life in these patients. The score calculated and compared between before and 6 months after ablation.

Results: Statistical analysis found a significant difference between the mean score before and 6 months after the ablation on the ASTA burden scale symptom score (38.83 vs 4.45, $p < 0.05$), ASTA HRQOL physical subscale (30.30 vs 1.91, $p < 0.05$). ASTA HRQOL mental subscale (32.41 vs 4.51, $p < 0.05$), and ASTA HRQOL total scale (32.09 vs 2.90, $p < 0.05$).

Conclusions: Radiofrequency Ablation associated with favorable short-term outcome on symptom burden and quality of life in patients with low burden PVC.

Keywords: Premature ventricular complexes, Low burden, Radiofrequency ablation

Table 1. ASTA Scale Score Before and 6 Months Post Ablation

ASTA Scale	Before Ablation	6 Months Post Ablation	P value
ASTA Symptom burden	Min/max 17.8/75.0 38.83±14.98	Min/max 0/46.4 4.45±8.54	< 0.05
ASTA symptom near syncope	Min/max 0/75 7.25±22.50	Min/max 0/0 0±0	0.083
ASTA symptom syncope	Min/max 0/85.7 2.76±15.30	Min/max 0/0 0±0	0.780
ASTA HRQOL			
Physical subscale	Min/max 4.5/86.3 30.30±17.72	Min/max 0/31.8 1.91±6.18	< 0.05
Mental subscale	Min/max 15.7/89.4 32.41±21.52	Min/max 0/31.5 4.51±7.09	< 0.05
Total scale	Min/max 10/87.5 32.09±19.37	Min/max 0/32.5 2.90±6.22	< 0.05



Hypertension and Abnormal Renal Function Increased the Risk of Ischemic Stroke in Anticoagulated EHRA type-1 Valvular Atrial Fibrillation

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Background and aims: Atrial fibrillation (AF) increases the risk of stroke substantially, therefore many scores have been developed to risk stratify these patients. However, most of the previous studies have focused on non-valvular AF. The most widely used risk stratification score is the CHA2DS2-VASC score. Unfortunately, the validation of this score in valvular AF is poor. This study aimed to evaluate the clinical factors and echocardiographic parameters related to the incidence of ischemic stroke in anticoagulated EHRA (Evaluated Heartvalves, Rheumatic or Artificial) type-1 valvular AF patients.

Materials and methods: We conducted a retrospective cohort study based on data from the *Indonesian Registry on Atrial Fibrillation (OneAF)*. Patients with type-1 EHRA valvular AF between January 2015 and December 2019 were analysed. The clinical outcome was an ischemic stroke that occurred during the monitoring period of January 2015 - December 2019.

Results: Among 329 AF patients with mitral stenosis or prosthetic heart valves, we found the incidence of ischemic stroke was 17 (5.2%). Multivariate logistic regression analysis showed that two clinical factors, i.e., history of hypertension (OR 5.59; 95% CI: 1.93-16.15; $p = 0.001$) and estimated Glomerular Filtration Rate (eGFR) ≤ 59 mL/min/m² (OR 3.62; 95% CI: 1.30-10.02; $p = 0.013$) were independently associated with the incidence of ischemic stroke. No echocardiographic parameters were associated with the incidence of ischemic stroke in this population.

Conclusion: We observed that two clinical factors i.e., history of hypertension and abnormal renal function, were markedly associated with stroke incidence in anticoagulated EHRA type-1 valvular AF patients.

Usefulness of Fragmented QRS In Patients with Stable Angina Pectoris: A Single-Center Experience

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Background and aims: Coronary artery disease (CAD) is associated with heart muscle damage and decreased cardiac performance. The assessment of CAD involves clinical evaluation, non-invasive tests and coronary angiography (CAG). In addition, assessment with further risk factors and risk strategies may be useful for estimating the severity of CAD before CAG. A non-invasive parameter is needed to estimate the significance of lesions in the coronary arteries. Fragmented QRS (fQRS) can be easily identified by electrocardiography (ECG). Fragmented QRS is a sign recorded on ECG of a heterogeneous slowing of ventricular conduction and is highly correlated with myocardial fibrosis and ischemia. In this study we investigated the association between fQRS on the ECG and the significance of coronary lesions in stable angina pectoris patients who had a positive ischemic response to a exercise treadmill test (ETT) undergoing CAG.

Materials and methods: A total of 63 patients with stable angina pectoris who had a positive ischemic response to ETT underwent CAG in RSUP dr. M. Djamil, Padang, January – March 2021, divided into two groups as the fQRS and non fQRS. The differences between the groups in terms of the presence of significance of lesions in the coronary arteries and clinical characteristics were investigated.

Results: The mean age of patients was 58.2 ± 8.3 years, and 47 of them were males (74.6%). Fragmented QRS was present in 33 (55%) patients, and significant lesions was demonstrated in 42 subjects (66.7%) among the enrolled subjects. The significant lesion was more prevalent in fQRS group compared to non fQRS group ($p=0.003$). In addition, fQRS was associated with the increased risk of significance of lesions in the coronary arteries in multivariate analysis (OR = 6.4, CI=1.94-21.07, $p=0.003$).

Conclusion: The presence of fQRS in a patient with a positive ETT can help clinicians make the decision to refer CAG.

Table 1. Patient Characteristic

Variabel	Fragmented QRS		p value
	(+) (n = 33)	(-) (n = 30)	
Age (years), mean \pm SD	60.18 \pm 8.44	56.17 \pm 8.05	0.06 ^a
Gender (f%)			0.08 ^b
Male	28 (84.8)	19 (63.3)	
Female	5 (15.2)	11 (36.7)	
Body Mass Index, mean \pm SD	26.45 \pm 3.81	25.80 \pm 3.67	0.44 ^a
Risc Factors (f%)			
Family History	1 (3.0)	1 (3.3)	1.00 ^b
Smoker	18 (54.5)	12 (40.0)	0.32 ^b
Dyslipidemia	15 (45.5)	10 (33.3)	0.44 ^b
Hypertension	27 (81.8)	24 (80.0)	1.00 ^b
Menopause	3 (9.1)	7 (23.3)	0.17 ^b
Diabetes mellitus	9 (27.3)	4 (13.3)	0.22 ^b
Vessel Disease (f%)			
LM disease	4 (12.1)	0 (0.0)	0.11 ^b
1 vessel disease	11 (33.3)	4 (13.3)	0.08 ^b
2 vessel disease	8 (24.2)	5 (16.7)	0.54 ^b
3 vessel disease	13 (39.3)	5 (16.7)	0.06 ^b
Significant Lesion	28 (84.8)	14 (46.7)	0.003 ^b

^ap<0,05

^a mann-whitney

^b chi-square



Correlation between Renal Function and Ejection Fraction in Hospitalized Atrial Fibrillation Patients in Prof Kandou General Hospital.

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Background and aims: Atrial fibrillation (AF) is the most common arrhythmia in patients with chronic kidney disease. Meanwhile renal dysfunction is a common comorbidity in patients with heart failure (HF) despite the measure of ejection fraction (EF). One of the common reasons in hospitalized AF patients is HF and yet the correlation between renal function and EF in AF patients is still unclear. This study aims to determine the correlation between renal function and ejection fraction in hospitalized AF patients in Prof Kandou General Hospital. This study also aims to provide an overview of EF in hospitalized AF patients with simple markers such as renal function.

Materials and methods: A total of 51 hospitalized AF patients in Prof Kandou General Hospital were involved in this study. Renal function was measured by using estimated glomerular filtration rate (eGFR) and EF was measured by using teicholz echocardiography during hospitalization. The correlation between both measures was analyzed using the Spearman correlation test.

Results: The mean age of the patients was $60,61 \pm 13,15$ years old and sex category of the study subjects were almost equal where female was 51% . There was a significant positive correlation ($p < 0,05$) between EF and eGFR ($p = 0.03$, $r = 0.305$) in this study. There was no statistically significant difference in AF patients with or without history of hypertension (HT) ($p = 0,203$, $p = 0,06$). Unfortunately, this study could not determine the correlation with history of DM as comorbid due to lack of samples.

Conclusion: There was a statistically significant positive correlation between renal function and EF in hospitalized AF patients in Prof Kandou General Hospital, irrespective of history HT.



CORRELATION OF HYPERCOAGULABLE STATE IN COVID 19 PATIENTS WITH THE INCIDENCE OF NEW ONSET AF

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Background and aims: Arrhythmias are frequently reported in COVID-19 patients, with atrial fibrillation (AF) being the most common form. Previous studies showed the incidences of new-onset AF varies between 3.6% and 6.7% in patients with COVID-19. The pathophysiology of COVID-19 related AF is not well understood and proposed several presumptive mechanisms. COVID-19 also causes pro-inflammatory state, as evident from high D-dimer levels and makes hypercoagulable state in the patient. This is the first study that identify the correlation of hypercoagulopathy condition with new onset AF in the COVID 19 patients. The purpose of this study is to study the correlation between hypercoagulable state with new-onset AF in COVID 19 patients.

Materials and methods: This is a retrospective cross sectional study including 30 patients divided in AF and non AF groups treated at Dr M Djamil Hospital in June-August 2021. Baseline characteristic data and D-dimer levels were obtained. We excluded patient who had history of arrhythmia, hypertension and diabetes mellitus. Hypercoagulable state defined as D-dimer level >500 ng/ml. New onset AF defined as who present for the first time with persistent or paroxysmal AF, regardless of whether the duration of the arrhythmia is known at the time of presentation. Data analyzed using the contingency coefficient method.

Result: In the group with new-onset AF, the percentage of male patient was 46% with average age was 63.2(\pm 10.1) years old, and in the group without AF, the percentage of male patient was 53% with average age was 60.0(\pm 6.4) years old. In the group with new-onset AF, high D-dimer level was found in 13 patient (86%), whereas in the group without AF, only 8 patients (58%) presented with high D-dimer level. Based on the contingency coefficient method, no significant correlation was found between new onset AF and hypercoagulable state (p 0.020)

Conclusion: There is no correlation between hypercoagulable state and the incidences of new onset AF in COVID-19 patients.

Keywords: hypercoagulable state, D-dimer, new-onset AF



Association CHA2DS2-VASc score and in-hospital mortality in Atrial Fibrillation Patients with COVID-19 at M. Jamil Hospital

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Background and aims: Arrhythmias are frequently reported in COVID-19 patients, with atrial fibrillation (AF) being the most common form. The CHA2DS2-VASc score is a well-validated risk stratification tool for predicting stroke in AF, as well as morbidity and mortality in several entities. This study aimed to evaluate the relationship between the CHA2DS2-VASc score and in-hospital mortality in patients with COVID-19, regardless of AF.

Materials and methods: A single-centre, retrospective study for patients with COVID-19 who were hospitalized in Intensive and High Care Unit in May until August 2021. The CHA2DS2-VASc score of each patient was calculated, and mortality outcomes were observed.

Result: Among 82 patients enrolled as arrhythmias with COVID-19, 36 had AF (43.9%). AF patients had a higher prevalence of cardiovascular risk factors and comorbidities. After propensity score matching, these differences were attenuated. The CHA2DS2-VASc score was significantly higher in non-survivor COVID-19 patients than in survivor COVID-19 patients ($p < 0.001$). Forward stepwise logistic regression analysis demonstrated that a CHA2DS2-VASc score of ≥ 3 were independent predictors of in-hospital mortality of COVID-19 patients.

Conclusion: High value of CHA2DS2-VASc score was correlated in-hospital mortality in Atrial Fibrillation patients with COVID-19.

Keyword: Atrial Fibrillation, Arrhythmia, CHA2DS2-VASc, COVID-19



CORRELATION OF INTERLEUKIN-6 LEVEL AND CORRECTED QT INTERVAL IN CORONA VIRUS DISEASE 2019 PATIENTS HOSPITALIZED IN M. DJAMIL HOSPITAL PADANG

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Background and aims: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing coronavirus disease 2019 (COVID-19) has a high inflammatory burden which cause multiple organ dysfunction including cardiovascular system. Systemic inflammation marked by increasing interleukin-6 (IL-6) can cause repolarization changes with resultant prolongation of QT interval. IL-6 also increasing bioavailability of concomitant QT-prolonging drugs (via CYP450 [cytochrome P450]-3A4 inhibition) and further cause prolongation of QT interval. The purpose of this study is to determine correlation of increasing IL-6 to corrected QT (QTc) interval in Covid-19 patients hospitalized in M. Djamil hospital.

Materials and methods: A retrospective study was conducted on Covid-19 patients hospitalized in M. Djamil hospital during August - September 2021 with increasing IL-6 level. Patients with electrolyte imbalance and prolonged QTc in ECG baseline were exclude. We compared the corrected QT interval value from ECG baseline to ECG follow up after five days therapy. Statistic evaluation performed using SPSS with pearson correlation formula.

Results: In this study, we include 31 patients, most patients were female (58.1%) with overall mean age was 52.71 ± 13.44 years. Concomitant disease in this population were 32.3% hypertension, 22.6% diabetes mellitus and 9.6 % coronary artery disease. All patients have increased IL-6 (mean = 83.53 ± 74.00 pg/dl). We found prolongation of QTc with mean QTc baseline was 388.81 ± 37.14 ms, and mean evaluation QTc was 426.23 ± 45.35 ms, but from statistical analysis, level of IL-6 did not significantly correlate with prolongation of QTc (p-value = 0.29, r = 0.19).

Conclusion: In this study, the prolongation of QTc interval in Covid 19 patients did not correlate with increasing of IL-6 level.

Keyword: *QT interval, Interleukin-6, Covid-19*



Significant Correlation between Tp-e/QTc ratio with Lactate Level in COVID-19 Patient

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Background and aims: COVID-19 has been known as the causes of severe pneumonia and systemic hypoxemia. The systemic hypoxemia causes the increase of blood's acidity state leaving a poor oxygenation and tissue perfusion. Hyperlactatemia is one of the established markers for tissue hypoxia. Hypoxia state has been known to increase risk of ventricular arrhythmia due to abnormal repolarization of ventricle. Repolarization abnormality can be measured from corrected QTc, and novel parameter called T wave peak-to-end (Tp-e) interval. The aim of this study is to find correlation between Tp-e/QTc ratio and the lactate levels in moderate COVID-19 patients.

Materials and methods: This is a cross sectional study including 85 positively confirmed moderate COVID-19 patients with no previous documented cardiovascular disease. We observe clinical, laboratory and ECG indices on the first admission to find correlation between lactate levels and QTc interval, Tp-e, and ratio Tp-e/QTc by using Spearman correlation analysis. QTc is calculated by Bazett formula, while Tp-e is measured using tangent method from the distance between peak of T wave and end of T wave from precordial leads.

Results: There is positive correlation between lactate level and ratio Tp-e/QTc (r 0.277, $p < 0.05$) with median of ratio 0.1516 (0.08-0.38) independent of other hypoxia's clinical and metabolic parameters. Patients with ratio Tp-e/QTc 0.1291 shows 4 times greater risk to have a higher lactate (OR 4.071 [1.227-13.514]; p value < 0.05).

Conclusion: There is significant correlation between the Tp-e interval and Tp-e/QTc ratio with lactate levels in moderate COVID-19 patient.

Keyword: Tp-e interval, QTc interval, ECG, COVID-19, Lactic Acid