Assessment of ventricular repolarization variability in wake states in REM Sleep Behaviour disorder and Parkinson's Diseases

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Aim: Idiopathic REM Sleep Behavior Disorder (iRBD) patients exhibit autonomic dysfunction symptoms, potentially increasing cardiovascular mortality risk. Although the autonomic irregularities in iRBD are recognised, its association with the risk of cardiovascular mortality in wake or sleep states remain underexplored, highlighting a critical research area. In this regard, the QT-variability (QTV), a promising repolarization variability indicator, have two distinct components: QTV related (QTVrRRV) and unrelated (QTVuRRV) to RR-variability (RRV). This pilot research is focused on studying QT-dynamics in iRBD and RBD with Parkinson's disease (PD-RBD) populations during two wake states i.e., wake before sleeping (WBS) and wake upon awakening next day (WAS), as markers of potential cardiovascular risk.

Method: The study included 18-controls (CG) (age: 59 ± 8 years, 61% female), 20-iRBD (68 ± 9, 15% female), and 20-PD-RBD (73 ± 5, 35% female) participants. QTV and RRV were derived from a 5-minute ECG epoch of polysomnography records during two wake states. Analyses included the time and frequency domain indexes, followed by non-parametric statistical analysis to assess intra- and inter-group patterns.

Results: No significant differences were found in the mean values of RR, QT, and QT-corrected intervals across all groups and wake states. For intra-group analysis, significant differences ($p < 0.05$) in frequency domain RRV indexes and QTVrRRV were found for iRBD and PD-RBD groups in the WAS compared to the WBS. The inter-groups analysis showed significant reduction ($p < 0.05$) in certain frequency domain RRV indexes and QTVrRRV for iRBD and PD-RBD groups compared to the CG. Yet, no significant differences were noted in QTV indexes or QTVuRRV across all groups and wake states.

Conclusions: RRV and QTVrRRV findings suggest altered autonomic regulation in iRBD and PD-RBD compared to CG. However, the lack of differences in QTV indexes and QTVuRRV suggests that these conditions might not pose a risk of cardiovascular mortality.