

A Novel Scoring System Predicting Major Adverse Cardiac Events in Coronary Artery Spasm Patients: A Large-scale Simulation Analysis

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Background: Some clinical risk factors were found to be associated with adverse cardiac events in coronary artery spasm (CAS) patients, however, combinatorial effects of those risk factors have not been systematically evaluated yet. This study is to develop a novel scoring system which effectively predicts major adverse cardiac events (MACEs) in CAS patients. **Method:** A total 3477 patients without significant coronary artery disease who underwent acetylcholine (Ach) provocation test were enrolled. a total 13 factors were included in the scoring system. Each factor can take one of the three scores (i.e., 0, 1, 2), generating total 1,594,322 (313) different scoring systems. In each scoring system, patients were divided into two groups (i.e., low-score group and high-score group) using a mean score. Survival analysis was performed for each scoring system according to the Kaplan-Meier method. **Result:** Among 1,594,322 scoring systems, 15,483 (1.0%) predicted MACE with statistical significance, representing the validity of included risk factors. Scoring system with the best performance was '2*ST-elevation (0 or 1) + ST-depression (0 or 1) + T-wave inversion (0 or 1) + 2*Atrial fibrillation (0 or 1) + Chest pain (0 or 1) + 2*Atrioventricular block (0 or 1)' during the provocation test (Hazard ratio=1.9, p-value < 0.001). Among the risk factors, ECG changes were consistently included in the scoring systems with high performance (Hazard-ratio <1.5). **Conclusion:** Through the large-scale simulation analysis, we presented a scoring system predicting MACE in CAS patients. ECG changes needs to be carefully observed during the provocation tests since they were found to be important predictors.