Association of Deep Terminal Negativity of P Wave in V1 with Severity of Rheumatic Mitral Stenosis and Risk of Mortality

Introduction: Previous studies demonstrated a relation of deep terminal negativity of P wave in V1 (DTNPV1) with risk of sudden cardiac death, all-cause mortality, and newly diagnosed of atrial fibrillation in general population. Electrocardiogram (ECG) parameter DTNPV1 defined as negative P prime >100 - 200 µV in V1. This simplified ECG metric represents the development of left atrium (LA) and left ventricle (LV) fibrosis. The association of DTNPV1 with severity and all-cause mortality in mitral stenosis (MS) patient were poorly investigated. The aim of this study was to evaluate the relationship between DTNPV1 with severity and all-cause mortality in rheumatic MS patient.

Methods: This analysis enrolled subjects with ECG sinus rhythm from rheumatic mitral stenosis registry in Sardjito Hospital since June 2014 until June 2019. The DTNPV1 was manually measured using caliper and magnified lens from the superficial ECG. Echocardiography examination and clinical data were analysed.

Result: A total of 90 from 510 patients were recruited as subjects, of which 76.7% were female, 82.2% were severe MS, with mean age 37.58 ± 10.821 years old. This study demonstrated mean amplitude of negative P prime 142.7 ± 81.2 µV and 53.3% of subjects had DTNPV1. Bivariate analysis showed a significant positive correlation between amplitude of negative P prime and transmitral valve gradient (r=0.353, p=0.001) and significant negative correlation with mitral valve area (r=-0.353, p=0.001). The severity of MS also proved to be statistically significant associated with subjects who have DTNPV1 (p=0.001). There were 18 deaths during 5 years follow up. Kaplan Meier curve showed higher mortality in DTNPV1 with the same survival rate for short (10 months) and long (5 years) term, which is equal to 74.4% (log rank test p=0.200 and 0.209, respectively).

Conclusion: The DTNPV1 is associated with severity of rheumatic MS in sinus rhythm. Subjects who have DTNPV1 experience a higher mortality rate, although not proven to be statistically significant.