

Introduction: Both QT dispersion (QTD) and heart rate turbulence (HRT) were studied and tested like potential noninvasive markers for risk stratification. **Aims:** Compare QTD between different groups of patients with expected different mechanism of developing changes in QTD. Investigate if HRT is present following ventricular train drives and depends on left ventricular dysfunction. Test the hypothesis that QTD and HRT parameters assessed during programmed ventricular stimulation correlated to each other and there is association with inducibility of ventricular arrhythmia. **Methods:** We analysed body surface potential mapping (BSPM) recordings and vectorcardiographic T-loop parameters (T-loop width – Tw and T-loop amplitude – Ta) in 37 healthy women (20 – 36 yrs) in the 36th to 40th week of physiological pregnancy and 2 to 6 days after delivery. Control group contained 18 healthy women. Then we analysed BSPM recordings from 27 psychiatric outpatients treated with prophylactic doses of dosulepin (20 women, 44 ± 13 yrs) and compared to those obtained from 37 healthy volunteers. From these recordings the QTD was evaluated. This parameter was estimated using both BSPM recordings and 12 lead standard ECG. Acquired data were statistically correlated with Tw or Ta and dosulepin plasma levels, respectively. Distribution of maximal and minimal QT_i in BSPM leads were investigated in pregnant, dosulepin and control group. Analysis of digital recordings of programmed ventricular stimulation in 82 pts (25 women, 64 ± 13 yrs) referred for ventricular arrhythmias was performed for detection HRT after ventricular trains. Profiles of sinus RR intervals (RR_i) after all available 8-beat ventricular train drives (600 and 400 ms) were averaged. Turbulence Slope (TS) was analyzed as the maximum positive slope of a regression line through a sequence of 2 - 5 (TS 2-5) consecutive RR_i within the first 5 RR_i after train drive. Electrocardiographic parameters (QT_i, QTD) in same group were analysed as well. QT_i and QTD were compared between sinus rhythm and right ventricular pacing in two locations. QT_i and QTD were correlated with echocardiographic parameters and with TS 2-5, respectively. Systolic dysfunction was defined as left ventricular ejection fraction less than 40%.

Results: The average QTD in normal subjects was significantly lower (34 ± 12 ms) than in those in late pregnancy (73 ± 18 ms; $p < 0.001$). The average Ta in women in late pregnancy was significantly ($p < 0.001$) smaller (532 ± 98 μ V) and Tw was wider (21.2 ± 11.5 deg) than in the control group (793 ± 114 μ V and 7.2 ± 3.0 deg, respectively). The partial post-partum restoration of all parameters was not significant. In all groups QTD was significantly 7 correlated with Tw but not with Ta. The average QTD evaluated from BSPM leads in the dosulepin group was significantly higher (70 ± 21 ms) than that in the control group (34 ± 12 ms $p < 0.001$). Moreover, the correlation between QTD and the dosulepin plasma level was significant as well ($p < 0.001$) with the value of correlation coefficient 0.7871. The QTD evaluated from standard 12 ECG leads was increased in dosulepin group as well (46 ± 18 ms vs 28 ± 10 ms, $p < 0.05$) but we have not found correlation of the QTD with the dosulepin plasma level. There was difference in localization of minimal QT_i in BSMP leads between pregnant and control group, not between dosulepin and control group. Dynamics of RR_i had biphasic and monophasic pattern in pts with and without VA conduction, respectively. After 400-ms train drives, TS was significantly reduced in pts with LV dysfunction compared to those with normal systolic function. TS₄ was the optimum discriminator between both groups (6.7 ± 8.6 vs 19.6 ± 26.0 ms/RR_i, $p = 0.02$). QTD in sinus rhythm was 56 ± 31 ms. Only in patients with diabetes and patients with positive programmed ventricular stimulation had significant difference in QTD between sinus rhythm and right ventricular pacing. Significant correlation of QTD and left ventricular ejection fraction was found in sinus rhythm. No significant correlation between QTD and TS 2-5 was detected.

Conclusions: According to these results QTD indirectly reflect the complete process of ventricular repolarization; genesis of increased QT disperzion is multifactorial including extracardial and technical ones. Heart rate turbulence after ventricular train drives is present and it is dependent on retrograde conduction and LV dysfunction. QTD assessed during PES has no additional significance in comparison to assessment during sinus rhythm. There is no significant correlation between QTD and TS 2-5 in patients undergone programmed ventricular stimulation.