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## New Perspectives of Holter Monitoring in Diagnostics of the Long QT Syndrome in the Young

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Introduction: Long QT Syndrome (LQTS) is a hereditary life-threatening cardiac arrhythmia. The prognosis and efficiency of therapy depends on genotype and early diagnosis. About 25-35% of genetically positive LQTS patients have no symptoms with normal QTc values. Additional diagnostic criteria are required to identify silent mutation carriers among apparently healthy. 24-hour ECG Holter monitoring (HM) is used for LQTS to detect ventricular arrhythmias, T-wave alternans and T-wave morphology. The automatic QTc analysis on HM has not been used for diagnostic purposes. We aim at determining the potential significance of HM-based QTc analysis for LQTS diagnosis.
Patients and Methods: 58 children aged 5-17 years with genetically confirmed LQTS (64% boys; 25 patients have syncope, 7 - aborted cardiac arrest, 44 - receive beta-blockers) were randomly selected from 450 LQTS patients (Russian Pediatric Arrhythmia Center database). The age-matched control group consists of 59 children (73% boys) without cardiac pathology. The study protocol includes ECG, treadmill-test (TT), family history analysis. The HM protocol includes QTc max and QTc mean measured automatically and accepted after expert's confirmation.
Results: The mean QTc values for all methods of evaluation were significantly higher in LQTS patients (Table). However, the sensitivity and specificity of methods for the differential diagnostics of LQTS based on an assessment of the QTc were different. In 20% of patients QTc on a standard ECG and in 35% of patients QTc after TT were lower than the once determined by diagnostic criteria (<440 ms and < 480 ms correspondingly). ROC-curve analysis was used for determining QTc cut-points for QTc mean and QTc max categorization. QTc mean > 450 ms and QTc max > 490 ms on HM enabled us to distinguish between LQTS and control in 93% and 100% of cases, and identify 12 (20%) LQTS patients unrevealed by the conventional diagnostic approach.
Conclusions: HM-based QTc criteria are efficient for LQTS diagnostics, especially for the detection of asymptomatic children with "silent" forms of the disease.
Table.

| Parameters, ms | LQTS | Control | P-value |
|---|---|---|---|
| QTc (ECG) | 477±51 | 380±22 | 0.0000 |
| QTc after TT | 492±33 | 426±17 | 0.0000 |
| QTc max (HM) | 553±43 | 460±25 | 0.0000 |
| QTc mean (HM) | 496±37 | 415±21 | 0.0000 |