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### Wedensky Modulation of T-Wave Accurately Predicts Arrhythmic Events

**Author Block:** Peter A. Brady, MD, FRCP, Paul Erne, MD, Jesus E. Val-Mejias, MD, Joerg O. Schwab, MD, Rainer Schimpf, MD, Michael V. Orlov, MD, PhD, Tom Mattioni, MD, Marek Malik, MD, PhD and Jan P. Amlie, MD, PhD. Mayo Clinic, Rochester, MN, Kantonsspital Luzern, Luzern, Switzerland, Galichia Heart Hospital, Wichita, KS, Dept. of Medicine – Cardiology, University of Bonn, Bonn, Germany, 1st Department of Medicine-Cardiology, University Hospital Mannheim, Mannheim, Germany, Caritas St. Elizabeth's Hospital, Boston, MA, Arizona Arrhythmia Consultants, Scottsdale, AZ, St. George's Hospital, London, United Kingdom, Rikshospital, Oslo, Norway

#### *Abstract:*

Introduction: Wedensky Modulation (WM) is based on subthreshold transthoracic electrical stimulation delivered to every other QRS complex. The WM Index (WMI) is computed from electrocardiographic (ECG) differences between stimulated and non-stimulated QRS complexes and accurately predicts arrhythmic events. We hypothesized that WM effects measured within T-waves would also accurately predict arrhythmic events. Methods: The WM T-wave index was prospectively evaluated post-hoc using patient ECG data derived from a recently completed study (prospective observational study, 8 global centers). There were 268 post-myocardial infarction (post-MI) patients with ICD implantation with at least one 6 month follow-up completed. Patients were placed into the TMI-L group (TMI = 0, T-wave index  $\leq$  0.5, n = 202) or the TMI-H group (TMI = 1, T-wave index  $>$  0.5, n = 66). Cumulative ICD-treated arrhythmia event rates for the two TMI groups were compared using Kaplan-Meier estimates. Results: There were 35 events in the first year for the TMI-L group compared to 23 events in the same time period for the TMI-H group (log-rank  $p < 0.01$ ). Comparing TMI-L to TMI-H, the hazard ratio for event rates was  $> 2$  at one year (95% CI of 1.2 to 3.5, Wald  $p < 0.01$ ). TMI is significantly different from WMI regarding future cardiac-related events prediction ( $p < 0.0001$  regarding discordant pairs). When combined with WMI study results to form an R-wave T-wave index the event rate predicted by this combined index significantly improves the separate predictive power of the two indices, raising the positive predictive value (PPV) from 64% (WMI) and 40% (TMI) to 81%. The event rate for the RTI-L group (RTI = 0, n = 106) was 10% compared to the event rate of 29% for the RTI-H group (RTI = 1, n = 162). Conclusions: Post-MI infarction patients with a high T-wave modulation index may have a significantly increased risk of a life-threatening arrhythmia when compared to patients with a low index. When combining the R-wave index with the T-wave index, the predictive power of Wedensky modulation testing for future cardiac-related events accurately predicted more than 80% of events occurring in the first 12 months following myocardial infarction.