DECREASED GLOMERULAR FILTRATION RATE ESTIMATED BY SCINTIGRAPHY IS CORRELATED WITH CLASSICAL AND NOVEL RENAL BIOMARKERS IN ADVANCED STAGES OF CANINE LEISHMANIASIS

González MA, Jiménez J, Barrera R, Macías-García B, Cristóbal JI, Nicolás P, Durán A, García AB, Duque FJ
Animal Medicine Department, University of Extremadura, Cáceres, Extremadura, Spain.

Abstract

Traditional renal biomarkers are correlated with glomerular filtration rate, but these are altered late, necessitating the use of earlier biomarkers. These new biomarkers must also correlate renal filtration for a correct diagnosis and monitoring of kidney disease in patients with canine leishmaniosis.

Introduction

In canine leishmaniosis (CL) patients affected eventually develop glomerulo-nephritis. Its is not fully understood, but it is due in large part to the deposition of immune complexes, which compromise kidney function.

Determination of glomerular filtration rate by scintigraphy (GFRs) is a highly precise method but is not generally available. Traditionally, plasmatic creatinine and urea have been used to estimate renal function, but they present major limitations. Recently, new biomarkers as plasmatic Cystatin C (CysC) and serum symmetric dimethylarginine (SDMA) have been demonstrated to provide proper monitoring of chronic kidney disease (CKD) (Figure 1). These have an adequate correlation with the GFRs, but this has not been studied in CL. Our objective is to analyze the correlation between the novel and classic renal biomarkers with GFRs in CL.

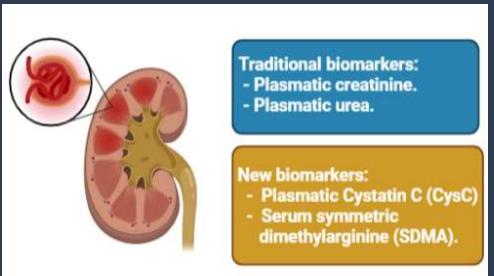

Figure 1. Representation of traditional and new renal biomarkers studied. Performed with BioRender software.

Methodology

Fourteen dogs among 1-10 years (with CL classified in III and IV Leishvet stages were included.

Hematology, biochemistry with plasmatic urea and creatinine, and urinalysis were performed. ELISA was used to diagnose CL. CysC was measured by turbidimetric latex assay (Spinreact®,Spain) and SDMA was analyzed using a commercial kit (IDDEX®,U.S.A.).

Determination of global glomerular filtration rate (GFR) was performed by renal scintigraphy and 99mTc-Diethylenetriaminepentaacetic acid was the radiopharmaceutical used (Image 1).

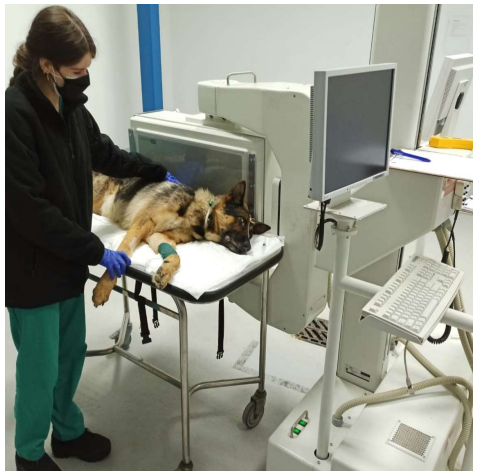

Image 1. Preparation of a five years old patient before scintigraphy.

Results

Pearson correlation test was used for statistical analysis. Results showed significant and positive correlations ($p<0.01$) between all renal biomarkers.

When thet were compared with GFR (ml/min/kg), they presented negative correlations. Their correlation coefficients were -0,77 for urea and creatinine (mg/dl), -0,76 for SDMA (µg/dl) and -0,70 for CysC (mg/l).

Conclusion

Strong negative correlations were found between all biomarkers studied (plasmatic urea and creatinine, plasmatic cystatin C and serum symmetric dimethylarginine) with GFRs.

Hence, our study suggests that the novel biomarkers, SDMA and CysC, properly reflect GFR. This makes them a great and potent tools for monitoring the state and progression of CKD in CL.

Acknowledgements

We want to thank the Veterinary Hospital of the University of Extremadura, as well as to each and every one of our patients and their families for their collaboration.