O8-6

QT interval dynamic changes from supine to standing in children

Dionne A., Fournier A., Kelly F., Dominique K., Dahdah N., Abadir S.
Division of Pediatric Cardiology, CHU Ste-Justine, Montreal, Canada

Introduction: QT interval shortening in response to heart rate (HR) acceleration usually occurs within seconds, and may vary between healthy and disease conditions. QT hysteresis has been reported in children and adults performing exercise testing, and more recently in adults undergoing the standing test. A paradoxical QT interval increase has been used to confirm diagnosis of long QT syndrome in patients with borderline corrected QT (QTc). Studying QT hysteresis during a quick standing challenge may compensate for exercise testing; yet no pediatric data is available.

Methods: The standing test was performed in 51 healthy children (mean age 9.2±2.8 yrs, 34 male) having a normal echocardiogram and negative family history for sudden death and long-QT syndrome. Following 10 min supine, fast standing with continuous ECG recording was performed. QT intervals were measured at baseline, maximal tachycardia, maximal QT and each minute of recovery (5 min), using a computerised software (leads II/V5), and corrected for HR using Bazzett (QTcB), Fridericia, Framingham, and Hodge formulas.

Results: In response to standing, HR increased from 75.2±12.9 to 100.4±12.7 beats/min. QT intervals at baseline and maximal tachycardia were similar (377±33 vs 373±37 msec, p=1), however QTcB increased (419±20 vs 480±39 msec, p<0.001). The 95th percentile for QTcB was 451 msec at baseline and 548 msec at maximal tachycardia. QT interval decreased throughout recovery (362±28 msec at 1 min, 356±24 msec at 5 min, p=0.003). QTcB reached baseline values after 1 min of recovery and remained stable (418±22 msec at 1 min, 420±26 msec at 5 min, p=0.97). Similar trends were recorded with the various correction formulas (Figure). Corrected QT using the Bazett formula was significantly higher at all point in times compared to the Fridericia, Framingham and Hodge formulas (p<0.001).

Conclusions: This study provides pediatric reference values for normal QT and QTc interval responses to the brief tachycardia provoked by standing, which differ from published adult values. Potential applications of this easy bedside diagnostic test include, amongst other, screening for long QT syndrome.

QT and QTc measures during standing test