LEFT ATRIAL FUNCTION DETERMINED BY 2-DIMENSIONAL SPECKLE TRACKING ECHOCARDIOGRAPHY IDENTIFIES DOGS WITH CONGESTIVE HEART FAILURE SECONDARY TO MITRAL VALVE DISEASE

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Left atrial (LA) function (consisting of 3 phases: reservoir, conduit and booster pump) can be evaluated by speckle tracking echocardiography (STE) which measures myofiber deformation during these phases. Recent studies in humans have evaluated the utility of STE in assessing left atrial deformation/function. We evaluated the deformation of the LA by STE in healthy dogs and in dogs with myxomatous mitral valve disease (MMVD).

We acquired 2D echocardiographic cineloops from the left apical 4-chamber view optimized for the LA, and analyzed atrial longitudinal strain (St) and strain rate (SR) in 27 dogs (10 healthy dogs and 17 dogs with MMVD - 5 ACVIM Stage B1, 5 Stage B2 and 7 Stage C). Endocardial LA STE curves were obtained and peak atrial longitudinal strain (PALS), peak atrial contraction strain (PACS), conduit atrial longitudinal strain (CALS); PALS-PACS) and contraction strain index (CSI - PACS/PALS*100) were calculated. LA SR curves were similarly obtained to determine the peak positive strain rate (SRs) during left ventricle systole, the first negative peak strain rate (SRe) during early diastole and the second negative peak strain rate (SRa) during atrial contraction. For all variables, a mean of 3 measures was used for the statistical analysis. We compared each of these variables between each ACVIM stage by Kruskal-Wallis tests and post-hoc pairwise comparisons, with comparison-wise $\alpha=0.05$.

Normal dogs had higher PALS and CALS than dogs with MMVD ($p<0.0001$ and $p=0.0005$); Stage C dogs had lower PALS, PACS and CALS than all other dogs ($p<0.0001$, $p=0.0022$ and $p=0.0005$), but CSI did not differ between groups ($p=0.1$). Stage C dogs had lower SRs ($p=0.0005$), higher SRe ($p=0.0029$) and SRa ($p=0.0004$) than other dogs. Normal dogs had lower SRe and SRa than dogs with MMVD ($p<0.001$).

Our data suggest that STE might be useful in assessing LA function in dogs with MMVD, and might potentially differentiate dogs with severe subclinical disease from dogs with congestive heart failure.

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