The Reproducibility of Global Electrical Heterogeneity ECG Measurements

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Abstract

Background: Global electrical heterogeneity (GEH) is a useful predictor of adverse clinical outcomes. However, reproducibility of GEH measurements on 10-second routine clinical ECG is unknown.

Methods: Data of the prospective cohort study of incident hemodialysis patients (n=253; mean age 54.6±13.5y; 56% male; 79% African American) were analysed. Two random 10-second segments of 5-minute ECG recording in sinus rhythm were compared. GEH was measured as spatial QRS-T angle, spatial ventricular gradient (SVG) magnitude and direction (azimuth and elevation), and a scalar value of SVG measured by (1) sum absolute QRST integral (SAI QRST), and (2) QT integral on vector magnitude signal (iVM_{QT}). Bland-Altman analysis was used to calculate agreement.

Results: For all studied vectorcardiographic metrics, agreement was substantial (Lin's concordance coefficient >0.98), and precision was perfect (>99.99%). 95% limits of agreement were ±14º for spatial QRS-T angle, ±13º for SVG azimuth, ±4º for SVG elevation, ±14 mV*ms for SVG magnitude, and ±17 mV*ms for SAI QRST. SAI QRST and iVM_{QT} were in substantial agreement with each other.

Conclusion: Reproducibility of a 10-second automated GEH ECG measurements was substantial, and precision was perfect.

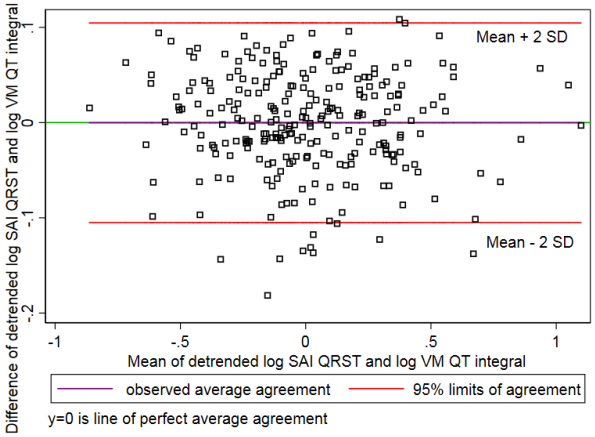

Figure. Bland-Altman plot demonstrating agreement of detrended log-transformed SAI QRST and iVM_{QT}.