 QT interval in right ventricular pacing: how to define “normal” or “prolonged”

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Introduction: QT prolongation is associated with clinical outcomes. Left bundle branch block (LBBB) can cause “falsely” prolonged QT. Several formulae have been derived to assess the QT interval in LBBB. Patients with pacemaker implantation and stimulated LBBB by right ventricular (RV) pacing are common. Recently, we developed a new formula (Wang formula) for QT assessment in LBBB. We aimed to apply Wang formula in patients with stimulated LBBB by RV pacing, and compare the correction accuracy with prior formulae.

Methods: Ninety-one (73 ± 10 years; 50% male) patients with RV apical pacing and sixty-two (65 ± 13 years; 50% male) patients with RV non-apical pacing were included. RR, QRS and QT were measures in sinus rhythm and during RV pacing. QT_{LBBB} was modified by Wang formula and 3 prior formulae (Yankelson, Bogossian, and Rautaharju formulae).

Result: QTc determined by Wang formula was highly agreeable with the reference value (428 ± 29 vs. 428 ± 29 ms; P = 0.870). Yankelson formula performed well when QRSLBBB < 170 ms. Bogossian formula overcorrected the QT interval (416 ± 30 vs. 428 ± 29 ms; P < 0.001) while Rautaharju formula slightly overestimates (439 ± 27 vs. 428 ± 29 ms; P < 0.001). QTc derived from Wang formula in identifying prolonged QTc are pretty satisfying (sensitivity 90%, specificity 98%), followed by Yankelson formula (sensitivity 81%, specificity 98%).

Conclusion: Wang and Yankelson formulae perform best to estimate the QT in with RV pacing. However, the predictive value of the modified QT in RV pacing for clinical outcomes awaits further investigations.