

"QT-Stretching:" The Response of the QT Interval to the Brief Tachycardia Provoked by Standing. A Bedside Test for Diagnosing Long QT Syndrome

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Objectives. To determine if the short-lived sinus tachycardia that occurs during standing will unravel changes in the QT interval of diagnostic value.

Background. The QT interval shortens during heart rate acceleration but this response is not instantaneous. We tested the idea that the transient, sudden, sinus tachycardia that occurs during standing would reveal abnormal QT prolongation in patients with LQTS.

Methods. Patients (68 LQTS and 82 controls) underwent a baseline electrocardiogram (ECG) while resting in the supine position and were then asked to get up quickly and stand still during continuous ECG recording. The QT was studied at baseline and during maximal reflex sinus tachycardia, maximal QT prolongation and maximal "QT-stretching."

Results. In response to brisk standing, patients and controls responded with similar heart rate acceleration of 28 ± 10 beats/min ($p=0.261$). However, the response of the QT interval to this tachycardia differed: On average the QT of controls shortened by 21 ± 19 msec while the QT of LQTS-patients increased by 4 ± 34 msec, $p < 0.001$. Since the R-R interval shortened more than the QT, during maximal tachycardia the QTc increased by 50 ± 30 msec in the control group and by 89 ± 47 msec in the LQTS group ($p < 0.001$). Receiver operator curves demonstrated that the test has diagnostic value. The response of the QT interval to brisk standing was particularly impaired in patients with LQT2.

Conclusions. Evaluation of the response of the QT interval to the brisk tachycardia induced by standing provides important information that aids in the diagnosis of LQTS.