LEFT VENTRICAL MECHANICS IN HEALTHY DOGS AND IN DOGS WITH TACHYCARDIA-INDUCED DILATED CARDIOMYOPATHY

Poster Contributions
Poster Sessions, Expo North
Sunday, March 10, 2013, 9:45 a.m.-10:30 a.m.

Session Title: Imaging: Echo IX
Abstract Category: 18. Imaging: Echo
Presentation Number: 1227-342

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Background: Strains are a measure 3 dimensional deformations of left ventricular (LV) contraction. To our knowledge, no previous study described these 3 dimensional deformations in conscious dogs with tachycardia-induced cardiomyopathy (TIC). We hypothesized that cardiomyopathy would alter LV mechanics, and this hypothesis was tested by studying conscious dog before and after the development of TIC.

Methods: A total of 25 adult mongrel conscious dogs were trained to lie down calmly for echocardiography. Seven dogs were randomly selected, we implanted with pacing system for TIC induction. We measured LV geometry and function, strains, and torsion before and after the development of TIC.

Results: In 25 normal dogs, all three types of normal strains significantly increase from base to apex (p <0.05), while a definite and recognizable twist can be measured due to presence of shear strain. In 7 dogs, with TIC marked changes LV mechanics occur throughout the cardiac cycle, resulting in decrease of linear strain (p <0.001), twist (p <0.05), and negative peak twisting rate (p <0.05). Interestingly, the relative decrease of strain during TIC was more profound in the apex (p <0.001), with the radial strain decreasing the most (p <0.05) (Figure).

Conclusions: TIC is accompanied by decreased systolic LV strain and twist deformation and loss of early diastolic recoil, which may associated with LV dysfunction by impaired transmural myocardial function and impairing diastolic filling.