MP4-3

QT correction methods in children

Benatar A., Dewals W., Decraene T., Feenstra A.
Universitair Ziekenhuis
Vrije universiteit Brussel
Brussels
Belgium

Introduction: accurate determination of the QTc interval in children is important especially when considering a drug’s ability to prolong cardiac repolarization. Previous work suggests the most appropriate correction formula is QTc = QT/RR0.38. We set out to compute the best population derived and age-related formula correction factor in our normal childhood population.

Methods: we enrolled a cohort of 1200 healthy children. In a quiet state a digital 12 lead electrocardiogram (50 mm/second) was recorded and stored. The QT and RR intervals were measured digitally in lead 2. Subjects were divided into 4 age groups; 0-1 years (n = 379); 1-5 (n = 280); 5-10 (n = 268) and > 10 years (n = 273). For each age group the QT/RR curve was fitted with 2 regression analyses, a linear regression for constant $\alpha$, whereby QTc = QT + $\alpha$ x (1-RR), and natural log-linear regression analysis for constant $\beta$ whereby QTc = QT/RR$^\beta$. Furthermore, linear regression analysis of QTc/RR for the two formulae were performed (least squares method), obtaining slope and $R^2$.

Results: Mean age: (0-1 years age group) 0.3 years, SD + 0.27; (1-5) 2.8 SD + 2.8 years; (5-10 years age group) 7.3 SD + 1.4 years; (> 10 years age group) 13.3 SD + 1.2 years. From linear regression analysis correction factor was $\alpha$ = 0.275, $\beta$ = 0.43 for 0-1 years, $\alpha$ = 0.26, $\beta$ = 0.46 for 1-5; $\alpha$ = 0.19, $\beta$ = 0.41 for 5-10; $\alpha$ = 0.18, $\beta$ = 0.39 for > 10 years. Linear Regression plots of QTc against RR intervals: QTc linear: slope < 0.005, $R^2$ < 0.01 for the 4 formulae; QTc log-linear slope: < 0.001, $R^2$ 5*10^-2 for the 4 formulae.

Conclusion: For the full range of pediatric subjects studied the optimum population-based correction factor $\alpha$ and $\beta$, decreased with increasing age. It appears that more specific correction factors, based on age and gender, are required. These are being further evaluated.