Biomarkers of Congestive Heart Failure

In congestive heart failure (CHF), increased activity of the adrenergic system, overexpression of atrial and brain natriuretic peptides (ANP and BNP), activation of the renin-angiotensin-aldosterone system, and increased synthesis and release of endothelin (ET) have been observed. In humans, plasma concentrations of ANP and BNP and their N-terminal propeptides have been shown to have prognostic value. Most commercial kits used for veterinary patients are designed for human use, but there is reason to believe some crossreactivity exists among mammalian species. In this study, 8 immunoassays for cardiac biomarkers were assessed for accuracy and reproducibility in dogs. Plasma samples from 27 healthy dogs and 3 dogs with CHF were used, and assay validation was performed in a 2-step process. Preliminary validation included determination of intraassay variability and dilutional parallelism. Kits showing good results in the preliminary validation were further validated by determining precision, linearity, and accuracy. Performance was found to differ considerably among the assays. Based on study results, 4 of the 8 assays (proANP, BNP_Phe, ET-1IBL, and Big-ET-1IBL) were found to be precise, reproducible, linear, and accurate and could thus be recommended for use in dogs.

COMMENTARY: The use of biomarkers to diagnose cardiac disease in veterinary medicine has garnered tremendous interest over the past 5 to 10 years. Some of these markers have promise to help differentiate dyspnea caused by CHF from noncardiac causes in dogs. However, while they provide supportive evidence of CHF, the definitive diagnosis cannot be made based on the results of these biomarkers alone. The use of BNP in cats may be more reliable in this manner. This article does not try to answer the clinical question of how reliable these assays are in diagnosing CHF. Instead, it focuses on whether these markers are accurately measured by some commercially available assays. Based on the results, most assays evaluated performed fairly well under what would be considered normal clinical conditions.

—Dan Hogan, DVM, Diplomate ACVIM (Cardiology)


High-Protein with High-Fiber vs Canine Obesity

Based on evidence that protein and fiber in food can influence satiety, a study was designed to assess their effect, alone or in conjunction, on diet in dogs. Diets were formulated containing 1) high protein and high fiber (HPHF), 2) high protein and moderate fiber (HP), and 3) moderate protein and high fiber (HF) and were evaluated for voluntary food intake as measured by energy consumption. Associated studies measured 1) voluntary intake during the first meal of the day, 2) short-term satiety when repeated exposure to food occurred during a 3-hour period, 3) medium-term satiety over a period of 3 hours, 4) long-term satiety over a period of 7 hours, and 5) satiety effect after an energy-restricted meal. During the short- and medium-term studies, the HPHF diet showed the greatest reduction in voluntary energy intake, suggesting a potential for greater compliance in weight-loss programs. None of the diets had a significant effect on intake in the long-term study, so reducing the number of hours between meals by splitting the daily ration over a number of meals may be necessary to increase compliance with a weight-reducing diet. The HPHF diet also had a satiating effect when fed at an energy-restricted level but whether it lessens when a restricted diet is fed continually is not known. However, the favorable satiety characteristics of the HPHF diet suggest it would likely perform better than diets formulated as high in protein or fiber alone.

COMMENTARY: The HPHF diet in this study strikes a unique balance between palatability and ability to satisfy an animal’s desire to eat, at least in the short term. When given a choice of 2 diets, there was no preference between the HPHF and the HP diet, but both were strongly preferred over HF. However, when a single diet was offered as a morning meal, dogs voluntarily consumed significantly fewer calories when fed HPHF vs HP. Further, desire for more food was suppressed at least several hours when fed HPHF, an effect lost with twice-daily feeding. However, because the 3 commercial diets tested were manufactured by 2 companies, protein and fiber contents are difficult to compare across diets (eg, the fiber content of HPHF is much lower than in HF). Also, the diets notably varied in fat, nitrogen-free extract (carbohydrate), and calorie content as well as in major ingredients and types of fiber. Regardless, from a practitioner’s perspective, the results may be compelling. Compliance issues (eg, extra treats, dogs stealing food) can be a major hindrance to successful weight loss. While further investigation is warranted, this study suggests that even a short-term effect on satiety may offer a potential advantage in the war on canine obesity.

—David A. Dzanis, DVM, PhD, Diplomate ACVIM