

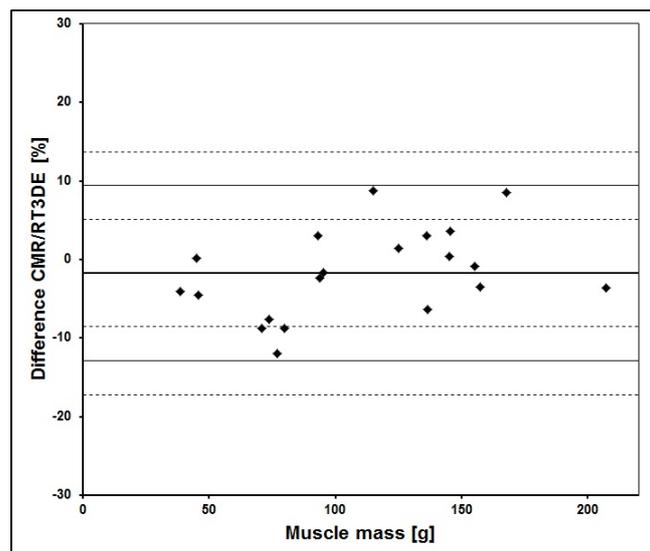
Left ventricular muscle mass in CHD by realtime three dimensional echocardiography: Quick, cheap, precise, reproducible, ready for clinical use

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Introduction: Calculation of muscle mass is one important aspect in the follow up of increased pressure load. Problems of current two dimensional echocardiographic techniques are a lack of precision and bad reproducibility. We tested the hypothesis if realtime three dimensional echocardiography (RT3DE) is far behind the gold standard cardiac magnetic resonance (CMR) concerning calculation of left ventricular muscle mass.

Methods: 20 individuals (5-44ys, 9 f, median 15ys, 10 patients with LV disease) were consecutively investigated by CMR (3T TX Achieva, Philips Healthcare, Cine steady-state free precession technique, TR/TE/flip = 2.7/1.35 ms/40°, slice thickness = 5-6 mm, 25 cardiac phases) and RT3DE (IE 33, X5-1 transducer Philips, 4 subvolumes, resolution 20-24 cardiac phases). Calculation of CMR data was done using the summation of disks method excluding papillary muscles (HDZ MR-Tools software package, HDZ, Bad Oeynhausen, Germany), RT3DE data were processed using 4D LV Analysis 3.1 software (Tomtec, Germany) by two separate expert investigators blinded to each other. For interobserver variability a third investigator was introduced. Statistical analysis by Bland Altman, correlations by Pearson-Bravais.



Results: All data could be evaluated, muscle mass by CMR ranged from 38-204g, mean 110g. RT3DE provided very mild overestimation of $1,7 \pm 5,6\%$ ($r=0,991$) with low intraobserver- ($3,2 \pm 5,5\%$, $r=0,993$) as well as interobserver-variability ($1,1 \pm 5,5\%$, $r=0,994$). Mean calculation time for RT3DE was < 3 minutes.

Conclusions: RT3DE allows quick and precise calculation of left ventricular muscle mass for a wide spectrum of LV size which makes the method an interesting tool for clinical use in patients.