INCREASED LEFT HEART SIZE PREDICTS RISK OF CONGESTIVE HEART FAILURE IN CAVALIER KING CHARLES SPANIELS WITH MITRAL REGURGITATION CAUSED BY MYXOMATOUS VALVE DISEASE

S Eriksson-Palojarvi[1], K. Hansson[2], H. Duelund Pedersen[3], J. Haukka[1], J. Häggström[2]
[1]University of Helsinki, HELSINKI, Finland
[2]Swedish University of Agricultural Sciences, UPPSALA, Sweden
[3]Novo Nordisk, Denmark

Mitral regurgitation (MR) progresses slowly, but dogs living long enough often develop congestive heart failure (CHF). However, tools to predict onset of CHF are sparse.
225 echocardiographic examinations in 78 dogs were performed in a longitudinal, multicenter study with a surveillance time of up to 4.5 years. Client-owned dogswere enrolled at the University Hospitals in Finland, Sweden and Denmark (subset to the SVEP study).
Left ventricular end diastolic (LVIDd) and systolic (LVIDs) diameters, fractional shortening (FS), left atrial (LA) and aortic root (Ao) diameters were estimated. Values were normalized for body size (nLVIDd, nLVIDs, and nLA, respectively) and, for comparison, ratios to aortic root were calculated (LVIDd/Ao, LVIDs/Ao and LA/Ao, respectively).
A Cox's proportional hazard analysis with a counting process approach was used. Spline smoothed graphical models were constructed to evaluate linearity of hazards. Curves were then used to find cut-off values for interval hazard ratios (HRs).
The HR for nLVIDd, nLVIDs and nLA (per 0.1 unit, 95% confidence intervals), were 1.5 (*1.32-1.70, p=0.00034*), 1.3 (1.05-1.62, p=0.016), and 1.5 (1.28-1.83, p=0.0039), respectively. The HRs for LVIDd/Ao, LVIDs/Ao and LA/Ao (0.1 unit increase) were 1.3 (1.14-1.55, p=0.0025), 1.1 (0.99-1.32, p=0.07), and 1.4 (1.24-1.66, p=0.0041), respectively. The HR for FS was 1.1 (1.05-1.19, p=0.00037).
The relative hazard plot presented a steep increase for FS values above 31%. HRs for intervals 31<36%, 36<40%, and ≥40% were 1.0 (0.2-5.1, p=0.99), 4.8 (1.2-18.4, p=0.023), and 9.1 (2.4-33.7, p=0.00098), respectively. The HR for nLVIDd increased linearly. HRs for intervals 1.73<1.86, 1.86<1.92, 1.92<2.1 and ≥2.1 were 0.7 (0.1-6.6, p=0.7), 6.0 (1.3-26.7, p=0.02), 6.8 (1.9-25.1, p=0.0037), and 12.5 (3.8-40.1, p=0.00088), respectively. In contrast, the hazard for nLVIDs remained stable until 1.4, whereafter it increased. The HRs for nLVIDs (1<1.33, 1.33<1.68, 1.68<1.86 and ≥1.86) were 1.6 (0.6-4.6, p=0.35), 3.4 (1.0-11.5, p=0.048), 78 (9.6-634, p=0.030), and 47.6 (7.1-316, p=0.044), respectively. HRs for values normalized to Ao diameter behaved in a parallel way.
We conclude that FS, left ventricular and atrial size may be used to predict CHF. However, because the value of a HR is dependent on the unit used and, more essentially, does not account for nonlinear change in hazard, interpretation of hazards is challenging. In contrast, interval hazards are only dependent on the reference interval used. Therefore they are easier to implement in every day clinical work.

Conflicts of interest: No conflicts of interest reported