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New technologies for the study of left ventricular mechanics in pediatric heart transplantation recipients

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Introduction: Recently some studies dealing with assessment of cardiac function by Speckle Tracking Imaging (STI) in heart transplant (HTX) recipients have been published, an integrated assessment of all myocardial properties of deformation is lacking.
Methods: The aim of this study is to perform, by using Speckle Tracking Imaging, an integrated study of LV mechanics (longitudinal, radial, circumferential regional deformation, twist, untwist onset and diastolic function) in HTX recipients with preserved ejection fraction and good clinical conditions (NYHA I). We enrolled 20 HTX subjects without symptoms (NYHA I) and with preserved ejection fraction (HTX group), and 40 normal subjects as control group (CTRL group).
Results : HTX patients were characterized by an early diastolic dysfunction, detectable by an increased value of E/E' ratio (HTX 10,58 +/- 2,94; CTRL 5,3 +/- 1,5; p<0,0001). Compared to control group our HTX recipients showed: a) impaired longitudinal and radial strain values with normal circumferenzial strain values b) LV rotation was preserved at apex and impaired at basal level (bas rot CTRL -7,35 +/- 1,6; HTX = -5.05 +/- 2,89 p < 0.001; ap rot CTRL 6.92° +/- 2.56°; HTX = 9,73 +/- 4,38 p<0,0001) with normal LV twist (CTRL 14,22 +/- 3.4; HTX = 14,78 +/- 5,58; p value not significant); c) delayed untwisting due to prolonged twist (time to peak twist/systolic time: CTRL 80,48 +/- 13,69, HTX 103,45 +/- 18,42 p<0.0001).
Conclusions: Of interest "healthy" HTX patients, even in presence of widespread impairment of regional myocardial deformation, normal apical rotation, which account for normal amplitude of twist and in turn global ejection fraction.
In addition delayed untwisting (after aortic valve closure) due to prolonged twist could be responsible of an early impaired LV diastolic filling.