University of Prince Edward Island

Faculty of Veterinary Medicine
Summary of Dissertation

Submitted in Partial Fulfilment
of the Requirements for the

DEGREE OF MASTER OF SCIENCE
Andrea Del Mar Plá Gutierrez

Supervisory Committee

Dr. Etienne Côté
Dr. Lynne O'Sullivan
Dr. Sandra McConkey
Dr. Katie Hoddinott
Posthumous: Dr. Sheri Ross

Examination Committee

Dr. Katie Hoddinott, chair
Dr. Etienne Côté
Dr. Lynne O'Sullivan
Dr. Sunny Hartwig
Dr. Emilia Bourassi

Investigation of empagliflozin for the treatment of canine dilated cardiomyopathy

Sodium glucose cotransporter 2 (SGLT2) inhibitors are an emerging medication used in the treatment of human heart failure. While there are abundant clinical trials in human medicine, there are no published data on the use of SGLT2i in naturally occurring canine heart disease. This study aimed to determine if the SGLT2i empagliflozin produces (1) measurable clinical effects in a 0.3 mg/kg oral single-dose trial, and (2) if a double-blind placebo-controlled clinical trial of 0.3 mg/kg oral empagliflozin once daily in dogs with dilated cardiomyopathy (DCM) produces significant differences in echocardiographic parameters and cardiac biomarkers compared to placebo.

In the single-dose trial, six healthy adult dogs were administered a single 10 mg tablet of empagliflozin. Blood and urine samples were collected at 0h, 6h, 12h, 24h, 48h, and 72h for measurement of urine glucose, plasma empagliflozin, and serum ß-hydroxybutyrate (ß-HA) concentrations. Oral empagliflozin at 0.28-0.45 mg/kg produced measurable changes in urine glucose and plasma empagliflozin concentrations. One dog experienced a single episode of diarrhea.

In the clinical trial, eight adult dogs with a diagnosis of DCM were studied. A baseline echocardiographic assessment and measurement of cTnl, NT-ProBNP, ß-HA, urine glucose, and galectin-3 concentrations were performed. Dogs were randomly assigned to either placebo or empagliflozin 0.3 mg/kg once daily for 30 days, before re-evaluation with the same echocardiographic and clinicopathologic tests. Oral empagliflozin at 0.31-0.48 mg/kg produced measurable

changes in urine glucose and ß-HA concentrations but did not produce significant changes in echocardiographic parameters or cardiac biomarkers. Two dogs developed either self-limiting or chronic diarrhea after administration of empagliflozin.

Conclusions: 0.28-0.48 mg/kg of oral empagliflozin produced measurable glucosuria, indicating inhibition of SGLT2, but failed to produce significant improvements in dogs with DCM. The occurrence of diarrhea in several dogs raises concern that empagliflozin is less SGLT2 selective in dogs compared to humans.

Presentations

ACVIM 2024: Effects of Oral Single-Dose Empagliflozin on Urinary Glucose and Serum B-Hydroxybutyrate Concentrations in Healthy Adult Dogs.

Biographical Data

Born in Boston, MA.
Raised in Phoenix, AZ

Awards

National Hispanic Merit Scholar
Lily Ireland Scholarship
Gizmo Latimer Memorial Scholarship in Cardiology
Myra Scholarships for AVC Residency Students
Alice Peake Bissett Residency in Companion Animals Scholarship