Exercise-Stress Test for Predicting Genetic Mutations and Future Cardiac Events in Asymptomatic Young CPVT Relatives

Meiso Hayashi1, Isabelle Denjoy2, Miyuki Hayashi2, Fabrice Extramiana2, Takao Kato1, Antoine Leenhardt1

1Department of Cardiology, Nippon Medical School, Tokyo, Japan, 2Service de Cardiologie, Hopital Lariboisiere, Universite Paris Diderot, Paris, France

Background: Catecholaminergic polymorphic ventricular tachycardia (CPVT) is an inherited arrhythmic disorder with a highly malignant clinical course. Exercise-stress test is the first-line approach to diagnose suspected individuals. We sought to elucidate the sensitivity and specificity of exercise-stress test for identifying mutations in young CPVT-family relatives.

Methods and Results: The present study included 35 asymptomatic CPVT-family relatives younger than 20 years old who underwent exercise-stress test and genetic examination. Exercise-stress test, which was considered positive if ventricular tachycardia or premature ventricular contractions consisting of bigeminy or couplets were recorded, was positive in 12 relatives (34%), and the following genetic analysis disclosed mutations in 20 (57%). Mutation was identified in all 12 relatives with positive and in 8 of 23 (35%) with negative exercise-stress test; the sensitivity and specificity for a positive genotype were 60% and 100%, respectively (p<0.001). Among 20 genetically-positive subjects, cardiac events occurred in 7 of 12 with positive and 1 of 8 with negative exercise-stress test during the follow-up period of 9.2±4.2 years. Conclusion: In young asymptomatic relatives, exercise-stress test can be used as a simple diagnostic tool. Nevertheless, because of the low sensitivity for predicting mutations and future cardiac events in those with negative stress test, genetic analysis should be performed to improve patient management.

Keywords: catecholaminergic polymorphic ventricular tachycardia, exercise stress test, mutation