

Abstract

Background: The non-osmotic release of antidiuretic hormone (ADH) caused by poor cardiac output contributes to refractory congestive heart failure (CHF) through excessive free water retention. Identification of those CHF dogs with excessive free water retention is an important first step for identification of patients who might benefit from targeted therapy to antagonize ADH. Relative free water retention in CHF is expected to lower plasma osmolarity and increase the gap between measured serum chloride concentration ([Cl⁻]) and mathematically corrected [Cl⁻].

Statement of Purpose: To determine if serum osmolarity is lower in dogs with refractory CHF (ACVIM Stage D) compared to dogs with controlled CHF (ACVIM Stage C) and dogs with heart disease but without CHF (ACVIM Stage B), and to determine if serum osmolarity is correlated with the degree of [Cl⁻] correction.

Hypothesis: Dogs with Stage D CHF will have lower serum osmolarity than dogs with Stage B and C CHF, and serum osmolarity will be indirectly correlated with the degree of mathematical [Cl⁻] correction.

Specific Aims (Objectives):

Aim #1: To measure the osmolarity of serum from dogs with all stages of heart disease using the freezing point depression method.

Aim #2: To compare serum osmolarity between dogs with ACVIM B, C, and D Stages of heart disease.

Aim #3: To correlate serum osmolarity and the degree of mathematical [Cl⁻] correction in dogs with all stages of heart disease.

Student role: The student will be responsible for the following aspects of this study. Faculty oversight and guidance will be provided at all steps.

1. The student will peruse Cornerstone and the Cardiology appointment board daily for a 7-week period to identify dogs with heart disease who have had serum submitted to the Clinical Pathology Laboratory for a comprehensive renal panel. The student will collect residual serum samples from the lab either at the end of the day or the day after submission.

2. The student will measure serum osmolarity using Dr. Harris's laboratory freezing point osmometer (Precision Systems INC).

3. The student will record salient features for each patient, including signalment, medications and dosages, underlying disease and presence/absence of active CHF. The student will learn how to stage the heart disease of dogs using the ACVIM guidelines.

4. The student will collate data in an excel spreadsheet and participate in statistical analysis with the guidance of the faculty mentors. Manuscript preparation and presentation of study findings is expected as per program requirements.