Modified Electrocardiographic Scoring to Predict Left Ventricular Ejection Fraction in Chronic Heart Failure

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Introduction: Heart failure (HF) are divided into HF with reduced ejection fraction (EF<40), mid range (EF 40-49%), and preserved (EF≥50%). Echocardiography is used as gold standard examination, but it is limited only in several healthcare. Preliminary examination tools is needed. Previously there was ECG scoring to predict LVEF in HF patients, but still divided into two categories. This study make a new modified ECG scoring which dividing HF into three categories and also adding new variables like age and sex.

Methods: An observational approach with cross sectional study design. The data was taken from patient’s medical record with chronic heart failure (CHF) who went to the Department of Cardiology at Dr. M. Djamil Padang Hospital in January-August 2018. Bivariate analysis was performed on each ECG variable then correlated with LVEF by chi-square method. Multivariate analysis with logistic binary regression test was conducted to obtain variables that would go into the score calculation stage with the Hosmer-Lameshow test (p <0.25). The sensitivity, specificity test and receiver operating curve (ROC) analysis were performed.

Result: 283 subjects of CHF who had been divided into three groups. Obtained variables that met the requirements for calculating scores were left atrial enlargement (LAE) (OR = 6.36; p = 0.000) score was 6, wide QRS (OR = 13.06; p = 0.000) score was 9, prolonged QTc interval (OR = 2.18; p = 0.065) score was 2, ST-T change (OR = 5.05; p = 0.000) score was 6, male patient (OR = 1.78; p = 0.018) score was 1, and age ≥ 60 (OR = 1.34; p = 0.000) score was 1. Subjects with HFpEF if the scored were <9, HFmrEF if the scored were 9-10, and HFrEF if the scored were >10. It has sensitivity 89.3%, specificity 85.6% with AUC 88.4%.

Conclusion: Modified Electrocardiography scoring system in this study can be used as an initial tools to determining LVEF in patients with CHF.