



Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

EFFECT OF ROTATION ON MYOCARDIAL STRAIN DETERMINATION USING REAL-TIME THREE-DIMENSIONAL ECHOCARDIOGRAPHY

Poster Contributions

Poster Hall B1

Sunday, March 15, 2015, 9:45 a.m.-10:30 a.m.

Session Title: Non Invasive Imaging: Strain Imaging by Echocardiography

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Background: A better understanding of the mechanics of the heart can be provided with the analyses of cardiac rotation and its effects on cardiac function. Previous studies have implied an impact of rotation on strain, but the relationship has not been reported. This study was designed to evaluate the effect of rotation on strain using the three-dimensional echocardiography (3DE).

Methods: Six porcine hearts were studied. A balloon was sutured into the left ventricle through the mitral annulus and connected with a pulsatile pump. The hearts were pumped at varying rotation degrees (0, 5, 10, 15, 20). A constant compaction of 10 mm and stroke volume of 50 mL were maintained throughout the experiment to simulate physiological cardiac motion. The heart model and a Toshiba PST-25SX Transducer were submerged in a torsion tank for imaging acquisition. At each rotation degree, two full-volume loops were acquired and then analyzed using the Toshiba UltraExtend Advanced Cardiology Package.

Results: With increasing rotation degrees, 3DE-derived global circumferential strain, radial strain and general 3D strain were increased ($P < 0.05$). ANOVA analyses among varying degrees of rotation indicate a significant effect on circumferential, radial, and 3D strain ($P < 0.05$).

Conclusion: 3DE is feasible to detect the effect of rotation on strain. Greater rotation degrees yielded greater strain values.

