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Evaluation of electrocardiographic repolarization parameters in patients with polycystic ovary syndrome

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Introduction: Polycystic ovary syndrome (PCOS) is a multifactorial, endocrine disease associated with metabolic disturbances (e.g. hyperinsulinemia, insulin resistance) and increased cardiovascular risk. Recent data strongly suggest that different QT variability parameters characterizing cardiac repolarization instability represent novel markers in proarrhythmic risk assessment.

Purpose: In the present study we investigated ECG repolarization parameters, including QT variability parameters in patients with polycystic ovary syndrome.

Methods: Fifty-five PCOS patients (age: 29 ± 6 years) and 55 age-matched healthy volunteers (age: 29 ± 10 years) were enrolled in the study. Five-minute 12-lead resting electrocardiograms were recorded, the ECGs were digitized and evaluated off-line using the Cardiosys-A01 system (Cardiosys-A01, MDE Heidelberg GMBH, Heidelberg, Germany). The following parameters were determined: the frequency corrected QT interval (QTc) using Bazett's, Fridericia, Framingham and the Hodges formulas; QT dispersion (QTd) and T wave peak-to-end distance (Tpeak-Tend). Among QT variability parameters we analyzed the QT variance (QTV), the QT variability index (QTVI), the short-term beat-to-beat QT and RR interval variability (STV-QT, STV-RR) based on constructed Poincaré plots and the variability ratio (VR).

Results: The RR interval did not differ significantly in PCOS patients compared to controls (821 ± 129 ms vs. 847 ± 99 ms), however the QT interval (373 ± 30 ms vs. 391 ± 27 ms, $p < 0.01$), the QTc calculated with Bazett's, Framingham, Fridericia and Hodges correction formulas (QTc Bazett's: 413 ± 18 ms vs. 426 ± 21 ms, $p < 0.01$) and the Tpeak-Tend intervals were significantly shorter (76 ± 10 ms vs. 83 ± 12 ms, $p < 0.01$). The QTd, QTV, and STV-RR did not differ significantly. However, the VR (0.3 ± 0.4 vs. 0.2 ± 0.2 , $p < 0.05$), the QTVI (-0.9 ± 0.5 vs. -1.3 ± 0.4 , $p < 0.001$), and importantly, the STV-QT were significantly higher in PCOS patients compared to controls (4.0 ± 0.9 ms vs. 3.2 ± 0.9 ms, $p < 0.0001$).

Conclusion: Some of the alterations in repolarization parameters and the significant increase in the short-term beat-to-beat QT interval variability and the QT variability index may indicate increased repolarization instability in patients with polycystic ovary syndrome compared to age-matched controls, however, further studies are needed to establish the exact relation of this finding to increased arrhythmia propensity in this population.