



THE WINN FELINE FOUNDATION

For the Health and Well-Being of All Cats

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Investigation of the Mechanism of Glucocorticoid-Associated Congestive Heart Failure in Cats.

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Congestive heart failure (CHF) is characterized by congestion within the blood vessels of the lungs due to impaired heart function. This may be due to pressure or volume overload, heart failure, or increased stiffness in the walls of the heart due to many factors, including administration of certain medications. Recently, CHF associated with the administration of corticosteroids has been reported in cats and humans. The University of Minnesota's Department of Veterinary Clinical Sciences investigated whether corticosteroid administration may lead to congestive heart failure in cats.

Nine domestic shorthairs, one domestic medium hair, one Persian, and one Siamese with skin disorders were treated with doses of methylprednisolone acetate (MPA). MPA is commonly used to treat a variety of conditions in cats. They were then examined at two time points following the administration of the MPA, -- at 3-6 days and at 16-24 days. This included a physical examination, blood pressure measurement, heart rate, weight, blood studies, chest x-ray, an echocardiogram, and total body water determination.

The study had originally been planned for 15 cats, but after 12 cats had been studied the statistical analyses showed some clear results, so the study was curtailed.

Based on observation by the owners and clinical review of the participating cats, no adverse clinical effects were caused by the MPA administration.

Blood pressure and heart rate showed no significant changes. While body weight showed a slight decrease at the first return visit, it returned to baseline within 16-24 days. Similarly, an initial change in blood values (elevated serum glucose level and decreased hematocrit, red blood cell count, hemoglobin concentration, and serum concentrations of sodium and chloride) returned to normal levels at 16-24 days. The chest x-rays and Doppler echocardiography showed no changes over the course of the study. M-mode echocardiography disclosed a small increase in septal heart wall thickness in diastole 16-24 days after MPA administration.

Total body water was very difficult to study in conscious cats, but in the seven (out of the 12) cats studied, a statistically significant drop was noted at 3-6 days, but had returned to baseline by 16-24 days.

Results of this study suggest that MPA administration may predispose certain at-risk cats to CHF via plasma volume expansion caused by extracellular hyperglycemia with a shift of fluid from the intra- to extra-cellular space. The increase in heart wall thickness in diastole at 16-24 days following MPA administration was small and probably clinically unimportant but warrants further investigation. Despite a substantial increase in plasma volume in some of the study cats, CHF did not occur presumably because normal compensatory mechanisms accommodate the changes in body fluid distribution. However, cardiovascular disorders that impair these compensatory mechanisms could predispose cats to developing CHF following MPA administration

For more information:

Ployngam, T., A. H. Tobias, et al. (2006). Hemodynamic effects of methylprednisolone acetate administration in cats. *Am J Vet Res* **67**(4): 583-7.