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2D Speckle Tracking assessment of left ventricular torsion in healthy children and heart transplants

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Introduction: During cardiac cycle the left ventricular (LV) base and apex rotate in opposite directions resulting in a twisting motion. These movements can be assessed by 2D Speckle tracking echocardiography (2DSTE), a new, non-invasive echocardiographic method. Our aim is to study the feasibility and the reproducibility of LV rotation parameters in healthy children (HC) by 2DSTE, describe normal parameters of rotation in HC and compare them with children undergoing heart transplantation (HT).

Methods: 30 HC and 40 HT were included prospectively, all in sinus rhythm, no congenital heart disease nor acute rejection. An iE33 Philips ultrasound system with QLAB software was used. Two observers (X and Y) completed all the measurements: systolic global and endocardial peak rotation at the base and the apex. Torsion was calculated as the difference between base and apex peak rotation.

Results: No significant differences were found among both groups, HC and HT, in relation with gender (67,7% vs 54,8% male), mean age (7,7 vs 9,8 years), mean weight (29,1 vs 32,1kg) or body surface area (0,98 vs 1,05m²). In the HC group mean global and endocardial torsion by observer X were 6,2° and 8,4°; by observer Y 6,1° and 7,8°. For global torsion the Lin's concordance correlation coefficient of absolute agreement was 0.72 and for endocardial torsion 0,74. The Bland-Altman interval of agreement between the two observers mean global measures was -0,13° (95% Agreement Interval: -3,40 to 3,13) and the mean endocardial measures was -0,71° (95% Agreement Interval: -5,48 to 4,06). Mean global torsion is slightly higher but not significantly different in patients undergoing HT than in HC (7,2° vs 6,1° p=0,1), neither is mean endocardial torsion (9,2° vs 8,1° p=0,27).

Conclusions: Measures of LV rotation and torsion by 2DSTE in healthy and heart transplant children is feasible and reproducible with a good inter-observer agreement. Although global and endocardial torsion are higher in heart transplants, no statistically significant differences among both groups.