Quantification of Cardiovascular Function by Multi-modality Speckle Tracking

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Technology description

Recently, speckle tracking was introduced as a new method for assessment of myocardial deformation from conventional echocardiographic recordings.1-4 Speckles are natual acoustic makers visible in ultrasound images that can be tracked automatically frame by frame throughout the cardiac cycle. However, due to need of high image quality and the restricted acoustic access to the hear, the speckle tracking method is stil not implemented in the clinic. As a par of our collaboration with Toshiba we are curently validating their new speckle tracking algorithm for 2- and 3-dimensional echocardiography. The algorithm uses pixel patterns from any audio video interleave (A VI) format as speckle markers. Consequently, we hypothesized that the algorithm could also be applied on CT and MR A VI recordings. By using aleady existing CT and MR data we discovered that (1) from tagged MR recordings myocardial deformation of the left and right ventricle can be quantified with higher accuracy and feasibility than with curently available softare; (2) that from cine CT and MR recordings wall motion of areries and all 4 cardiac chambers can be tracked and quantified with high spatial accuracy, and (3) that the distensibilty ofthe femoral and carotid areres can be measured accurately from conventional 2-dimensional echocardiographic recordings. To our knowledge no previous studies have used the semi-automatic speckle tracking algorithm for quantification of cardiovascular wall motion and deformation based on CT or MR recordings or 2-dimensional vascular distensibility by echo cardiography.

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