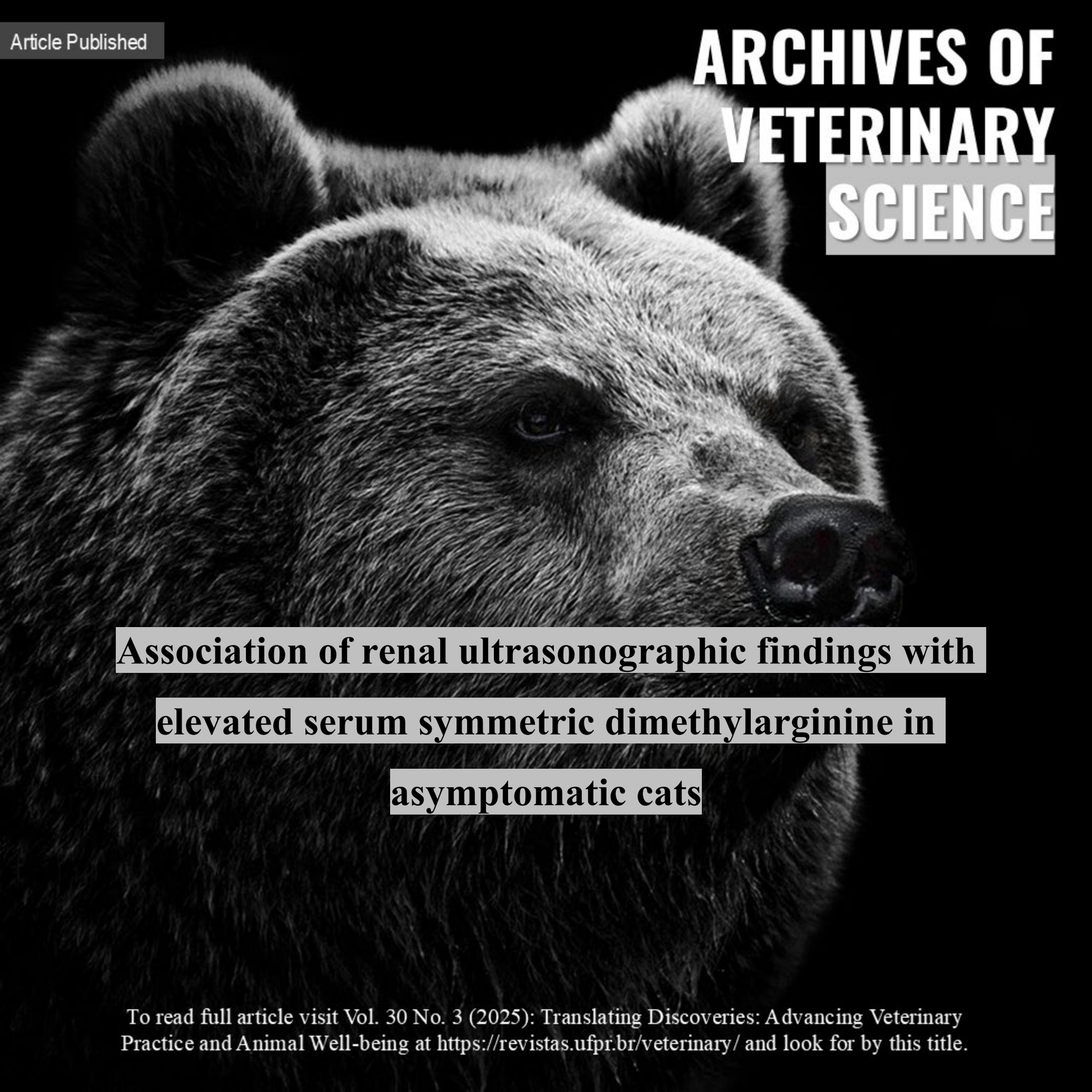
Article Published

ARCHIVES OF VETERINARY SCIENCE



Association of renal ultrasonographic findings with elevated serum symmetric dimethylarginine in asymptomatic cats

To read full article visit Vol. 30 No. 3 (2025): Translating Discoveries: Advancing Veterinary Practice and Animal Well-being at https://revistas.ufpr.br/veterinary/ and look for by this title.

Association of renal ultrasonographic findings with elevated serum symmetric dimethylarginine in asymptomatic cats

Rafaelle Cristine Dea Gerez
Fabiana Rodrigues de Freitas
Rosangela Locatelli Dittrich
Camila Marinelli Martins
Tilde Rodrigues Froes

https://doi.org/10.5380/avs.v30i3.99733

UFPR
UNIVERSIDADE FEDERAL DO PARANÁ

PPGCV
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS VETERINÁRIAS·UFPR

50 anos
Setor de Ciências Agrárias
Universidade Federal do Paraná
1973 - 2023

ARTICLES
Archives of Veterinary Science
UFPR
https://www.ufpr.br/

Association of renal ultrasonographic findings with elevated serum symmetric dimethylarginine in asymptomatic cats

Submitted: *21/05/2025*
Accepted: *29/07/2025*

*Rafaelle Cristine Dea Gerez[1], Fabiana Rodrigues de Freitas[2], Rosangela Locatelli Dittrich[3], Camila Marinelli Martins[4], Tilde Rodrigues Froes[5]**

[1]*Veterinary Medicine Department / Federal University of Paraná, Curitiba, Paraná, Brazil ORCID: 0000-0002-9468-3978*
[2] *ORCID: 0000-0002-3905-3949*
[3] *ORCID: 0000-0001-5144-6422*
[4]*AACT Research Consulting Ltd., Curitiba, PR, Brazil ORCID: 0000-0002-8425-5769*
[5] *ORCID: 0000-0002-7802-2598*

***Author for Corresponding**: Tilde Rodrigues Froes – tilde@ufpr.br

Abstract: This study aimed to compare renal ultrasonographic findings with serum symmetric dimethylarginine (sSDMA) in asymptomatic cats. A prospective blinded study evaluated qualitative and quantitative ultrasound parameters in 101 cats without clinical signs of chronic kidney disease (CKD). Cats were grouped based on sSDMA levels: normal (≤14 µg/dL) or elevated (>14 µg/dL). Ultrasonographic abnormalities were scored (1–10) for statistical comparison. Of the 101 cats, 86 (85.15%) had normal sSDMA, while 15 (14.85%) exhibited elevated levels. Cats with increased sSDMA were more likely to show reduced corticomedullary differentiation (p=0.029), pelvic dilation (p=0.036), and ureteral calculi (p=0.04). A positive correlation was found between sSDMA and corticomedullary loss, whereas renal length showed a negative correlation with sSDMA. The overall correlation between sSDMA and ultrasonographic score was weak (r = 0.190, p = 0.057). Ultrasonographic variability was greater in cats with elevated sSDMA. In conclusion, asymptomatic cats with reduced corticomedullary differentiation, pelvic dilation, or smaller kidneys on ultrasound are more likely to have elevated sSDMA, suggesting early renal changes. These findings highlight the potential role of ultrasonography alongside sSDMA in detecting subclinical kidney disease in cats.
Keywords: CKD, feline, ultrasound, kidney, SDMA.

1. Introduction

Chronic kidney disease (CKD) is a common disorder in geriatric cats (Lulich et al., 2017). Although it can occur at any age, the prevalence of CKD in the general feline population is reported to be approximately 0.5 to 1.5% (Polzin et al., 2011). CKD may be the result of incomplete recovery from single or multiple injuries to one or both kidneys (Cowgill et al., 2016), which can cause irreversible and progressive structural and functional impairment (Polzin, 2011; Bartges, 2010).

Early diagnosis and supportive treatment may slow disease progression (Debruyn et al., 2013), but management requires a combination of laboratory and imaging tests. The most helpful method of monitoring is the measurement of serum urea and creatinine concentrations, as well as urine specific gravity. Urinary tract ultrasound and measurement of symmetric dimethylarginine (SDMA) may provide useful adjuncts to diagnosis. SDMA has emerged as a potential serum biomarker for the early detection of CKD, offering potential advantages over serum urea nitrogen and creatinine assays (Hall et al., 2017).

SDMA is a byproduct of cellular protein metabolism, specifically the intranuclear methylation of L-arginine residues; after proteolysis, these free SDMA residues are released into the circulation. SDMA is not bound to plasma proteins and is primarily eliminated via renal excretion, where it is freely filtered by the glomerulus and neither secreted nor reabsorbed by the tubules (Schwedhelm et al., 2011).

Previous literature reports have described sSDMA as an indicator of compromised renal function in cats with CKD (Hall et al., 2017). A recent review on feline renal biomarkers stated that SDMA detects decreased glomerular filtration rate (GFR) earlier than creatinine, is unaffected by lean body mass, and is now included in the International Renal Interest Society (IRIS) guidelines for staging chronic kidney disease (Kongtasai et al., 2022). An investigation involving hyperthyroid cats treated with radioactive iodine showed that, although creatinine and urea increased after treatment, SDMA levels remained stable and did not consistently correlate with glomerular filtration rate (Wagner et al., 2023). Moreover, in another study, sSDMA was found to be increased above upper reference limits in 39 of 43 cats with kidney stones (Hall et al., 2017).

Ultrasound examination of the urinary tract enables a non-invasive assessment of the internal renal architecture, provides information on parenchymal morphology, and excludes certain pelvic and obstructive ureteral diseases (Nyland et al., 2002; Debruyn et al., 2012). Nevertheless, there is an overlap between normal and abnormal ultrasound findings in azotemic and non-azotemic cats, with one study reporting that 47% of ultrasound abnormalities were present in the kidneys of non-azotemic cats (Lamb et al., 2017).

https://doi.org/10.5380/avs.v30i3.99733