

Electrocardiographic Markers Associated with Sotalol-induced Torsades de Pointes

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Background: Recent recommendations from the AHA, ACCF and the ISCE have highlighted the need for monitoring in-hospital patients with a risk for drug-induced QT prolongation and torsades de pointes (TdPs). In this work, we compared repolarization prior to the occurrence of drug-induced TdPs in three cases of sotalol-induced TdPs (+TdPs) to the ECG patterns preceding maximum QTc prolongation in healthy individuals exposed to sotalol who did not develop TdPs (-TdPs). Method: Based on data from the Telemetric and Holter ECG Warehouse (THEW), we implemented a computer-based analysis of the repolarization signal (ST-T-wave) on 10-min intervals just prior to the arrhythmia (for the group with TdPs-n=3) and just prior maximal QTc prolongation (in the individuals without sotalol-induced TdPs-n=3). We computed the delta values using baseline values one hour prior to the first interval (10-min off drug). We investigated QT/QTc prolongation, QT variability, ventricular ectopic beats (VPBs) frequency, T-wave amplitude, T-peak to Tend interval, T-wave complexity and macro T-wave alternans. Results: The table below describes the baseline differences between the two groups. The analysis of changes of these parameters in reference to baseline revealed primarily an increased QTc variability prior to the event, presence of VPCs prior to TdPs, and profound changes in T-loop morphology in patients developing TdPs.

+TdPs (N=3)	-TdPs (N=3)	RR (msec)	1038±119	1038±91	QTcF (msec)	555±34	478±21	TpTe (msec)	118±9	107±28	madQTc* (n.u.)	0.93±0.64	0.23±0.08	T-wave magnitude (mV)	-0.36±0.35	0.22±0.17	Macro T-Wave alternans	No	No	T-wave complexity (n.u.)	0.29±0.18	0.18±0.04	VPCs (n/10 min.)	60±20	0±0
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Conclusion: The individuals who developed sotalol-induced TdPs exhibit longer baseline QTc interval. There was no difference in the magnitude of sotalol-induced prolongation of QTc between the groups with and without TdPs. Individuals with TdPs reveal larger beat-to-beat variability of the QT intervals, lower T-wave amplitude and presence of VPBs.