NEW ROTATION PARAMETER, 'TORSION REGIONAL' CAN PREDICT CARDIAC RESYNCHRONIZATION THERAPY: THREE-DIMENTIONAL SPECKLE TRACKING IMAGING ANALYSIS

ACC Moderated Poster Contributions
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Background: Left ventricular (LV) twist can be evaluated using 2-dimensional speckle tracking imaging (2DSTI) as the difference between apical and basal rotation. However, LV motion is not only rotation but also shortening and it is difficult to evaluate whole LV rotational motion by 2DSTI. Thus we hypothesised that 3DSTI can evaluate whole LV rotational dyssynchrony and make a new parameter to predict cardiac resynchronization therapy (CRT) responder.

Methods: We investigated 43 patients: 12 CRT responders, defined as LV end-systolic volume reduction >15% at 6 months after CRT, 14 CRT non-responders and 17 normal controls. Torsion regional (a new parameter of 3DSTI: the meaning is shown in a figure) and rotation were assessed using 3DSTI across 16 segments during CRT-off as own beat and CRT-on. Following parameters were calculated (figure): peak twist, Δ peak twist and torsion delay index. Torsion delay index was considered as the rotational energy lost by dyssynchrony.

Results: Peak twist was significantly improved in responders than non-responders after CRT-on. Torsion delay index, which was calculated using torsion regional, during CRT-off was significantly higher in responders than non-responders, but the data of non-responders and normal controls were similar. Torsion delay index during CRT-off was significantly correlated with Δ peak twist.

Conclusions: Improvement of LV rotational motion by CRT can be predicted by torsion delay index during own beat evaluated by 3DSTI.

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\text{Peak twist} = \frac{\text{rotation average of apical 4 segments} - \text{rotation average of basal 6 segments}}{\text{rotation average of basal 6 segments}}
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\Delta \text{peak twist} = (\text{peak twist during CRT-on} - \text{peak twist during CRT-off})
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\text{Torsion delay index} = \sum \left( \frac{\text{torsion regional}}{\text{rotation regional}} - \frac{\text{torsion regional at end-systolic}}{\text{rotation regional at end-systolic}} \right)
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![Graph showing peak twist and torsion delay index comparisons between responders, non-responders, and normal controls.](image_url)