A Variant in Locus of Caveolin 1 Confers Atrial Fibrillation and Left Atrial Enlargement

Yuki Kishihara¹, Yusuke Ebana¹, Hitoshi Hachiya², Kenzo Hirao², Mitsuaki Isobe², Tetsushi Furukawa¹

¹Department of Bio-informational Pharmacology, Medical Research Institute, Tokyo Medical and Dental University, Japan, ²Department of Cardiovascular Medicine, Tokyo Medical and Dental University

Introduction: The single nucleotide polymorphism (SNP) in caveolin-1 locus was shown to be associated with the PR interval in electrocardiogram and weakly with AF in Caucasian. The purpose of this study was to test if this SNP confers the AF susceptibility in Japanese population and to examine the role of caveolin-1 in AF pathogenesis.

Methods and Results: (1) 927 samples (416 AF cases and 511 controls) were collected and genotyped with PCR/invader assay. The major allele frequency revealed significant different distribution between two groups (70.4% in AF vs 65.8% in control, P=0.032). (2) We compared various clinical parameters between risk allele homozygous carriers (CC) and others (TC and TT). Only left atrial (LA) diameter was significantly larger in risk CC carriers than in TC or TT (P=0.0096). (3) We examined effects of various stimuli, including angiotensin II, cyclic mechanical stretch, electrical pacing and others on caveolin-1 expression in HL-1 cells. None of these stimuli significantly altered caveolin-1 expression. Conclusion: The common variant in caveolin-1 is associated with AF enlargement also in Japanese population. Although the SNP in caveolin-1 is significantly associated with LA enlargement, the mechanism linking between caveolin-1 polymorphism and AF is currently unknown, and requires further study.

Keywords: atrial fibrillation, caveolin-1, genome