Acute, short and long term ‘reverse’ electrical remodeling after biventricular pacing in patients with CRT

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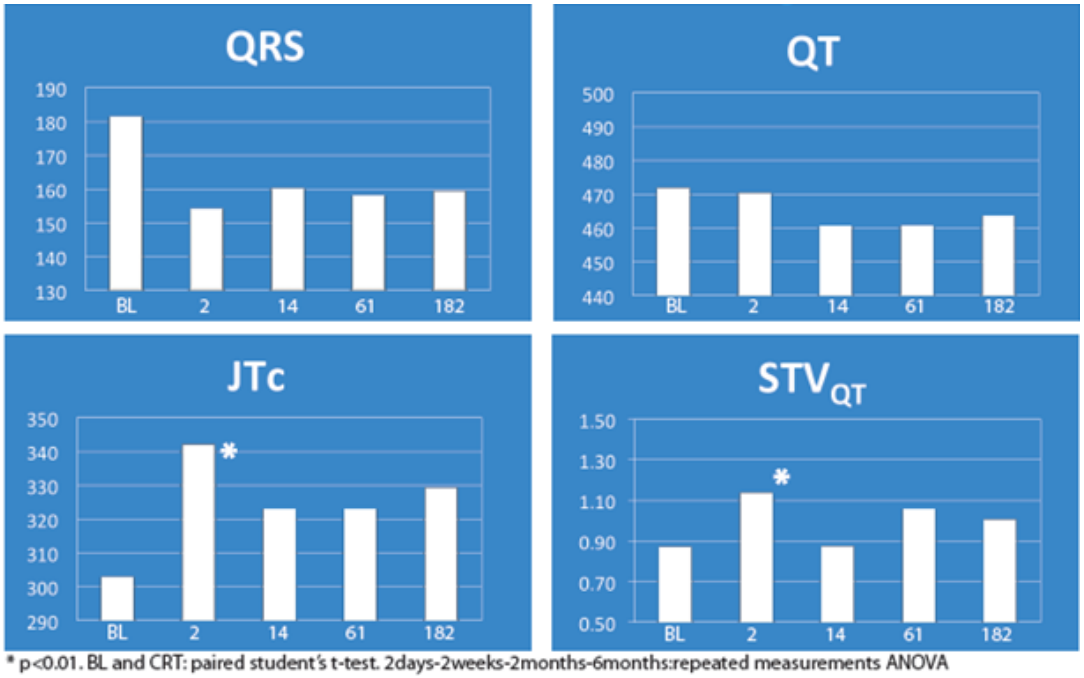
INTRODUCTION Initiation of biventricular (BiV) pacing shortens depolarization and optimizes timing of atrial and ventricular contraction. Over time BiV pacing has shown to be able to cause reverse structural remodeling. However, the effect of BiV pacing on repolarization and the presence or absence of electrical reverse remodeling, is not clear. Both pro- and anti-arrhythmic effects of BiV pacing have been mentioned, often restricted to a specific time window. In this study we measured spatial as well as temporal dispersion of repolarization to assess the acute, short term (<2 months), and long term (>6months) effects of BiV pacing.

METHODS Fourteen patients were prospectively enrolled. A 12 lead two-minute digital ECG was recorded before (baseline, BL) and after (two days, two weeks, two months, and six months) CRT implantation. ECGs were stored for offline analysis. Electrophysiological measurements including Tp-e, JTc and beat-to-beat variability of the QT interval, quantified as STVQT, were done by fiducial segment averaging (FSA).

RESULTS After initiation of BiV pacing we see a significant increase in JTc interval and STVQT compared to baseline. No correlation was seen between the increases in JTc and STVQT. The changes in Tp-e were not significant. After the acute effects of initiation of BiV pacing on repolarization a trend towards baseline values is noticed although baseline values are not reached during the six-month follow up. (Figure 1)

DISCUSSION Biventricular pacing causes alterations in electrophysiological variables that are not fully reversed during follow-up. The uncorrelated increase in both JTc and STVQT suggests that these two parameters contain different electrical information. In the prospective MARC-study (n=250) these findings are further investigated.



* p<0.01. BL and CRT: paired student’s t-test. 2days-2weeks-2months-6months:repeated measurements ANOVA

Figure 1. Electrical ‘reverse’ remodeling