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RESEARCH



Anterior T Wave Inversion to Identify Arrhythmogenic Right Ventricular Cardiomyopathy: Does the Amplitude Matter?

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Background and Aims: Arrhythmogenic right ventricular cardiomyopathy (ARVC) is a hereditary condition characterized by the myocardium's progressive replacement by fibrofatty tissue and a predilection towards malignant arrhythmias. Affected individuals may show several electrocardiogram (ECG) anomalies such as anterior T wave inversion (TWI). Although anterior TWI is one of the most common electrocardiographic features in ARVC, this specific repolarization pattern may be a marker of physiological adaptation to exercise in athletes or may also be detected in a small portion of young sedentary individual. We aim to use the amplitude of the anterior T wave inversion in V1 to distinguish the benign variant from an anterior TWI suggestive with ARVC.

Materials and Methods: A cross sectional study was performed using ECG taken from arrhythmia registry in RSUP DR Sardjito. We reviewed records of ECG and cardiac magnetic resonance imaging (CMR). Anterior TWI must be present in the ECG to be included in this study. Patient were classified into two categories being ARVC and non ARVC based on Padua criteria. The depth of anterior TWI amplitude was obtained using imageJ and were used as a comparison in between both groups. Mann Whitney U test and Chi Square were applied.

Results: Out of the total of 71 patients, 23 subjects (32.3%) were diagnosed with ARVC. Ten patients with ARVC were found to have TWI only in V1 and 30 patients with non ARVC were found to have TWI in V1 alone. The subjects were categorized into two groups of having anterior TWI solely in V1 and TWI extended more than V1, the difference was not statistically significant (P: 0.13). There is no evidence that the mean amplitude of TWI specifically in V1 is statistically different between subjects with ARVC compared to subjects with non ARVC ($0.175 \text{ mV} \pm 0.083 \text{ mV}$ vs $0.135 \text{ mV} \pm 0.058 \text{ mV}$, P: 0.178).

Conclusion: Currently, there is no evidence that the presence of TWI confined in V1 can be used to distinguish patients with ARVC and patients with non ARVC. Further research with larger sample is needed to explore the use of anterior TWI amplitude in V1 as a sole parameter to determine ARVC.

Keywords: Anterior T wave inversion, arrhythmogenic right ventricular cardiomyopathy, Padua score



Association Between Timing of Beta Blocker Administration and the Post-Operative Atrial Fibrillation after Cardiac Surgery: A Single Center Experience

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Background and Aims: Postoperative Atrial Fibrillation (POAF) is the most common postoperative supraventricular tachyarrhythmia after Coronary Artery Bypass Graft (CABG) surgery.¹ Guidelines recommend perioperative oral Beta-Blocker (BB) therapy for the prevention of POAF following cardiac surgery.² However, there remains a paucity of data regarding the optimal timing for the administration after the surgery. This study aims to find out the relationship between the timing of beta-blocker administration and the incidence of POAF post-CABG surgery in RSUP Dr Kariadi.

Material and Methods: This is a single-center retrospective study of 63 patients who underwent elective CABG surgery between June 2022 to April 2023 at RSUP Dr. Kariadi Hospital. 12 patients were excluded due to concomitant valvular heart surgery and passed away right after surgery. All the subjects were observed with an ECG monitor for 96 hours using Heal Force Prince 180B Portable ECG Monitor after the surgery was performed. All the patients were given Beta-Blocker following surgery, the subjects were divided into two groups: POAF and non-POAF. We analyzed subject groups using IBM SPSS 26.

Results: Of the 51 patients, 46 were males (90.2%) and 5 were females (9.8%) with mean age of 58.2 ± 6.5 years old. POAF was found in 24 of them (47.1%). Several comorbidities were screened with hypertension being the highest, followed by diabetes mellitus and dyslipidemia with percentages of 92.1%, 49%, and 43.1% respectively. No significant differences in the baseline characteristics were observed between groups. The most commonly used type of beta-blocker was bisoprolol (80.4%), followed by carvedilol (19.6%), and the most frequently utilized initial dosage was bisoprolol 1.25mg/24 hours (51%). The Earliest Beta-Blocker was given on day 1 and the latest was on day 9 after surgery. The average number of days for beta-blocker initiation in the non-POAF group is 2.4 ± 1.5 days. There was an association between the timing of Beta-Blocker administration and occurrence of POAF (p-value <0.001; OR 13.2 (3.45-50.4)).

Conclusion: The administration of Beta-Blocker within 72 hours following surgical procedure is associated with a lower risk of POAF occurrence after CABG surgery.

Keywords: Beta Blocker, Post Operative Atrial Fibrillation, Atrial Fibrillation, Coronary Artery Bypass Surgery

Table 2. Association between Timing of Beta-Blocker Administration and POAF

Beta-Blocker	Subject Group		Total n=51	OR	p-value
	POAF n=24	non-POAF n=27			
≥72 hours	18 (35.3%)	5 (9.8%)	23 (45.1%)	13.2	<0.001 ^a
<72 hours	6 (11.8%)	22 (43.1%)	28 (54.9%)	(3.45-50.4)	

*significant (p<0.05); ^achi-square test



**FACTORS ASSOCIATED WITH POOR TIME IN THERAPEUTIC RANGE IN NON-
VALVULAR ATRIAL FIBRILLATION PATIENTS RECEIVING WARFARIN IN RSUD ULIN
BANJARMASIN**

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Background and aims: Warfarin is a widely used anticoagulant to prevent stroke incidence, particularly for non-valvular atrial fibrillation (NVAF) patients. Time in therapeutic range (TTR) reflects the anticoagulation quality of patients receiving warfarin with target international normalized ratio (INR) of 2-3, and patients with TTR \geq 65% were associated with a lower risk of stroke and bleeding. This study aimed to find the factors associated with poor TTR in NVAF patients receiving warfarin in RSUD Ulin Banjarmasin.

Materials and methods: This cross-sectional study was conducted on NVAF patients with no history of mitral valve disease/replacement, who received monthly-prescribed warfarin in the Warfarin Clinic in RSUD Ulin Banjarmasin. Medical records of these patients that fit the inclusion criteria of having recorded variables needed in this study were selected. The TTR value was calculated using Rosendaal method. Only 2 consecutive INR values were used, the index INR and the first follow-up INR. TTR below 65% was considered as poor TTR. The potential factors associated with poor TTR were analyzed with multivariate logistic regression, and the AUC, sensitivity, and specificity values of significant predictors were calculated.

Results: 128 NVAF patients consisted of mostly males (62.5%), aged 55.2 ± 10.34 years, and proportions of positive clinical histories: congestive heart failure (79.7%), coronary artery disease (75%), thromboembolism (34.4%), hypertension (21.1%), diabetes mellitus (14.1%), stroke (1.6%), and chronic kidney disease (0.8). The mean CHA₂DS₂-Vasc score and TTR were 2.71 ± 1.35 and $77.37 \pm 30.04\%$, respectively. The mean warfarin dose prescribed was 2.88 ± 1.18 mg and most patients were prescribed with ≥ 5 comedication drugs (73.4%). Bisoprolol was the most prescribed comedication (19.72%). Age (OR: 1.10, 95% CI: 1.03-1.18), CHA₂DS₂-Vasc score (OR: 0.31, 95% CI: 0.11-0.90), histories of hypertension (OR: 5.10, 95% CI: 1.26-20.73) and coronary artery disease (OR: 5.32, 95% CI: 1.30-21.82) were significant predictors of poor TTR. The cut-off value of 56.5 or above for age was associated with the increased risk of having poor TTR (AUC: 0.675, sensitivity: 70.7%, specificity: 60.9%).

Conclusion: Age, CHA₂DS₂-Vasc score, and histories of hypertension and coronary artery disease were associated with poor TTR in NVAF patients receiving warfarin.

Keywords: Atrial fibrillation; Warfarin; Time in therapeutic range



Clinical Profile of Arrhythmias in Myocarditis: A Single Center Experience

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Background and aims: Myocarditis is an inflammatory disease of the heart that may manifest as a result of infections, exposure to toxic substances, or the activation of the immune system.¹ Myocarditis can manifest clinically in a wide variety of forms, from relatively mild symptoms like fever, myalgias, palpitations, or exertional dyspnea to life-threatening ones like profound hemodynamic derangement.² Diagnosis can be difficult because to the wide variety of clinical symptoms and their overlap with those of other acute heart diseases.³ It's also a leading cause of sudden cardiac death in young people because of arrhythmia.⁴ The purpose of this study is to determine the clinical profile of myocarditis patients, especially the incidence and type of arrhythmias they experienced.

Materials and methods: subjects of this study were adults above 18 years-old diagnosed with myocarditis based on cardiovascular magnetic resonance (CMR) examination at Sardjito Hospital, Yogyakarta, between January 2022 and June 2023. Data were obtained retrospectively and analyzed statistically with IBM SPSS version 22.

Results: A total 10 of 322 patients underwent CMR were enrolled in this study, with males slightly more than half. The mean age was 50.5 ± 15.4 years. Patients' chief complaint is chest pain, followed by dyspnea. On the other hand, only 10% of the population reports symptom of flulike syndrome. 70% of the population has an arrhythmia (40% simple and 30% complex). The incidence of arrhythmia type is divided into 60% ventricular tachycardia, 30% complete heart block, 10% atrial fibrillation, and 10% atrial flutter. Part of it reversible and the others was proceeded with permanent pacemaker implantation. Up to 30% of the population had history of cardiac arrest and half of the patients experienced decreased systolic function.

Conclusions: Myocarditis is still an serious clinical illness, and arrhythmias are among the potentially deadly consequences.⁵ Seventy percent of the people in our study had episode of arrhythmia, and thirty percent had a previous record of cardiac arrest. Since myocarditis is often associated with fatal arrhythmia, early detection and appropriate treatment can decrease patient morbidity and mortality.

Keyword: myocarditis, cardiovascular magnetic resonance (CMR), arrhythmia

Table 1. Baseline Characteristics

		Type of arrhythmia, n (%)	
Male, n (%)	6 (60%)	Ventricular Tachycardia	6 (60)
Mean Age \pm SD, years	50.5 ± 15.4	Complete Heart Block	3 (30)
Chief Complaint, n (%)		Atrial Fibrillation	1 (10)
Chest Pain	4 (40)	Atrial Flutter	1 (10)
Dyspnea	3 (30)	Mean Ejection Fraction \pm SD, %	40.29 ± 9.9
Palpitation	1 (10)	Mean LVIDd \pm SD, mm	49.57 ± 7.13
Fatigue	2 (20)	Mean TAPSE \pm SD, mm	18.9 ± 2.02
Arrhythmia, n (%)	7 (70)	Median hs Troponin T, ng/L (IQR)	524 (19-3177)
Simplex arrhythmia, n (%)	4 (40)	LVIDd= Left ventricular internal diameter end diastole; TAPSE=	
Complex arrhythmia, n (%)	3 (30)	Tricuspid Annular Plane Systolic Excursion	



Risk of Atrial Fibrillation Following Right Ventricular Pacing: A Cohort Analysis of Pacemaker Interrogation Records from Saiful Anwar Hospital Malang, Indonesia

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Background and aims: Pacemaker implantation is still an integral part of the management of severe bradyarrhythmias. The right ventricular (RV) pacing has been proved as the standard pacing site in most of the patients. However, pacing from the RV is associated with electrical and mechanical dyssynchrony, that may theoretically trigger atrial arrhythmias. While in several studies, documented ventricular high rate (VHR) episodes is associated with higher atrial fibrillation (AF) burden. This study aimed to evaluate association between ventricular pacing percentage (VP%) with VHR episodes and AF risk in patients with right ventricular pacing.

Materials and methods: We analyzed pacemaker interrogation records of 168 patients with VVI pacing from 2020 to 2023 at Saiful Anwar Hospital Malang, Indonesia. VP% and VHR episodes data were recorded. Patients were divided into two groups: 110 patients in the high ventricular pacing percentage group (VP% \geq 60%) and 58 patients in low ventricular pacing percentage group (VP% <60%). Baseline characteristics such as age, gender, comorbidities and basic echocardiography values were also collected.

Results: The occurrence of documented VHR episodes were observed in 67 (39.8%) patients. High VP% groups showed higher occurrence of VHR episodes compared to low VP% groups (50.7% and 49.3%, respectively; OR 3.25, P=0.001). Further analysis from independent predictors of AF, left atrium dilatation more commonly found in high VP% groups than low VP% groups (25 patients vs 15 patients, respectively) and had higher risk of VHR episodes occurrence (OR 1.23, P=0.602). Other independent predictors of AF such as age, gender, LVEF, LV dimension was not significantly associated with occurrence of VHR episodes and AF risk.

Conclusion: Higher ventricular pacing percentage is associated linearly with documented VHR episodes in patient with chronic right ventricular pacing. Our study highlights the importance of pacemaker diagnostics to guide patients future treatment and the importance of appropriate pacing mode and pacing sites selection to improve survival outcomes for individuals in need of cardiac implantable electronic devices (CIEDs).

Keyword: Right ventricular pacing; Atrial fibrillation; Ventricular high rate episodes; Cardiac implantable electronic devices



P Wave Characteristics as Early Predictors for Paroxysmal Atrial Fibrillation: Insight from Holter Registry

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Background and aims:

This study aimed to address the underdiagnosis of paroxysmal atrial fibrillation, a common cardiac arrhythmia, by assessing the predictive value of P wave characteristics for its early detection. With the goal of improving diagnostic strategies and patient outcomes.

Materials and Methods:

We analyzed Holter monitoring data from 2020 to 2023 for 103 patients at Saiful Anwar Hospital, Malang. The patients were divided into two groups: 43 in the paroxysmal atrial fibrillation group and 60 in the non-paroxysmal atrial fibrillation group. Baseline characteristics such as age, gender, comorbidities, and therapeutic regimens were recorded. P wave characteristics, including duration, axis, terminal force in V1, and dispersion, were determined using predefined measurement criteria.

Results:

The baseline characteristics of the patients showed no significant difference in age distribution or gender between the two groups. In terms of comorbidities, the prevalence of hypertension, heart failure, diabetes mellitus, and cerebrovascular accident varied between the groups. Differences in medication usage were also observed. Further analysis of P wave characteristics showed that a P wave duration of more than 120ms was significantly associated with paroxysmal atrial fibrillation (26 patients in AF group vs 14 in non-AF group, $P=0.002$). The P wave axis also showed a significant correlation with paroxysmal atrial fibrillation, with most patients having a P wave axis between 0-75 (31 patients in AF group vs 54 in non-AF group, $P<0.0001$). The presence of P terminal force in V1 was significantly more common in patients with paroxysmal atrial fibrillation (14 patients in AF group vs 11 in non-AF group, $P=0.002$). Furthermore, a P wave dispersion of more than 36ms was significantly associated with paroxysmal atrial fibrillation (29 patients in AF group vs 4 in non-AF group, $P<0.0001$). However, no significant difference was found concerning advanced interatrial block between the two groups ($P=0.142$).

Conclusion:

These findings suggest that P wave characteristics, including duration, axis, terminal force in V1, and dispersion, could serve as useful predictors of paroxysmal atrial fibrillation. This emphasizes the role of ECG markers in early detection, which could lead to more effective treatment strategies and improved patient outcomes. Our study contributes to the existing body of evidence and highlights the need for further research to validate these findings and clarify their clinical implications in the field of cardiac rhythm management.

Keywords: P wave indices, paroxysmal atrial fibrillation, Holter monitoring

HEART RATE INDEPENDENCE OF PREMATURE VENTRICULAR COMPLEX IMPAIRS MYOCARDIAL SYSTOLIC INTRINSIC FUNCTION

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Background & Aims: Premature ventricular complexes (PVC) was associated with a risk of decreased ventricular function and heart failure, and increased long-term mortality. Low circadian variation is one of the predictors of PVC-induced cardiomyopathy. Independent-type-PVC (I-PVC) is a form of PVC with a low distribution of circadian variation. However, not all I-PVC show low circadian variation. No studies have been performed to examine differences in intrinsic systolic function of left ventricle (LV) using global longitudinal strain (GLS) in independent versus heart rate-dependent idiopathic PVC. The aim of this study is to determine the relationship between I-PVC and intrinsic systolic function of LV using speckle tracking echocardiography in patients without structural heart disease.

Materials & Methods: A cross-sectional study was conducted using data from patients with idiopathic ventricular arrhythmias collected at RSPJD Harapan Kita Jakarta in February 2021-May 2021. Evaluation of idiopathic PVC was carried out using a 12-lead ECG, 24-hour Holter monitoring. Basic echocardiography was performed then LV intrinsic systolic function was assessed using speckle tracking echocardiography with global longitudinal study (GLS).

Results: Of the 67 patients with idiopathic PVC included in the study, 27 (40.2%) patients included in the independent PVC group and 40 (59.8%) patients in the HR-dependent PVC group. A total of 31 (46.3%) patients had LV systolic dysfunction on GLS examination (less than -18). Independent-type-PVC (OR 5.3; 95% CI 1.10-33.29; $p = 0.038$), PVC burden of 9% (OR 16; 95% CI 1.58-163.61; $p = 0.019$), male gender (OR 6.58; 95% CI 0.80-0.99; $p = 0.029$), and non-sustained VT episodes (OR 13.88; 95% CI 1.77-108.53; $p = 0.012$) was significantly associated with a decrease in LV intrinsic systolic function.

Conclusion: Independent-type-PVC was associated with decreased LV intrinsic systolic function assessed by speckle tracking echocardiography. Evaluation of the type of idiopathic PVC needs to be considered since it is related with the patient's prognosis in clinical practice.

Keywords: Arrhythmia, cardiomyopathy, circadian rhythm, PVC, speckle tracking

Variables	Adjusted OR	95% CI	P Value
Independent-type PVC	5,30	1,10 – 33,29	0,038
PVC Burden > 9%	16	1,58 – 163,61	0,019
Male Gender	6,58	0,80 – 0,99	0,029
Non-sustained PVC episodes	13,88	1,77 – 108,53	0,012

Table. Multivariate analysis of Independent PVC with Intrinsic LV function in the form of abnormal GLS in Idiopathic PVC patient

LOCALIZED RIGHT PRECORDIAL LEADS QRS PROLONGATION AND AMPLITUDE RATIO: DOES IT HAVE ANY ROLE IN THE DIAGNOSIS OF ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY?

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Background and Aims: Standard 12-leads electrocardiogram (ECG) remain as the most widely available tools, thus holds important role for clinical diagnosis. ECG clinical utility for patients with arrhythmogenic right ventricular cardiomyopathy (ARVC) is based on the changes observed in both the QRS complex and the ST-T wave, especially in the right precordial leads. ECG findings not only help to early recognize affected patients but also in identify the ones with maximum risk of ventricular arrhythmias and sudden cardiac death. To improve ECG role for the diagnosis of ARVC, this study sought to compare ECG parameters in the precordial leads for patients with definite ARVC and idiopathic right ventricular outflow tract (RVOT) tachycardia.

Materials and Methods: This paper analysed digital 12-leads ECG from Sardjito Hospital Yogyakarta arrhythmia registry, comparing 25 patients with definite ARVC by Padua Criteria, and 49 patients with idiopathic RVOT tachycardia. Localized right precordial QRS prolongation ratio was defined as QRS duration (V1+V2+V3)/QRS duration (V4+V5+V6). Other parameter measured was right precordial QRS amplitude ratio, defined as QRS amplitudes (V1+V2+V3)/QRS amplitude (V1+V2+V3+V4+V5+V6). These parameters were chosen since there appears to be typical changes mainly in right precordial leads for patients with ARVC, reflecting replacement of RV myocardium with fibro-fatty tissue.

Results: The ratio of localized right precordial QRS prolongation was found to be higher in patient with ARVC. Although the means of the ratio were not significantly different (1.20 ± 0.23 for ARVC vs 1.11 ± 0.20 for idiopathic RVOT; $p = 0.07$), when cut-off value of 1 were used, significant proportion of patient with ARVC were found to be in the higher ratio group ($p < 0.05$) with 80% sensitivity and 37% specificity. The ratio of right precordial QRS amplitude, however, were not significantly differ between two groups ($p > 0.677$).

Conclusion: Analysis of QRS complex in right precordial leads possess considerable diagnostic value in ARVC. This study results confirmed the diagnostic value and potential role of localized QRS prolongation in the right precordial leads. Meanwhile, QRS amplitude ratio is a poor discriminator for patients with ARVC and idiopathic RVOT.

Keywords: Arrhythmogenic Right Ventricular Cardiomyopathy, Localized Right Precordial QRS Prolongation Ratio, Right Precordial QRS Amplitude Ratio

Table 1. Comparisons of ECG findings in patients with ARVC and idiopathic RVOT tachycardia

	ARVC (n=25)	Idiopathic RVOT (n=49)	p Value
Localized Right Precordial QRS Prolongation Ratio	1.20 ± 0.23	1.11 ± 0.20	0.07
Right Precordial QRS Amplitude Ratio	0.59 ± 0.05	0.58 ± 0.03	0.66



Exploring the Epidemiological Landscape of Arrhythmia: A Comprehensive Analysis at a National Referral Hospital

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Background and Aims: Arrhythmias are a significant health concern, affecting individuals worldwide. It can result in life threatening condition suggesting its high morbidity and mortality burden. Understanding epidemiological profile of arrhythmias is crucial for effective management and interventions. Yet, there was no baseline epidemiology profile either hospital nor population based of arrhythmia provided in Indonesia. This study aims to describe the epidemiological profile of arrhythmias at a national referral hospital

Methods: A retrospective analysis of clinical records and electrocardiographic data was conducted for all patients who visited outpatient clinic and wards at Dr. Sardjito Hospital from June 1, 2022 to May 31, 2023. Descriptive statistics were employed to determine the percentage distribution of the various arrhythmia subtypes.

Results: A total of 2493 patients with arrhythmia were enrolled. The descriptive data analysis revealed the following distribution of arrhythmia subtypes: Atrial Fibrillation and Flutter accounted for 0.51%, SVT accounted for 0.11%, APC represented 0.03%, VPC constituted 0.21%, VT comprised 0.06%, ARVC constituted 0.002% (6 patients), and Brugada accounted for 0.007% (21 patients), of the total 271,982 patients who visited outpatient clinic and wards in Dr. Sardjito Hospital.

Conclusion: The descriptive data highlights the relative prevalence of various arrhythmia subtypes, contributing to the existing knowledge on the distribution and burden of arrhythmias in this specific healthcare setting. These findings can inform future research, healthcare resource allocation, and targeted interventions aimed at improving the management and prevention of arrhythmias in the population.

Keywords: Arrhythmia, Epidemiology Profile, Arrhythmia Subtypes



Another Clairvoyant on The Block: Association between Right Ventricle Electrocardiogram Parameter Abnormalities and Mortality Status in Mitral Stenosis Patients in RSUP Dr. Sardjito Yogyakarta

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Background and aims: Right ventricle hypertrophy is a common complication in patients with mitral stenosis, leading to abnormal electrophysiology. As electrocardiography is a rapid, widely available, and reproducible tool, this study aims to see the association between right ventricle electrocardiogram parameters abnormalities and mortality status in mitral stenosis patients in RSUP Dr. Sardjito.

Materials and Methods: This cross-sectional study uses the Mitral Stenosis registry data in RSUP Dr. Sardjito from April 2014 to September 2022. Clinical data, electrocardiogram, and echocardiogram were obtained as baseline measurements during admission. Each electrocardiogram was analyzed by ImageJ application to measure QRS duration, R-wave peak time, and RV strain. This study uses logistic regression to evaluate the association of QRS duration, R-wave peak time, RV strain, and mortality status.

Results: A total of 436 patients were eligible for the analysis. Among these were 78 (17.9%) deaths with unknown cause of death because of inadequate source documentation. The mean QRS duration and R-wave peak time in right precordial leads were 0.0807 (± 0.02401) and 0.0248 (± 0.01229), respectively. Prolonged QRS duration in lead V1 or V2 (OR 6.635 (95% CI 2.868 – 15.349), $p = 0.000$) and prolonged R-wave peak time in lead V1 or V2 (OR 1.826 (95% CI 1.023 – 3.259) $p = 0.042$) was associated with increased mortality rate, while presence of RV strain was not increased risk of death (OR 1.345 (95% CI 0.792 – 2.283) $p = 0.273$).

Conclusion: This study found that prolonged QRS duration (>120 ms) and prolonged R-wave peak time (>35 ms) in right precordial leads are significantly associated with mortality. This association might provide benefits in predicting patient conditions and prognostic based on electrocardiogram features only.

Keywords: mitral stenosis, electrocardiography, mortality



**Predictor of Acute Procedural Success of PVC Ablation using Conventional Non 3D Ablation
technique : Single Centre Experience**

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Backgrounds and aims: Catheter ablation is a preferred management in patients presenting with high burden of premature ventricular contraction (PVCs) and signs of cardiomyopathy. Standard procedure consist of proper 3D electroanatomic mapping, but in Indonesia the 3D procedure was limited by national government health insurance. This study aims to examine the success of the procedure using conventional ablation only and the factors that influence the successfulness of conventional ablation in NCCHK

Materials and methods: This study is a retrospective, single center study of patients who underwent PVC ablation using conventional methods from Jan 2019 - Feb 2023 in NCCHK. Predictors of acute procedural were evaluated.

Result: A total of 201 patients were included. The overall acute successful rate was 89.6%. Single PVC origin was the independent factor of acute procedural success in conventional PVC ablation ($p = 0.031$).

Table 2. Multivariat analysis of predictors acute procedural success in conventional PVC ablation

Variable	Bivariat analysis OR (CI 95%)	p value	Multivariate analysis OR (CI 95%)	p value
Single PVC morphology	3.2 (1.1-9.2)	0.024	3.2 (1.1-9.2)	0.031
Sex	0.5 (0.20-1.2)	0.20	0.57 (0.22-1.45)	0.236

Discussion: Conventional ablation for PVC are still considered effective, especially when 3D ablation is not available. Between several parameter than have been studied, single PVC morphology was independent variable for acute procedural success of conventional PVC ablation.

Keywords : PVC, conventional ablation, acute procedural success



Safety and Efficacy of Supraventricular Tachycardia Electrophysiological Study and Catheter Ablation in Single Health Center Indonesia

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Background and Aims: Supraventricular tachycardia (SVT) is one of the most common arrhythmias. The prevalence of SVT is 2.25 per 1000 population with a 2-fold female predominance. Catheter ablation is the recommended long term treatment to symptomatic and recurrent SVT. It is a safe, effective, and affordable technique that has been proved to have a high success rate and low complication. However, this study shows a low success rate of SVT ablation. Therefore, the aim of this study is to evaluate the safety and efficacy of EPS and ablation in one health center in Indonesia.

Material and Methods: This research is observational study with cross sectional approach. The subjects of this study were SVT patients, whose inclusion criteria were diagnosed AVRT, AVNRT, or AT through ECG and/or Holter monitoring and underwent catheter ablation in General Hospital Dr. Soetomo from the period of February 2021 to February 2023. The sampling to this study was done through total sampling

Results: Between February 2021 to 2023 there were 65 patients with SVT diagnosis that went through EPS and ablation. The most common SVT in this study is AVRT. The overall acute success rate of SVT ablation in this study is 53.85%. Among those, AVNRT ablation success rate is 92% while AVRT ablation success rate is 35.29%. The most common accessory pathway of AVRT is LLAP and the most frequently used ablation approach is retrograde.

Conclusion: The overall acute success rate of SVT ablation in this study is lower than previous studies. In general, AVNRT has a better success rate compared to AVRT. Most of AVRT originates from LLAP and is terminated through a retrograde approach. Low success rate of AVRT ablation in this study is thought to be related to the ablation approach. This study is done with a small population and in a relatively new ablation center however it may propose a solution to increase the success rate of SVT ablation in this center.

Keywords: supraventricular tachycardia, catheter ablation, safety, efficacy

Table 1. Characteristics of Study

	Diagnosis								Total	
	AVNRT		AVRT		AT		Non inducible SVT			
	n	%	n	%	n	%	n	%	n	%
Number of patients	25	38.46%	34	52.31%	5	7.69%	1	1.54%	65	100%
Sex										
Male	9	36.00%	17	50.00%	0	0.00%	0	0.00%	26	40.00%
Female	16	64.00%	17	50.00%	5	100.00%	1	100.00%	39	60.00%
Age										
0-18	1	4.00%	2	5.88%	0	0.00%	0	0.00%	3	4.62%
19-44	13	52.00%	24	70.59%	2	40.00%	0	0.00%	39	60.00%
45-54	5	20.00%	3	8.82%	2	40.00%	1	100.00%	11	16.92%
55-64	3	12.00%	4	11.76%	1	20.00%	0	0.00%	8	12.31%
65-74	3	12.00%	1	2.94%	0	0.00%	0	0.00%	4	6.15%
≥75	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%



Chief complaint

Palpitation	20	80.00%	20	58.82%	2	40.00%	1	100.00%	43	66.15%
Chest Pain	1	4.00%	0	0.00%	0	0.00%	0	0.00%	1	1.54%
Syncope	1	4.00%	8	23.53%	3	60.00%	0	0.00%	12	18.46%
Dyspneu	1	4.00%	5	14.71%	0	0.00%	0	0.00%	6	9.23%
Fatigue	1	4.00%	1	2.94%	0	0.00%	0	0.00%	2	3.08%
Dizziness	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Asymptomatic	1	4.00%	0	0.00%	0	0.00%	0	0.00%	1	1.54%

Comorbid

Hypertension	10	40.00%	5	14.71%	3	60.00%	0	0.00%	18	27.69%
Diabetes Mellitus	3	12.00%	2	5.88%	1	20.00%	0	0.00%	6	9.23%
Heart Failure	0	0.00%	2	5.88%	0	0.00%	0	0.00%	2	3.08%
Coronary Artery Disease	1	4.00%	0	0.00%	0	0.00%	0	0.00%	1	1.54%
Cardiomyopathy	0	0.00%	1	2.94%	0	0.00%	0	0.00%	1	1.54%
COVID	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Stroke	0	0.00%	0	0.00%	2	40.00%	0	0.00%	2	3.08%
Renal insufficiency	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Hypo/hyperthyroid	1	4.00%	0	0.00%	0	0.00%	0	0.00%	1	1.54%
Dyslipidemia	1	4.00%	13	38.24%	1	20.00%	0	0.00%	15	23.08%

Without Comorbid	11	44.00%	14	41.18%	1	20.00%	1	100.00%	27	41.54%
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Psychosocial

Smoker	2	8.00%	2	5.88%	0	0.00%	0	0.00%	4	6.15%
Non-smoker	23	92.00%	32	94.12%	5	100.00%	1	100.00%	61	93.85%

Procedure

Electrophysiology Study	1	4.00%	6	17.65%	4	80.00%	1	100.00%	12	18.46%
Electrophysiology Study and Catheter Ablation	22	88.00%	21	61.76%	1	20.00%	0	0.00%	44	67.69%
Redo Ablation	2	8.00%	7	20.59%	0	0.00%	0	0.00%	9	13.85%

Type of Catheter Ablation

2D Ablation	25	100.00%	28	82.35%	5	100.00%	1	100.00%	59	90.77%
3D Ablation	0	0.00%	6	17.65%	0	0.00%	0	0.00%	6	9.23%

Outcome

Successful	23	92.00%	12	35.29%	0	0.00%	0	0.00%	35	53.85%
Failed	1	4.00%	16	47.06%	1	20.00%	0	0.00%	18	27.69%

Acute complication

Vascular complication	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Embolism	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Pericardial effusion	0	0.00%	2	5.88%	0	0.00%	0	0.00%	2	3.08%
Pneumothorax	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%



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Phrenic nerve injury	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Diaphragmatic paralysis	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Death	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%



Factors Associated Atrial Fibrillation Patients with Functional Tricuspid Regurgitation

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Background and aims

Atrial Fibrillation (AF) can be found as concomitant with Functional Tricuspid Regurgitation (FTR). This indicates a relationship between AF and FTR. This is considered to be related with a secondary mechanism that occurs due to changes in the right atrium. Therefore, further elaboration is needed to determine factors associated between AF and FTR. The aim of this study was to investigate the prevalence of AF with FTR and factors that may be associated with this condition.

Materials and methods

This research is a retrospective cohort study in patient with AF with TR from November 2021 to October 2022. Subjects characteristics were measured including age, body mass index (BMI), left ventricular ejection fraction (LVEF), etiology, right atrium dilatation, and probability of pulmonary hypertension (PH). We use multivariate analysis and chi square test to determine relationship between these characteristics with AF-FTR.

Results

A total of 51 patients AF with TR (mean age 63.47 ± 12.7 years. 51% were female). Patient AF with FTR was 53% and 88 % among of this group developed moderate and severe tricuspid regurgitation (significant FTR). 51% of FTR have right atrial dilatation and mean TAPSE was 2.02. The result of the test analysis about sex, BMI, age, right atrial dilatation were not statistically significant ($p < 0.05$). Meanwhile, FTR etiology and PH have significant results on AF-FTR ($p < 0.05$)

Conclusion

In this study, AF was considered have a relation with significant FTR. We believe PH had significant impact toward AF-FTR. Right atrial abnormalities not showed significant impacts into AF-FTR condition.

Keywords

Atrial fibrillation, functional tricuspid regurgitation, pulmonary hypertension

24-Hours Holter Monitoring Characteristics in Young Patients With Palpitation and Normal Resting Electrocardiography at M. Djamil Hospital Padang

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Background and aim: Palpitation is the most common issue reported by young patients to cardiologist. Ambulatory ECG monitoring is class I recommendation especially with patients with normal resting ECG regarding to American College of Cardiology (ACC) and the American Heart Association (AHA) guidelines. From several modality of ambulatory ECG monitoring, 24-hours holter monitoring is the only diagnostic tool covered by national health insurance in Indonesia. This study aims to identify characteristic of 24-hours holter monitoring in young patients with palpitation and normal resting ECG in M. Djamil Hospital Padang in 2020-2023.

Materials and methods: A retrospective, single-centre study was performed to identify characteristic of holter monitoring results. The inclusion criteria was age greater than 18 years until 40 years old with the symptom of unexplained recurrent palpitations with normal resting ECG. The exclusion criteria was patients with structural heart disease or metabolic disease. The outcomes included a diagnostic holter monitor recording.

Results: Total sample are 224 patients, 70 (31%) males and 154 (69%) females, with normal holter monitoring in 53% patients and arrhythmia in 47% patients with ventricular ectopic as the most common arrhythmias that cause palpitation in this study.

Conclusion: Holter monitoring may have a role in identifying the cause of recurrent palpitations in many patients, however longer duration of holter monitoring needed for most cases as the most beneficial noninvasive diagnostic tool.

Keyword: Recurrent palpitation, Holter monitoring

Characteristic	Sex	
	Male (70) n (%)	Female (154) n (%)
Age (30.69 ± 6.1)	30.8 ± 5.9	30.68 ± 6.2
Holter 24 hours (n)		
Normal (119)	34 (15.2)	85 (37.9)
PVC		
PVC RVOT morphology (25)	6 (2.7)	19 (8.5)
PVC LVOT morphology (2)	0 (0)	2 (0.9)
Others PVC (24)	12 (5.4)	12 (5.4)
PAC (35)	14 (6.3)	21 (9.4)
AT (11)	2 (0.9)	9 (4.0)
SVT (4)	2 (0.9)	2 (0.9)
AF/AFL (1)	1 (0.4)	0 (0)
SND		
IST (5)	0 (0)	5 (2.2)
Sinus Pause (4)	1 (0.4)	3 (1.3)
SA exit block (1)	0 (0)	1 (0.4)



Correlation P Wave Indices and Post Operative Atrial Fibrillation in Patients Undergoing Coronary Artery Bypass Grafting:

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Background and Aims: Atrial fibrillation (AF) is a common complication following coronary artery bypass grafting (CABG) surgery, significantly impacting patient outcomes. Identifying predictive markers for post-operative AF (POAF) is essential for early detection and targeted intervention. This study aims to investigate the correlation between P-wave indices and the development of POAF in patients undergoing CABG.

Material and Methods: A retrospective electrocardiogram (ECG) analysis was conducted on a cohort of patients who underwent CABG at Kariadi Hospital between June 2022 and April 2023. Patient demographics, pre-operative characteristics, comorbidities, and post-operative outcomes, including the occurrence of AF, were collected from electronic medical records. P-wave indices, including P-wave area, P-wave duration, P-wave dispersion, P-wave area P-wave duration ratio, were extracted from pre-operative 12-lead electrocardiograms.

Results: Statistical analyses were performed in 51 patients, 90% (46 patients) male with mean age 59 years old, about 80% of patients were current smoker, 51% hypertension, 49% Diabetes Mellitus. Mean of Left Atrium dimension in POAF was 36.1 ± 5.9 mm and non POAF 36.3 ± 5.8 mm, with Ejection fraction of $48 \pm 9.6\%$ (POAF) and $49.2 \pm 10.3\%$ (non POAF). Most of the patients already on double anti platelet therapy (92% on salicylic acid and 68% on P2Y12 inhibitor), 92% on beta blockers, 98% on statin. We assess the correlation between P-wave indices and post-operative AF occurrence. There was significance correlation in P-wave area ($r=0.345$; $p=0.009$), P wave dispersion ($r=0.266$; $p=0.049$) and POAF occurrence in patient underwent CABG. Meanwhile P wave duration did not show significant correlation ($r = 0.173$; $p=0.211$)

Conclusion: P-wave indices are a noninvasive electrocardiographic (ECG) marker for atrial remodeling and predictor for atrial fibrillation (AF). Changes in surface P waves may convey significant information about abnormalities in P wave indices reflect pathological processes. The foregoing phenomenon reinforces the importance of POAF as a driver of cardiovascular outcomes. This study findings suggest significant correlation between P-wave indices and POAF in patients undergoing CABG. P-wave area and P-wave dispersion showed correlation for identifying patients at a higher risk of developing post-operative AF.

Keywords: Atrial fibrillation, P-wave area, P-wave duration, P-wave dispersion, post operative atrial fibrillation, coronary artery bypass grafting

Table 1A. Baseline Characteristics and Contingency Correlation Test

	POAF			P value
	Total (n =51)	Yes (n=24)	No (n=27)	
Demographic Factors				
Age (years)		59.75 ± 6.30	57.25 ± 6.51	0.173
Sex (n,%): Male		21 (41.2%)	25 (49%)	0.656
Female		3 (5.9%)	2 (3.9%)	
Body Mass Index (kg/m ²)		25.86 ± 3.94	24.87 ± 3.09	0.320
CV History and Risk factors				
Diabetes Mellitus	25 (49%)	11 (44%)	14 (56%)	0.668
Hypertension	47 (50.9%)	22 (47%)	25 (3.9%)	1.000
Dyslipidemia	22 (43.1%)	11 (50%)	11 (50%)	0.735
Smoker	41 (80.4%)	19 (37.3%)	22 (43.1%)	1.000
Stroke	3 (5.9%)	2 (66.7%)	1 (33.3%)	0.483
Previous AF	0 (0%)	0	0	
Family history of CAD	8 (15.7%)	5 (62.5%)	3 (37.5%)	0.341
Echocardiography Findings				
LVIDd (mm)		51.14 ± 7.74	52.08 ± 6.61	0.641



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LVEF Biplane (%)	48 ± 9.61	49.2 ± 10.36	0.671
LA dimension (mm)	36.12 ± 5.95	36.29 ± 5.79	0.918
TAPSE	20.9 ± 3.5	21.2 ± 4.7	0.871
Previous Medication			
Salicylic Acid	21 (41.2%)	26 (51%)	0.331
P2Y12 inhibitors	18 (35.3%)	17 (33.3%)	0.534
ACE inhibitors	21 (41.2%)	21 (41.2%)	0.473
ARB	8 (53.3%)	7 (46.7%)	0.562
Beta blockers	21 (45.7%)	25 (54.3%)	0.542
Statin	24 (49%)	25 (51%)	0.174
MRA	8 (36.4%)	14 (63.6%)	0.183

Association between Left Ventricular Mass Index and Lethal Ventricular Arrhythmia in Patients with End Stage Renal Disease

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Background and aims: Left ventricular hypertrophy (LVH) is highly prevalent in patients with end-stage renal disease (ESRD) undergoing hemodialysis, and generally has a negative prognostic value, representing increasing risk for the development of arrhythmias and sudden death. The aim of this study to assess association between LV mass index with occurrence of lethal ventricular arrhythmia (VA) in patients with ESRD patients with preserved LV ejection fraction (LVEF) undergoing hemodialysis.

Materials and methods: This is a analytics-observational cross sectional study including 45 ESRD patients in Prof. Dr. R. D. Kandou general hospital who underwent hemodialysis with LVEF \geq 40% from January – March 2023. Echocardiography parameter (LVMI) and 24 hours Holter monitoring were done before a single session of hemodialysis. Lethal VA was defined as VT, VF, or PVC with Lown grade III, IV, or V that captured by Holter recording. The mean difference between lethal VA and non-lethal VA group analyzed with Mann Whitney U test. The data was then processed using the IBM SPSS version 26 statistical program.

Results: The results were obtained on 45 subjects, 25 patients (56%) were male with a mean age of 53. Average LVEF was 57% with average LVMI 158g/m². Lethal VA was found in 22 subjects (49%), with non- sustained ventricular tachycardia was found in 1 subject. LVMI was significantly higher in subject with lethal VA compared to subject without lethal VA (183,4 vs 135 gr/m²; p =0,001). ROC analysis showed that LVMI value >141.24 gr/m² possesses higher risk developing lethal VA (AUC 0.801; sensitivity 77.3%; specificity 69.6%,).

Conclusion: In patients with ESRD who underwent hemodialysis, higher LVMI was associated with higher incidence of lethal VA. Subject with LVMI value >141.24 gr/m² was shown to possess higher risk developing lethal VA.

Keywords: Left ventricular mass index, lethal ventricular arrhythmia, End Stage Renal Disease, Hemodialysis

Mann-Whitney Test				
Ranks				
LethalVA	N	Mean Rank	Sum of Ranks	
LVMIgm2 No	23	16,37	376,50	
Yes	22	29,93	658,50	
Total	45			

Test Statistics ^a	
	LVMIgm2
Mann-Whitney U	100,500
Wilcoxon W	376,500
Z	-3,463
Asymp. Sig. (2-tailed)	,001

a. Grouping Variable:
LethalVA

Group Statistics				
LethalVA	N	Mean	Std. Deviation	Std. Error Mean
LVMIgm2 Yes	22	183,3991	51,46960	10,97336
No	23	135,0887	33,33018	6,94982

Table 1. Comparison of LVMI in groups with lethal VA vs without lethal VA. Subject with lethal VA have significantly higher LVMI (averaging 48.3g/m² higher; p = 0,001) compared subject without lethal VA



Correlation of Palmeri QRS Score for Estimating Left Ventricle Ejection Fraction in Patient with ST-Segment Elevation Myocardial Infarction

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Background and aims: Palmeri QRS score, a QRS-based scoring method for estimating LVEF following myocardial infarction using a 12-lead ECG was established by Palmeri et al in 1982. Impaired left ventricular ejection fraction (LVEF) has been associated with adverse outcomes in patients with ST-Segment Elevation Myocardial Infarction (STEMI) even they have undergone primary percutaneous coronary intervention (PPCI). Electrocardiograms (EKG) have been shown to be useful in the diagnosis and localization of acute myocardial infarction. The purpose of the study was to evaluate the correlation between Palmeri QRS score for estimating left ventricular ejection in patient with STEMI who have undergone PPCI.

Materials and methods: This study was retrospective study that include all STEMI patients with onset less than 12 hours who underwent PPCI between January 2022 and June 2023. LVEF prediction using Palmeri QRS score was calculated by formula: $60 - (3 \times \text{QRS Score})$ with 12-lead ECG right after PPCI as reference. LVEF was measured with transthoracic echocardiography after PPCI procedure by using Biplane method. LVEF estimation using Palmeri QRS score was compared to LVEF Biplane method using Bland-Altman analysis and linear regression.

Results: Eighty-two patients, including 71 males (86%) and 11 females (14%) with mean age of 56.84 ± 9.57 years were evaluated in this study. 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. There was no significant difference in the LVEF measured by transthoracic echocardiography (TTE) and Palmeri QRS score ($48.46 \pm 11.77\%$ and $47.6 \pm 7.61\%$, respectively; $p = 0.41$). Correlation between TTE and Palmeri QRS score from EKG was 0.601 ($p < 0.0001$). Bland-Altman plot and linear regression showed strong agreement between two modalities with 91.46% of both measurements were between two SD lines, with overestimation and underestimation were up to 17.62% and 19.34%, respectively, and the mean measurement difference was 0.86%.

Conclusion: Palmeri QRS score showed strong positive correlation and agreement with TTE in measuring LVEF in patient with STEMI who had undergone PPCI.

Keywords: Palmeri QRS score; left ventricle ejection fraction; acute coronary syndrome

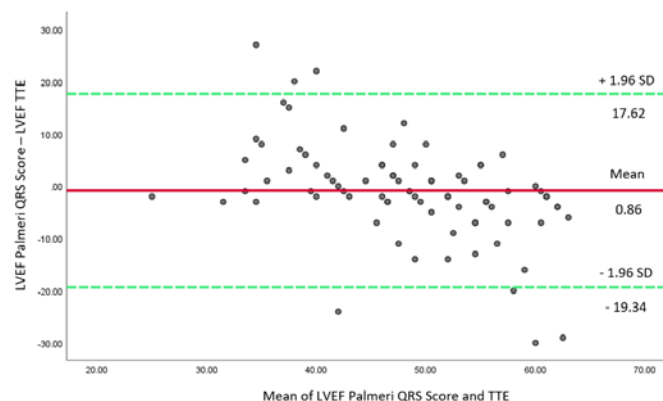


Figure 1. Linear correlation between Palmeri QRS Score and TTE for LVEF measurement



Characteristic Finding from Cardiac Magnetic Resonance Imaging as Diagnostic Workup in Premature Ventricular Complexes Patients in Dr. Sardjito Public Hospital, Yogyakarta : 1-year Observational Study

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Background and aims: Cardiac magnetic resonance (CMR) plays a significant role in the diagnosis of various cardiac conditions, including arrhythmogenic right ventricular dysplasia (ARVD) and mitral valve annular disjunction (MVAD). The normal finding of CMR in patient with frequent premature ventricular complexes with unknown etiology remains unclear. The aim of our study to analyze the characteristic finding of cardiovascular magnetic resonance imaging as diagnostic tools in predicting the etiology in patient with premature ventricular complexes (PVC) at Dr. Sardjito Public Hospital, Yogyakarta.

Material and Method: Between Februari 2022- February 2023 a total of 110 patients with age >16 years old with presenting of PVC by electrocardiography in Dr. Sardjito Public Hospital, Yogyakarta who underwent CMR with late gadolinium enhancement imaging with suspected ARVD or MVAD by clinical presentation. The multivariate analysis done between the result of CMR and the type of PVC.

Results: The baseline result of the study 67.3% of the patients were female with a mean age of 42.96± 26 years with youngest age is 16 and the oldest 70 years old. The type of the PVC divided into multifocal PVC 37.3%, unifocal outflow-tract PVC 32.7% and unifocal non-outflowtract 30%. The CMR finding was 17.3% patient fulfilled criteria of ARVD, 5.5% had MVAD figure and 77.3% with normal result. The multivariate analysis was done to know the relationship between the type of PVC and the result of CMR, it shows multifocal PVC has 14.6 % with ARVD, 2.4% with MVAD and 82.9 % with normal result whether unifocal outflow-tract PVC has 22.2% with ARVD, 2.8% with MVAD and 75% with normal result and last non-outflow-tract PVC had 15.2% with ARVD, 12.1% with MVAD and 72.7% with normal CMR result with p-value 0.299 indicated non significant relationship.

Conclusions: In this study normal cardiac finding by CMR were found mostly in patient with PVC despite the type of the PVC. Twenty-five patients with Abnormal cardiac finding including ARVD and MVAD were found that might cause further adverse clinical outcome in the future in patient with PVC.

KEY WORDS: Cardiac Magnetic Resonance, Arrhythmogenic Right Ventricular Dysplasia, Mitral Valve Annular Disjunction, Premature Ventricular Complexes.



**THE ASSOCIATION BETWEEN MORBIDITY AND DETERMINING LENGTH OF STAY IN
POST OPERATIVE ATRIAL FIBRILLATION (POAF) AFTER CORONARY SURGERY IN DR.
KARIADI GENERAL HOSPITAL**

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Background and Aims:

POAF is a common complication following coronary artery bypass grafting (CABG) surgery. It refers to the irregular rhythm of the heart that occurs within the first few days after the procedure. POAF can have significant implications for patient outcomes, including increased morbidity and prolonged hospital stays. The research aims to determine the influence of POAF on the length of hospitalization after CABG surgery.

Material and Methods:

In this case control study, between June 2022 and April 2023, a total of 63 patients with preoperative sinus rhythm who underwent open cardiac surgery were included of which 51, then divided into 2 groups; 24 patients had developed POAF and 27 patients which POAF was not found. The outcome of clinical variable that is length of stay associated with the development of POAF, were evaluated between two groups.

Results:

The research subjects consisted of 51 people consisting of as many as men 90.2% and women 9.8%. The mean age was 59.75 ± 6.51 years in the POAF group and the mean age of 57.25 ± 6.30 years in the non-POAF group. A total of 52.9% of patients had a history of myocardial infarction, and 58.9% were not obese. The length of hospital stay for POAF patients was longer than non-POAF patients with a median comparison in both groups of 11.5 days (6.0-31.0) vs 10 days (7.0-23.0), but not significantly ($p=0.127$). We investigated especially the length of critical care stay for POAF patients was longer than in non-POAF patients with a median comparison in both groups of 140.5 days (60-336) vs 92 days (48-192), showing significant ($p=0.006$). Ventilator use in POAF patients was also longer than in non-POAF patients with a median of 35.5 hours (18-192) vs 24 hours (12-192) and was significantly significant ($p=0.001$).

Conclusion:

POAF is associated with increased morbidity and mortality.

Keywords: Length of Stay, Morbidity, POAF, CABG



Left Atrial Function Is Related to New-Onset Atrial Fibrillation After Coronary Artery Bypass Grafting

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Background and Aims: Postoperative Atrial Fibrillation (POAF) is the most common postoperative tachyarrhythmia after Coronary Artery Bypass Graft (CABG) surgery. The etiology that underlie POAF after CABG surgery are incompletely understood although some studies suggest that atrial mechanical dysfunction caused by effects of oxidative stress, inflammation and fibrosis has role. This study aims to find out the association left atrial (LA) function assessed by Left Atrial Function Index (LAFI) and strain speckle tracking echocardiography (STE) with POAF after CABG surgery.

Material and Methods: This is a case control study included 2 groups which are patients developed POAF and non POAF in the period of June 2022 – April 2023 in RSUP Dr. Kariadi. Of the 63 patient, who underwent CABG, 12 patient were excluded due to concomitant valvular heart surgery and inadequate echo image. The data includes LAFI (a composite measure of LA size and function) and LA strain determining reservoir, conduit and contraction. LA function was examined using echocardiography machine, Phillips Epiq CVx pre surgery and all the subjects were observed with an ECG monitor for 96 hours using Heal Force Prince 180B Portable ECG Monitor after the surgery was performed. We analyzed subject groups using IBM SPSS 26.

Results: From total of 51 patients, 90.2% were male and POAF was found in 24 patients (47%) with the peak of time the FAPO appear was the second day after surgery (53%). No significant different in the baseline characteristics which are age, history of diabetes mellitus, hypertension, glomerular filtration rate, duration of cardio pulmonary bypass and aortic cross clamp. Hence, there were significant different between POAF and non POAF group in LAFI value (27.42 ± 4.45 vs 32.57 ± 6.64 , $p=0.002$), LA reservoir (22.52 ± 3.63 vs 28.35 ± 6.16 , $p<0.001$) and LA contraction (11.04 ± 1.97 vs 16.64 ± 4.15 , $p<0.001$). However, no statistical different was found in LA conduit (11.45 ± 3.64 vs 11.74 ± 5.09 , $p=0.814$).

Conclusion: LAFI, LA reservoir and LA contraction were associated with incident of POAF and patient who developed POAF after CABG had lower value in LAFI and LA strain.

Keywords: Left Atrial Function, Post Operative Atrial Fibrillation, Atrial Fibrillation, Coronary Artery Bypass Surgery

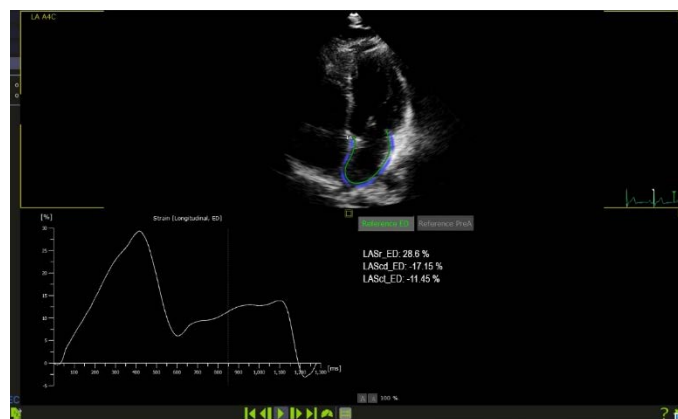


Figure 1. Demonstrates the LA strain analysis of a patient with POAF after CABG surgery



Perioperative Risk Factors for New Onset Postoperative Atrial Fibrillation after Coronary Artery Bypass Surgery

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Background and Aims: Postoperative atrial fibrillation (POAF) is the most common postoperative supraventricular tachyarrhythmia after Coronary Artery Bypass Graft (CABG) surgery. The risk factors that underlie AF after CABG surgery are multifactorial and incompletely understood. This study aims to find out the risk factors that might contribute to Atrial Fibrillation (AF) after CABG surgery in RSUP Dr Kariadi.

Material and Method: This is a case control study included 2 groups which are patients developed POAF and non POAF in the period of June 2022 – April 2023 in RSUP Dr. Kariadi. The data includes left atrial (LA) function which measured by strain and Left Atrial Function Index (LAFI), age, weight, height, history of diabetic mellitus, glomerular filtration rate, Chronic Obstructive Pulmonary Disease (COPD), Left Ventricle Ejection Fraction (LVEF), duration of Cardio Pulmonary Bypass (CPB), duration of aortic cross clamp, re-operation, use of inotropic vasoactive agent, fluid balance, and anemia. LA function was examined using echocardiography machine, Phillips Epiq CVx and COPD was diagnosed by spirometry result pre surgery. All the subjects were observed with an ECG monitor for 96 hours using Heal Force Prince 180B Portable ECG Monitor after the surgery was performed. We analyzed subject groups using IBM SPSS 26.

Result: From total of 51 patients, 90.2% were male and FAPO was found in 24 patients (47%) with the peak of time the FAPO appear was the second day after surgery (53%). There was a significant difference with the administration of vasoactive inotropes agent ($p=0.003$; OR 7.12; IK 95%, 2.06-24.6), LA reservoir ($p<0.001$) and LAFI ($p=0.002$) between FAPO group and non FAPO group. Administration of β -blocker ≥ 72 hours after surgery and the decreasing of LA contraction ≤ 12.5 was an independent risk factor for FAPO ($p=0.025$; OR 6.28; IK 95% 1.25-31.51) and ($p=0.049$; OR 5.34; IK 95% 1.04-28.27). There was no significant relation between POAF and the other variables.

Conclusion: Administration of β -blockers ≥ 72 hours postoperatively and LA contraction ≤ 12.5 was an independent risk factor for POAF after CABG surgery.

Keywords: Risk Factor, Postoperative Atrial Fibrillation, CABG



Conduction Disturbances after Open Heart Surgery: Does Steroid Help?

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Background and aims: Conduction disturbances is common yet threatening complication of cardiac surgery, with atrioventricular block (AVB) as the most common presentation. It causes implantation of permanent pacemaker in 2-3% cases. Steroid use is widely administer as it helps recover heart rhythm in several studies.

Methods and materials: We retrospectively studied 16 from 281 consecutive patients who underwent open-heart surgery in RSUP Dr Sardjito from June 2022 until June 2023 that developed conduction disturbance of sinus node dysfunction (SND) and atrioventricular node dysfunction (AVND) following the surgery: Mitral valve replacement(MVR) (n=10), Triple valve surgery (TVR) (n=1), MVR and Aorta valve repalcement (AVR) (n=1), closure of atrial septal defect (ASD) (n=3), closure of ASD and mitral valve repair (n=1).

Results: Among 281 patients underwent open heart surgery, there are 16 cases of SND and AVND from June 2022 until June 2023 at RSUP Dr Sardjito. Majority of the conduction disturbances were advanced atrioventricular block (AVB) in 7 patients, other findings were first degree AVB (n=6) and junctional rhythm (n=3). Five of 6 advanced AVB patients underwent mitral valve replacement and 1 patient following ASD closure. All advanced AVB occurred within 24 hours, were attached to temporary pacemaker (TPM) and received high dose of steroid, equivalent to a dose of prednisone > 30mg a day, with 5 patients resolved to a normal or previous rhythm at discharge. Only one advanced AVB patient did not improve and she was a 26 years old ASD closure patient who then required a permanent pacemaker. After MVR and/or surgery involving MVR, the most common conduction disturbance was advanced AVB. All patients with first degree AVB occurred varies in time, persistent at discharge and only one patient received high dose steroid for indication other than conduction disturbance.

Conclusion: All conduction disturbances occurred varies in time, but advanced AVB required only within 24 hours. Improvement were varied despite high dose steroid administration in patient with SND and AVND. Irreversible AVB requiring a PPM is an uncommon complication after open-heart surgery.

Keywords: conduction disturbance, cardiac surgery, steroid

PATIENT	SEX	AGE	TYPES OF SURGERY	CONDUCTION DISTURBANCES	HIGH DOSE STEROID	RESPONSE AT DISCHARGE
1	M	54	MVR	AF TAVB	Yes	resolve
2	F	50	ASD Closure	Intermittent junctional	No	resolve
3	F	26	ASD Closure	TAVB	Yes	PPM implantation
4	F	46	MVR	AVB 1	No	persistent
5	M	53	MVR	AF TAVB	Yes	resolve
6	M	56	MVR	Acc Junctional rhythm	Yes	resolve
7	M	56	MVR	AVB 1	No	persistent
8	M	38	Post ASD Closure	intermittent junctional	No	resolve
9	F	55	ASD Closure + MV Repair	AVB1	No	persistent
10	M	36	DVR	AVB 1	Yes	persistent
11	M	61	MVR	AT T AVB	Yes	resolve
12	F	59	MVR	AVB 1	Yes	persistent
13	F	55	MVR	AVB1	No	persistent
14	F	44	TVR	AF TAVB	Yes	resolve
15	M	63	MVR	AF TAVB	Yes	resolve
16	F	35	MVR	HDAVB	Yes	resolve



Accuracy of the Park Algorithm in Finding the Anatomical Location of Premature Ventricular Contraction in 12 – Lead ECG: A Cross – Sectional Study

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BACKGROUNDS AND AIM

Premature Ventricular Contraction (PVC) is a form of arrhythmia commonly found in the general public. This arrhythmia can be found in various morphologies depending on the origin of the location. The 12-lead ECG can help determine the anatomical location of a PVC. Early recognizing the anatomical location on the 12-lead ECG will be helpful when the patient is undergoing ablation. It is essential to assist in choosing the optimal ablation method and increase the success rate. Until now, many algorithms can be used to determine the anatomical location of PVCs. This study investigated the best algorithm to be used as a reference in determining the anatomical location of PVCs in our center.

MATERIALS AND METHODS

This study used a cross-sectional design by looking at ECG and EP study data in the medical records of patients undergoing 3D ablation from March 2022 to April 2023 at Pasar Rebo Hospital, Jakarta, Indonesia. Eleven (43 ± 4.8 years ; 3 male and 8 female) consecutive patients were included. The anatomic locations based on the 12-lead ECG were compared with the results obtained from the EP study. The algorithms used are Park Algorithm, Enrique Algorithm, and Hutchinson and Garcia Algorithm.

RESULTS

Eleven EP studies and 3D ablation were performed. The Park Algorithm has an accuracy of 81.8% in determining the location of arrhythmias, which is higher than the Enrique Algorithm and Hutchinson and Garcia Algorithm. Statistical test results based on Fischer's cross-tabulation showed that the three algorithms did not show significant results ($p = 0.121$ for Park's Algorithm; $p = 0.212$ for Enrique's Algorithm and Hutchinson and Garcia's Algorithm). The low number of samples is a limitation of this study.

CONCLUSION

This study shows that the Park Algorithm is superior in determining the anatomical location of PVCs on the 12-lead ECG. Although not statistically significant, the Park Algorithm will be prioritized in our center.

Keywords: Premature Ventricular Contraction, Electrocardiography, Electrophysiology Study ; Ablation ; Arrhythmia



Association between Idiopathic Inferior Axis Premature Ventricular Contraction Burden Percentage and Right Ventricular Dysfunction

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Background and aims: Previous studies have proved that high burden premature ventricular contractions (PVC) can be a risk factor for right ventricular dysfunction as similar to left ventricular dysfunction or PVC-induced cardiomyopathy (PIC) in general. There has been no previous specific study that analyzed how large percentage of idiopathic inferior axis PVC burden that could lead to right ventricular dysfunction. The aim to evaluate the association between idiopathic inferior axis PVC burden percentage and right ventricular dysfunction using speckle tracking echocardiography examination.

Material and Methods: A cross-sectional observational study on 24 patients with high burden of idiopathic inferior axis PVC underwent right ventricular global longitudinal strain (GLS) and free wall longitudinal strain (FWLS) using speckle tracking echocardiography in outpatient clinic of National Cardiovascular Center Harapan Kita (NCCHK) from January 1st - March 31st, 2023. Statistical analysis performed to find out the association between the percentage of idiopathic inferior axis PVC burden and right ventricular dysfunction using right ventricular GLS and FWLS.

Results: From the 24 study subjects, the proportion of female sex was higher than male (17 people compared to 7 people), with the majority of PVC morphology was inferior axis and left bundle branch block (LBBB) pattern as much as 83.3%. The average of the percentage of PVC burden in this study population is $18.6 \pm 9.6\%$. The percentage of PVC burden was found to be associated bivariately with right ventricular dysfunction through the right ventricular GLS parameter ($p = 0.031$), but there is no independent association with right ventricular dysfunction from multivariate analysis ($p = 0.063$, OR 1.18, 95% CI 0.99 – 1.41). The percentage of PVC burden had no association to right ventricular dysfunction through right ventricular FWLS parameters from both bivariate and multivariate analysis.

Conclusion: There is no independent association between the percentage of PVC burden and right ventricular dysfunction in patients with high burden of idiopathic inferior axis PVC.

Keywords: Premature Ventricular Contraction, Right Ventricular Dysfunction, Global Longitudinal Strain, Free Wall Longitudinal Strain



Efficacy of Morning vs Evening Bisoprolol Intake in Fast-Rate Dependent Premature Ventricular Complex: A Double-Blind Randomized Crossover Trial

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Background and aims: Fast-rate dependent premature ventricular complex (F-HR-PVC) is one of premature ventricular complex (PVC) circadian variation which occurrence increases linearly with baseline heart rate. The mechanism involved is considered related to the circadian mechanism which includes autonomic nerve system and catecholamine levels. The presence of circadian variation in PVC raise the potential of chronotherapeutic approach in treating PVC.

Material and Methods: This is a double-blind randomized crossover trial with a total subject of 23 patients who have F-HR-PVC with 24-hr PVC burden $\geq 5\%$ and PVC burden variability $>35\%$. Subjects were divided into two sequence groups. Those in sequence 1 were given bisoprolol in the morning in the first week, crossed over then followed by the administration of evening bisoprolol in the second week. Meanwhile, those in sequence 2 received alternate treatment. 24-hour Holter evaluation was done and analyzed to compare the efficacy of bisoprolol administration with chronotherapeutic approach toward clinical endpoints. The primary outcomes were PVC burden and PVC burden variability between morning bisoprolol and evening bisoprolol while the secondary outcomes were success rate and mean reduction in PVC burden of either morning or evening bisoprolol.

Results: There is no significant difference between morning and evening administration of bisoprolol on both PVC burden (treatment effect -0,06 [-4,12 – 4,00]; CI 95%, $p = 0,976$) and PVC burden variability (treatment effect 6,34 [-10,41 – 23,08]; CI 95%, $p = 0,439$) for 24 hours. Success rate of reducing PVC burden in morning dose and evening dose of bisoprolol in F-HR-PVC are 73,9% (mean reduction 30,4%) and 68,2% (mean reduction 39,9%) respectively.

Conclusion: There was no difference in the efficacy of giving bisoprolol in the morning compared to the evening dosing on the PVC burden and the variability of PVC burden for 24 hours.

Keywords: idiopathic ventricular premature contraction, PVC burden, PVC burden variability.



Comparing Right Ventricular ECG Parameter with P Wave ECG Parameter Abnormalities as a Predictor of Survival Rate in Mitral Stenosis Patients

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Background and Objectives: Mitral stenosis (MS) is considered as a heart valve abnormality which can result in heart failure with high morbidity and mortality. Abnormal P-terminal force in lead V1 (PTFV1) is a strong indicator of an enlarged, poorly functioning LA and is associated with poor prognosis. Nevertheless, right ventricular dysfunction is often undetected clinically until the appearance of symptoms and there has been no research exploring the impact of PTFV1 and right ventricle (RV) functions in predicting mortality in patient with MS. The purpose of this study is to compare the prognostic significance of PTFV1 and the RV electrocardiogram (ECG) parameters abnormality with mortality in patients with MS.

Materials and Methods: A retrospective study was conducted using the data from the Mitral Stenosis registry at RSUP Dr. Sardjito Hospital from April 2014 to September 2022. RV strain, QRS duration, R-wave Peak Time, and PTFV1 were recorded as baseline measurements during admission where each ECG parameter was analyzed by ImageJ application. Receiving Operator Characteristic (ROC) curve analysis was used to study the impacts of each parameter to predict mortality.

Results: From the 61 subjects involved in this study 48 (78.7%) was alive during the cohort and 13 (21.3%) subjects was deceased. The ROC for each parameters revealed an area under the curve (AUC) of 0.563 (95% CI 0.404-0.722); 0.627 (95% CI 0.453-0.800); 0.319 (95% CI 0.163-0.475); 0.631 (95% CI 0.451-0.811) for PTFV1, RV strain, QRS duration, and RWPT respectively.

Conclusion: RWPT and RV strain provided better indicators to predict mortality than PTFV1 or QRS thus RV function plays an important role in evaluating prognosis of patients with MS.

Keywords: mitral stenosis, electrocardiography, mortality



Correlation Between Electrocardiogram DETERMINE Score and Myocardial Fibrosis Assessed by Cardiac Magnetic Resonance in Patients Treated with Primary Percutaneous Coronary Intervention

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Background and aims: Myocardial infarction leads to fibrosis, which can be assessed using cardiac magnetic resonance (CMR), and is a major contributor to the development of heart failure. The DETERMINE score is an ECG-based tools that could estimate the extent of fibrosis on post MI patients. Tpeak-to-Tend interval is an independent predictor of fibrosis in hypertrophic cardiomyopathy (HCM) patients. This study sought to determine the correlation between these ECG markers and the extent of fibrosis based on CMR in STEMI patients.

Material and Methods: This was a retrospective study on patients who experienced first acute ST-segment elevation myocardial infarction (STEMI) and underwent successful primary percutaneous coronary intervention (PPCI). The assessed ECG abnormalities included Q waves, fragmented QRS complexes, and T-wave inversion. The DETERMINE Score was calculated as the sum of the number of leads with [Q waves × 2] + [fragmented QRS complexes] + [T-wave inversion]. Other ECG markers examined was Tpeak-to-Tend interval (TPTE), and TPTE/QTc ratio. The extent of fibrosis was measured using late gadolinium enhancement (LGE) on CMR.

Results: Total of 30 study subjects with a mean age of 52±10 years were included in the study. The mean total ischemic time in this study was 483±229 minutes with non-anterior area (63.4%) as the most common infarct location. The ECG markers of DETERMINE score, TPTE, and TPTE/QTc ratio was examined post PPCI (mean 10±5; 84.2±19.7 ms; 0.19±0.04 respectively), and the mean extent of fibrosis was 18.3±8%. A significant, moderately positive correlation was found between the DETERMINE score and the extent of fibrosis from LGE-CMR (p=0.022, r=0.417). No significant correlation was found between TPTE and TPTE/QTc ratio against the extent of fibrosis.

Conclusion: The ECG-based DETERMINE score have a moderately positive correlation with the LGE-CMR-based myocardial fibrosis in STEMI patients who underwent successful PPCI.

Keywords: electrocardiogram, myocardial fibrosis, cardiac magnetic resonance, ST-segment elevation myocardial infarction, primary percutaneous coronary intervention.



The Correlation of Spatial QRS-T Angle with Left Ventricular Ejection Fraction in Patients with Ischemic Cardiomyopathy

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Background and Aims

Vectorcardiography (VCG) visualizes movement of the heart vector through cardiac cycle. With VCG, a spatial angle between depolarization and repolarization, namely spatial QRS-T (sQRST) angle can be measured, which has emerged as a cardiac risk predictor. This study is aim to know the correlation between sQRST angle by Frank VCG and LVEF in patients with ischemic cardiomyopathy.

Materials and Methods

This is a cross-sectional study in patients with ischemic cardiomyopathy which defined as a symptomatic HF patients with LVEF ≤40% who undergone diagnostic coronary angiography. The sQRST angle was measured using Frank Lead with Biox Holter. We analyzed data using Pearson correlation and multivariate analysis with linear regression.

Results

We enrolled 66 patients in this study. There are 82% male and 18% female with mean age 61 ± 10 years. Mean sQRST angle was 142 ± 34°, mean frontal QRS-T angle was 128 ± 54° and mean LVEF was 27.88 ± 6%. The sQRST angle and LVEF had a negative correlation (r = -0,31, p=0.011). Frontal QRS-T angle also had no correlation (r= -0.23, p=0.063).

		LVEF_2D	Spatial_QRS_T_Angle	Frontal_QRS_T_Angle
LVEF_2D	Pearson Correlation	1	-.310*	-.230
	Sig. (2-tailed)		.011	.063
	N	66	66	66
Spatial_QRS_T_Angle	Pearson Correlation	-.310*	1	.542**
	Sig. (2-tailed)	.011		.000
	N	66	68	68
Frontal_QRS_T_Angle	Pearson Correlation	-.230	.542**	1
	Sig. (2-tailed)	.063	.000	
	N	66	68	68

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 1. Pearson Correlation between spatial and frontal QRST Angle with LVEF

Conclusion

The sQRST angle in Frank VCG had a negative correlation with LVEF in patient with ischemic cardiomyopathy, while frontal QRS-T angle had no correlation.

Keyword: ischemic cardiomyopathy, spatial QRS-T angle, frontal QRS-T angle, frank lead

Correlation between heart rate and electrocardiogram parameters in emergency department patients



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Background and aims: The measurement of heart rate is central to understanding cardiovascular control under normal condition. The electrocardiogram remains the most widely used tool for cardiac risk stratification in emergency department. However, there is a paucity data on whether ECG parameters are influenced by heart rate in emergency department setting. The purpose of this analysis was to assess the relation between heart rate and ECG parameters.

Materials and methods: This was an analytic study with cross-sectional approach from emergency department patients' medical records. Heart rate, PR interval, QRS duration, and QTc interval were obtained from the ECG performed in emergency department. Statistical analysis was done to assess the relationship between heart rate and ECG parameters.

Results: Eighty patients aged 19 to 91 years old who met the inclusion criteria were enrolled. The median heart rate was 94.5 bpm (37-136 bpm), the median PR interval was 161 ms (94-304 ms), the median QRS complex was 92 ms (68-176 ms), and the average QTc interval was 448.9 ms \pm 39,186 ms. There was a statistically significant correlation between heart rate and PR interval ($p = 0.039$) and also for heart rate and QRS duration ($p = 0.015$). While heart rate and QTc interval showed a very weak negative correlation ($r = -0.098$) which was not significant ($p = 0.387$). Compared to bradycardia, tachycardia had narrower QRS complex (116 ms \pm 2.828 ms vs 90.11 ms \pm 14.230 ms; $p = 0.020$).

Conclusion: Heart rate had association with PR interval and QRS duration in emergency department patients. Heart rate can be considered as an important indicator of cardiac risk stratification in emergency department patients.

Keywords:

heart rate, PR interval, QRS duration, QTc interval, electrocardiogram, emergency department

Table 1. Correlation between heart rate and ECG parameters

		PR interval	QRS duration	QTc interval
Heart rate	p	0.039	0.015	0.387
	r	-0.232	-0.271	-0.098
	n	80	80	80



Risk association of ventricular arrhythmias in long term haemodialysis patient

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Background and aims

Arrhythmias are one of the major causes of sudden death in end stage renal failure (ESRD) patient who undergo haemodialysis. Most studies showed association between supraventricular arrhythmias and inter-dialysis duration. This study aims to establish the risk of ventricular arrhythmias in ESRD patient on long term haemodialysis.

Materials and methods

We conducted analytics-observational cross-sectional study in ESRD patients on long term dialysis in Prof. Dr. R. D. Kandou General Hospital. Patients whose haemodialysis period ≥ 12 months and LVEF $\geq 40\%$ were included. Incidence of ventricular arrhythmias were monitored through 24 hours Holter in which lethal ventricular arrhythmia (VA) was defined as Ventricular Tachycardia (VT), Ventricular fibrillation (VF), or Premature Ventricular Contraction (PVC) Lown grade $\geq III$. Association of the risk of lethal VA and period of dialysis was analysed using Pearson's correlation and p value < 0.05 is considered significant. All data was processed using IBM SPSS version 26 statistical program.

Results

34 Patients were included in this study, mostly were male patients (58.8%) with mean age of 52.6 years. Mean period of haemodialysis was 40 months with standard deviation of 23.92. Incidence of lethal VA in patient with period of haemodialysis ≥ 24 months compared to < 24 months was significantly higher (52.9% vs 47.1%; p = 0.036). In accordance, ROC analysis of haemodialysis period ≥ 24 months yields increasing risk of lethal VA events (AUC 0.766, sensitivity 77.8%, specificity 50%).

Conclusion

We conclude that ESRD patient on long term haemodialysis period ≥ 24 months has significantly higher risk of lethal ventricular arrhythmia. Implantable cardiac defibrillator might have a role for primary prevention when combined with other supporting parameters, such as low LVEF. However, further studies are needed to validate this hypothesis.

Keyword

Ventricular arrhythmia, End Stage Renal Disease, Haemodialysis, Sudden Death



Assessment of occurrence and severity changes in tricuspid regurgitation in short-term follow up after His bundle pacing and Left bundle branch pacing implantation using stylet-driven lead delivery system

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Background and aims: Tricuspid regurgitation (TR) is a common complication after Right Ventricular pacemaker implantation caused by lead position and inadequate pacing position. His Bundle Pacing (HBP) and Left bundle branch pacing (LBBP) using catheter delivery cause an improvement of TR grade in patients.¹ The new occurrence of TR on HBP and LBBP using stylet driven lead is not yet known, so this study aims to evaluating the occurrence and severity changes of TR in this population.

Material and Methods: Forty-two HBP and LBBP patients with stylet-driven delivery system (14 male, 28 female) taken from Makassar PPM Registry were included. Tricuspid regurgitation were evaluated using echocardiography 6 month after implantation compared to echocardiography before implantation. Lead position also evaluated with 3D-echocardiography in patient without TR after implantation. Tricuspid regurgitation were found on 19 samples, mild (n =15, 35.7%) and moderate (n = 4, 9.5%) before implantation while 23 patients (52.2 %) have no Tricuspid regurgitation

Results: The mean age of patients range between 65 ± 11. 37, Follow up after six month showed no new occurrence of TR in prior 23 patients (52.2 %), Improvement of TR happens in 4 patients, 1 patient from mild TR become no TR (2,4%, P Value 0.04), and 3 patients with moderate TR improving to mild TR (2.4%, P Value 0.04)

Conclusion: HBP and LBBP using stylet-driven lead delivery system, cause no tricuspid regurgitation event and improvement in TR grade after implantation. So stylet-driven system is efficient and could be acceptable in HBP and LBBP procedures.

Keywords : Tricuspid Regurgitation, His Bundle Pacing, Left bundle branch pacing

TABLE.

Table 1. Tricuspid regurgitation event and change of severity before and after pacing (n=42)

	SETELAH PEMACUAN n (%)			P value
	TIDAK ADA	MILD	MODERATE	
	TIDAK ADA (n=23)	23 (54.8)	0	0
SEBELUM PEMACUAN n (%)	MILD (n=15)	1 (2.4)	14 (33.3)	0
	MODERATE (n=4)	0	3 (7.1)	1 (2.4)

* Data disajikan dalam n (%). Menggunakan Uji Marginal Homogenity, significant P Value < 0.05

AH
JUMP



**INTERVAL AND DURATION OF CUMULATIVE JUNCTIONAL RHYTHM ARE THE
INDEPENDENT FACTORS ASSOCIATED WITH THE COMPLETE ELIMINATION OF
SLOW PATHWAY IN AVNRT ABLATION**

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Background and Aims: The success of AVNRT ablation is achieved in two ways: complete elimination or modification of the slow pathway (SP). Recurrence rate for SP modification is higher than complete elimination. Continuous ablation to achieve complete elimination will increase the risk of total AV block, so the operator needs to know the clinical and electrophysiological characteristics of the patient that affect the achievement of SP elimination.

Materials and methods: A cross-sectional study of AVNRT patients undergoing SP ablation at dr. Kariadi General Hospital Semarang from October 2019 to October 2022. Multivariate logistic regression was used to find the factors associated with SP complete elimination.

Results: 34 patients with an average age ranging from 48 ± 14.3 years. The procedure duration was 62 ± 15 minutes with median number of RFA given was 3 (1-14) times. Independent factors of SP complete elimination: AH jump interval ≥ 110 ms (OR 7,9; 95% CI 1,21-51,76; $p=0,031$) and cumulative junctional rhythm (JR) duration ≥ 30 s (OR 6,9; 95 % CI 1,08-45,27; $p=0,041$).

Conclusion: The AH jump interval and the duration of the cumulative JR are electrophysiologic parameters associated with the slow pathway complete elimination ablation in AVNRT.

Keywords: slow pathway ablation, complete elimination, modification



CORRELATION BETWEEN SHORT-TERM CARDIAC AUTONOMIC FUNCTION MEASUREMENT WITH LEFT VENTRICULAR SYSTOLIC FUNCTION IN ISCHEMIC CARDIOMYOPATHY

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Background and aims: Cardiac autonomic function, derived from 24-h holter monitoring parameter, such as heart rate variability (HRV), heart rate turbulence (HRT), and deceleration capacity (DC) have been demonstrated as a predictor of mortality in ischemic cardiomyopathy. However, measurement of these parameter with short-term holter monitoring showed a contradictive result. The aim of this study is to assess correlation between short-term HRV, HRT and DC with left ventricular systolic function in ischemic cardiomyopathy.

Materials and methods: This is a cross-sectional study including 65 ischemic cardiomyopathy patients in Prof. Dr. R. D. Kandou general hospital with left ventricular ejection fraction (LVEF) ≤ 40%. Short-term HRV, HRT and DC are measured with 15-min holter recording using Vasomedical BIOX holter. Left ventricular ejection fraction (LVEF) is calculated with 3D echocardiographic methods using GE Vivid E95. All parameters are analyzed using SPSS version 25.

Results: Among 65 subjects, 54 patients (82%) are male and 12 patients (18%) are female with a mean age of 61.8 ± 10.2 years, mean DC value 3.64 ± 1.34 ms, mean SDNN 38.71 ± 30.33 ms and mean LVEF 26.98 ± 7.62 %. There is a significant correlation between DC value with LVEF (r = 0.279, p = 0.024), Turbulence Onset (TO) with LVEF (r = -0.375, p = 0.045) and Turbulence Slope (TS) with LVEF (r = 0.408, p = 0.028) using spearman correlation test and there are significant differences between each HRT class with LVEF (p = 0.035) and DC risk category with LVEF (p = 0.027) using one-way ANOVA test. No significant correlation was found between HRV parameters and LVEF.

Conclusion: Among each of short-term cardiac autonomic holter parameter, short-term deceleration capacity and heart rate turbulence have a better correlation with left ventricular ejection fraction in ischemic cardiomyopathy compared with heart rate variability

Keywords: Heart Rate Variability, Heart Rate Turbulence, Deceleration Capacity, LVEF

		Correlations			
		LVEF_3D	HRT_TO	HRT_TS	
Spearman's rho	LVEF_3D	Correlation Coefficient	1.000	-.375*	.408*
		Sig. (2-tailed)	.	.045	.028
		N	65	29	29
HRT_TO		Correlation Coefficient	-.375*	1.000	-.377*
		Sig. (2-tailed)	.045	.	.044
		N	29	29	29
HRT_TS		Correlation Coefficient	.408*	-.377*	1.000
		Sig. (2-tailed)	.028	.044	.
		N	29	29	29

*. Correlation is significant at the 0.05 level (2-tailed).

		Correlations		
		LVEF_3D	DC_Value	
Spearman's rho	LVEF_3D	Correlation Coefficient	1.000	.279*
		Sig. (2-tailed)	.	.024
		N	65	65
DC_Value		Correlation Coefficient	.279*	1.000
		Sig. (2-tailed)	.024	.
		N	65	65

*. Correlation is significant at the 0.05 level (2-tailed).



**Physical Fitness Level and Heart Rate Variability in Patients with Idiopathic Outflow Tract
Premature Ventricular Complex: A Cross-sectional Analysis**

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Background and aim

Decreased heart rate variability (HRV) has been documented as one of the predictor factors of ventricular tachycardia (VT) in patients with outflow tract ventricular arrhythmia. As a surrogate to assess the cardiac autonomic function, HRV was affected by various factors including physical fitness level. An increase in HRV values was found in the group with more routine physical activity through decreased sympathetic tone and modulation of parasympathetic tone. Meanwhile, a VT episode was associated with an increase in sympathetic tone in this population. This study aimed to evaluate the association of HRV with exercise capacity in adults with idiopathic outflow tract arrhythmia.

Methods

Analytical observational study with a cross-sectional design were conducted. Thirty-nine subjects with idiopathic ventricular arrhythmia at Sardjito Hospital during 2017-2021 were included. All patients underwent treadmill tests to assess physical fitness level. The treadmill test was done using the standard Bruce method with the threshold of 85% maximum heart rate achieved. The 24-hour Holter monitoring was completed to acquire the Standard Deviation of N-N interval (SDNN) value as a parameter of HRV. It was recorded with a standard 5 days washout of anti-arrhythmic drugs and 24-hour SDNN was acquired from the recording data. The subjects were then divided into two groups based on the incidence of ventricular tachycardia.

Result

The physical fitness level in the patient with VT episode ($5,5 \pm 2,6$ METs) was lower than the patient without VT episode ($6,6 \pm 1,9$ METs) although not statistically significant ($p = 0,145$). However, there is a positive correlation between physical fitness level and SDNN value, in which the higher the fitness level, the higher the SDNN value ($r = 0,468$, $p = 0,003$).

Conclusion

Physical fitness level correlates positively and significantly with cardiovascular autonomic function in patients with idiopathic ventricular arrhythmia. A lower physical fitness level was found in patients with VT episodes compared to the patient without VT episodes, although statistically not significant.

Keywords: Idiopathic outflow tract ventricular tachycardia, heart rate variability, physical fitness level



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RELATIONSHIP BETWEEN ANTITHROMBOTIC THERAPY WITH MAJOR ADVERSE CARDIAC EVENT ON PATIENT ATRIAL FIBRILLATION WITH STABLE CORONARY ARTERY DISEASE (CAD) IN RSUP DR M DJAMIL PADANG

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Background and aims : Atrial fibrillation (AF) frequently coexist with coronary artery disease (CAD) such as stable coronary artery disease. AF is closely linked to coronary artery disease as they share some common cardiovascular risk factors. These patients are known to have a worse prognosis than sinus rhythm. Optimal longterm management of AF with stable coronary artery disease is still a challenge for clinicians in daily practice. The risks and benefits of adding antiplatelet as a therapy of stable coronary artery disease in AF patients receiving anticoagulants are still unclear. Management of antithrombotic therapy must consider the risk of bleeding, stroke, and acute coronary syndrome or recurrent myocardial infarction in AF patients with stable CAD. This research aim to determine the relationship between antithrombotic therapy with major adverse cardian event (MACE) in AF patients with stable CAD in Dr. M. Djamil Padang General Hospital.

Materials and methods : This study used a cross-sectional design with a simple random sampling technique, and total sample of 61 people. Data were obtained from medical records of Dr. M. Djamil Padang General Hospital period 2015-2017. Analysis of data using Chi-Square test to assess the relationship between variables.

Result : In this study, MACE were found less frequently in patients with AF with stable CAD who received anticoagulant therapy with / without antiplatelet (83.7%). Analysis of data on the relationship of antithrombotic therapy with major cardiovascular events obtained $p = 0.014$ ($p < 0.05$).

Conclusion : From these results it was found that antithrombotic therapy was independently associated with major adverse cardiovascular events (MACE) in AF patients with stable CAD.

Keywords: Atrial fibrillation, stable coronary artery disease, major adverse cardiovascular events, antithrombotic.