Occurrence of Hypertrophic Cardiomyopathy in a Large Cohort of British Shorthair Cats
Granström, Sara Magdalena Rebecca; Godiksen, Mia Titine Nyberg; Christiansen, M.; Willesen, Jakob; Koch, Jørgen

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## Research Abstract Program of the 2010 ACVIM Forum

Anaheim, California,  
June 9 – 12, 2010  
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hounds (47 ± 42 m; min = 400 m; max = 556 m; 95%CI 459–498). In conclusion, regardless of anatomical differences between Poodles and Dachshunds, they walk similar distances. Based on a previously obtained equation (Distance = 55.3 ± 8.3 TC + 0.9 L + 2.1 RH), predicted distances were overestimated for Labradors and Dachshunds, demonstrating that standardization is required for different breeds.

Regular physical activity has been widely used in human cardiovascular therapy, promoting better autonomic control, heart function, life quality and decreasing sudden death risks. In dogs, however, there is not a standardized guideline to be used. This research has the goals of evaluating the effects of standardized treadmill training over the autonomic and hemodynamic functions of healthy dogs.

Six dogs (4 Beagles; 2 mixed breed), with mean weight of 13.1 Kg, were enrolled in this study. Twenty-four hour time domain heart rate variability (HRV), and echocardiography were analyzed before and after four weeks, five days a week, 40 minutes a day training. The intensity of training was individually determined by a maximal heart rate (MHR), observed in a maximal progressive effort test. Gradually, the intensity of training was increased in 50% of MHR, in the first week, to 60%, 70% and 80% of MHR in the second, third and fourth weeks, respectively. The paired t test was used to compare data before and after training. The improvement in functional capacity of the dogs was attested by a better performance on the physical test after training, achieving higher levels of intensity (9.0 km/h to 11.1 km/h; p < 0.0155) and decreasing the area under the curve of lactate (31.2 to 26.0; p < 0.0001). Increase in parasympathetic tone on HRV was verified by SDANN (155.5 ± 11.5 ms; p = 0.0059), rMSSD (115.3 ± 50.4 ms to 181 ± 51.9 ms; p = 0.0118), amplitude of heart rate (188.5 ± 21.9 bpm to 200.3 ± 17.5 bpm; p = 0.0033), and by a higher percentage of respiratory sinus arrhythmia on a maximal progressive effort test (> 50% until 2 km/h before training and 8 km/h after training). On the hemodynamic aspect, training lead to increase diastolic interventricular septum thickness (0.78 ± 0.12 cm to 0.91 ± 0.16 cm; p = 0.0294), decrease left atrial diameter (2.37 ± 0.22 cm to 2.15 ± 0.19 cm; p = 0.0349), left ventricular end-diastolic (4.47 ± 0.80 to 3.82 ± 0.62; p = 0.0068), and end-systolic (2.27 ± 0.39 to 1.88 ± 0.50; p = 0.0104) wall stress indexes, suggesting preload and afterload reduction. Improvement of diastolic function was confirmed by mitral E/A waves (1.42 ± 0.19 to 1.83 ± 0.46; p = 0.0467). No differences (p > 0.05) were detected on systolic function (EF%), SF%, left and right ejection time, left pre-ejection time, ejection in- dex, and mean velocity of circumferential fibers shortening, left ventricular end-systolic and end-diastolic volume indexes, and on Tei index of myocardial performance. As observed in a human being, training results in better autonomic and hemodynamic control in healthy dogs. In a near future we expect that this therapeutic modality could be helpful for cardiovascular improvement in the canine species.

**ABSTRACT #185**

**EFFECTS OF TREADMILL TRAINING OVER AUTONOMIC AND HEMODYNAMIC FUNCTIONS IN HEALTHY DOGS.**

JPF Pascon, D Paulino-Junior, E Zacchê, FN Gava, EMG Ortiz, AA Camacho. College of Agricultural and Veterinary Sciences, São Paulo State University, Campus of Jaboticabal, Brazil.

**ABSTRACT #187**

**OCCURRENCE OF HYPTERTOPHIC CARDIOMYOPATHY IN A LARGE COHORT OF BRITISH SHORTHAIR CATS.**

Granström1, M Nyberg Godiksen2, M Christiansen3, JL Willesen3, J Koch1. 1Department of Small Animal Clinical Sciences, University of Copenhagen, Denmark. 2Department of Clinical Biochemistry and Immunology, Statens Serum Institut, Copenhagen, Denmark.

Familial hypertrophic cardiomyopathy (HCM) has previously been described in British Shorthair cats (BSH), but until now, no reports have been published on how prevalent the disease is within this breed. The aim of this study was to assess the occurrence of HCM in a large cohort of BSH and to evaluate the effect of gender, weight and age as potential risk factors to presence of the disease.

The study was conducted as a prospective study including all BSH presented at the Small Animal Hospital for HCM screening in the period of April 2006–August 2009. All cats were examined by the same two trained ultrasonographers using a Vivid 7 ultrasono- graphic system (GE Medical) with a 10 S phased array transducer (8–10 MHz). Measurements of the left ventricle were obtained by conventional 2D- and M-mode imaging of right parasternal long and short axis views. Diagnosis of HCM was based on an overall assessment of echocardiographic findings, but cats were classified as to have a concentric hypertrophy if the interventricular septum (IVS) and/or left ventricular free wall (LVFW) measured > 5.5 mm in diastole. To rule out other causes of left ventricular concentric hypertrophy, a complete blood count, biochemical profile, thyroid level and blood pressure were measured in affected cats. In the statistical analyses occurrence of HCM was expressed as a percentage and age, weight and echocardiographic variables were presented as mean (standard deviation). A logistic regression analysis was used to test the effect of gender, weight and age on HCM as outcome and a p-value of < 0.05 was considered significant.

A total of 282 cats were examined, 189 (67.0%) females and 93 (33.0%) males. The average age of the cohort was 40 (± 29) months and the average weight was 4.5 (± 1.1) kg. Twenty-three cats (8.2%) were classified as HCM positive, 14 (4.9%) as equivocal and 242 (85.8%) as HCM negative. Three cats (1.1%) were diagnosed with other heart disease and excluded from further analysis. The average diastolic wall thickness of the IVS and LVFW in the HCM affected cats were 7.0 (± 1.2) mm and 7.1 (± 2.4) mm, respectively. In the HCM negative group the corresponding measurements were 3.9 (± 0.5) mm and 3.8 (± 0.5) mm. Male cats had a significantly higher occurrence of HCM (20.4%) compared with the females (2.1%) (p < 0.001). No effect of weight and age on presence of HCM could be identified. Eighteen of the HCM positive cats had diffuse, symmetric hypertrophic changes of the entire left ventricle, whereas 5 had an asymmetric or regional hypertrophy of the left ventricle myocardium.

The conclusion of this study is that the BSH in our cohort had a high occurrence of HCM. Most affected cats presented with pronounced, diffuse hypertrophic changes affecting the IVS, LVFW and papillary muscles. As in many other breeds, male gender predisposed to development of the disease.

**ABSTRACT #186**

**EFFECTS OF RUNNING ON THE RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM IN DOGS.**

M Mizuno, M Uechi, Y Izoue, S Kurilaha, Y Kamiyama. Nihoin University, Kanagawa, Japan.

Exercise and stress are important factors in the development of congestive heart failure. The present study evaluates the influence of exercise upon circulatory function and the renin-angiotensin-aldosterone system (RAAS) in healthy dogs. A placebo or benazepril hydrochloride was administered to four dogs and then heart rate and blood pressure were measured every 5 minutes for 30 minutes. Plasma renin activity, angiotensin-converting enzyme (ACE), angiotensin II (Ang II), aldosterone, adrenaline, noradrenaline and urinary aldosterone were measured in the dogs before and after running on a treadmill at 7 km/h for 10 minutes. Benazepril hydrochloride significantly (P < 0.05) decreased ACE (0.9 ± 1.0 U/l) and aldosterone (21.1 ± 16.1 pg/ml) compared with the placebo (Ang II: 1.5 ± 1.5 U/l, 42.9 ± 29.8 pg/ml). Plasma renin activity, Ang II, aldosterone and adrenaline levels increased during exercise. Heart rate and blood pressure significantly (P < 0.05) increased with both placebo and benazepril hydrochloride during exercise and heart rate and blood pressure did not significantly differ between the two groups. These results suggest that the increase in heart rate and blood pressure during exercise is related to activation of the RAAS and other heart disease.