Abnormal cardiac electrical remodelling in POTS: Mechanistic insights on potential autonomic dysregulation

Varun Malik
Anand Thiagarajah Thiagarajah
Dian Andien Munawar
Adrian Elliott
Dominik Linz
Ricardo Mishima
Mehrdad Emami
Rajiv Mahajan
Prashanthan Sanders
Dennis Lau

Introduction: Postural Orthostatic Tachycardia Syndrome (POTS) is a syndrome characterized by dysautonomia. It remains unknown if POTS individuals have abnormal cardiac electrical changes. To assess electrocardiographic markers of inter-atrial and ventricular conduction delay in POTS compared to patients with a history of vasovagal syncope (VVS).

Methods: Patients who met diagnostic criteria for POTS by tilt table test and free of other autonomic or structural heart disease were compared to VVS patients. 12 lead ECGs taken pre-treatment were digitized (minimum 8 good quality signals) and analyzed by a cardiologist blinded to treatment. P wave and RT dispersion (PWD, RTD) were calculated (maximum – minimum P wave/RT interval duration). Peak of T- to end of T wave (TpTe), a marker of transmural dispersion of ventricular repolarization, also sensitive to sympathetic stimulation, was measured in lead II.

Result: 11 POTS patients were compared to 9 age and sex-matched VVS patients. Mean age was similar. Atrial volumes and left ventricular ejection fraction (LVEF) were normal in all patients. There was no difference in LVEF. POTS was associated with abnormal PWD (normal cut-off 38 ms) and higher RTD; taken pre-treatment, despite lower left atrial volume. Baseline TpTe did not differ. Table 1.

Conclusion: Compared to VVS, POTS is associated with both longer PWD (above described normal limits) and increased RTD, whilst TpTe did not differ, despite systemic sympathetic predominance in POTS. Further clinical studies are warranted to assess the relative role of subclinical cardiac structural remodeling and/or impaired cardiac autonomic nervous system for these ECG findings.