Combining ICD Shock Reduction Strategies to Reduce Inappropriate Shocks: Probabilistic Analyses Applied to Japanese Cases

Satoshi Shizuta¹, Tomoyuki Tejima², Hideshiro Saito-Benz², Mitsuaki Takami²

¹Department of Cardiovascular of Medicine, Kyoto University Graduate School of Medicine, Japan, ²Cardiac Rhythm Disease Management, Medtronic Japan

Purpose: New shock reduction strategies have been developed to alleviate a major limitation of ICD therapy caused by inappropriate ICD shocks. Recently, computer modeling demonstrated that the strategies have potential to reduce inappropriate shocks occurred inside the settings of a clinical trial (e.g., shock-only therapy, single chamber ICDs). We simulated the utility of the strategies with data from routine clinical practice.

Methods: Consecutive 105 patients implanted with Medtronic ICDs were assessed for the utility of the strategies.

Results: During the mean follow-up of 19 months, there were 91 shocked episodes from 19 patients. Independent adjudication committee identified 16 episodes from 9 patients as inappropriate shocks caused by supra-ventricular tachycardia (SVT) and T-wave oversensing (TWOS). Six out of 16 episodes had the device setting with ATP and SVT discriminator ON, and the shock reduction strategies decreased the probability of inappropriate shocks by 78.0%. Nine episodes setting with ATP OFF and SVT discriminators ON reduced the probability by 92.7%, and one episode setting with ATP ON and SVT discriminator OFF reduced by 95.7%. Overall, the shock reduction strategies hypothetically reduced the probability of inappropriate shocks by 87.4%.

Conclusions: The new shock reduction strategies have the potential to reduce inappropriate shocks caused by SVT and TWOS.

Keywords: inappropriate shock, shock reduction, ICD