Symmetry dimethylarginine (SDMA) assay for diagnosis of kidney disease in dogs and cats: a mini review of case reports in Indonesia

Fitriya N.A. Dewi¹, Sus Derthi Widhyari¹, Arief Purwo Mihardi¹,², Setyo Widodo¹, Anita Esfandiari¹,*

¹ Division of Internal Medicine, IPB School of Veterinary Medicine and Biomedical Sciences, IPB University
² Joint Graduate School of Veterinary Medicine, Yamaguchi University, Japan

ABSTRACT: Symmetry Dimethylarginine (SDMA) is an important biomarker for early diagnosis of kidney disease. Studies suggest that SDMA is a more sensitive indicator of kidney function compared to traditional markers such as blood urea nitrogen (BUN) and creatinine. Since 2015, the International Renal Interest Society (IRIS) has established SDMA as one of the indicators for diagnosis and determining the stage of chronic kidney disease (CKD) in dogs and cats. SDMA assay use in veterinary clinics in Indonesia has empirically become more common. The aim of this study was to identify scientific reports on SDMA assay use in the diagnosis of kidney disease in dogs and cats in Indonesia. We performed a literature search in the Garuda portal and Google Scholar using the following keywords: “SDMA” or “Symmetry Dimethylarginine”, “dogs”, “cats” and “Indonesia”. The search strategy utilized English and Bahasa Indonesia, and the results were screened for relevance to the topic, and limited to studies conducted in Indonesia. Seven scientific articles in national and international journals reported the use of SDMA assay in cases of kidney disease in dogs or cats in Indonesia, published between 2021-2023. It is expected that SDMA assay use will continue to increase in veterinary practice settings in the country, and it is therefore critical to have a proper understanding of the advantages and limitations of SDMA use for kidney disease diagnosis.

Keywords: CKD, SDMA, renal, biomarker, pets

INTRODUCTION

Chronic kidney disease (CKD) in dogs and cats is progressive and marked by irreversible loss of kidney function (Santis et al. 2022). Its prevalence is 0.2% in dogs and 0.05-3.74% in cats, increasing with age (Brown et al. 2016, O’Neill et al. 2013). Early CKD detection is crucial, and biomarkers, such as podocin peptides, cystatin C, and symmetric dimethylarginine, have been studied for diagnosis (Pelander et al. 2019).

Symmetric dimethylarginine (SDMA) is a stable byproduct of methylated arginine proteins (Rysz et al. 2017) that inhibits nitric oxide synthase and circulates after proteolysis (Hokamp & Nabity 2016). It is a promising marker of the glomerular filtration rate (GFR) (Nabity et al. 2015). It has become more reliable as a renal function marker in human and animal studies (Kielstein et al. 2009). SDMA detects renal changes with 25% kidney function loss compared to 75% for creatinine (Lo et al. 2021). It is less influenced by extrarenal factors, aiding in the early detection of CKD (Smith et al. 2023). Included in the IRIS Guidelines for CKD diagnosis and staging in dogs and cats since 2015, its use in Indonesia has increased. This study assessed scientific reports on using SDMA to diagnose kidney disease in pets in Indonesia.

MATERIALS AND METHODS

A literature search was conducted in the Garuda portal and Google Scholar using the keywords “SDMA” or “Symmetric Dimethylarginine” and “dogs” and “cats” and “Indonesia” in both English and Indonesian. Rayyan (https://rayyan.ai) assisted in screening relevant articles. Only studies from Indonesia published in scientific journals were reviewed.

RESULT AND DISCUSSION

Literature screening identified five case reports and two experiments in Indonesia that evaluated or suggested using the SDMA assay for diagnosing kidney diseases in dogs and cats. These reports have been published in national or international scientific journals between 2021-2023 (Table 1).

Case studies show elevated SDMA levels and align with the IRIS guidelines for early CKD detection alongside creatinine and urinalysis. Longitudinal studies have indicated that SDMA has a superior ability to detect early renal function decline compared to creatinine (Nabity et al. 2015). Some
studies have similar efficacy between creatinine and SDMA in detecting reduced GFR in dogs and cats. There is debate regarding the advantages of SDMA over urinalysis or creatinine concentrations in predicting CKD (Braff et al. 2014).

Symmetric dimethylarginine is recognized as a sensitive kidney function biomarker with both strengths and limitations. Our findings indicate the increasing use of the SDMA assay in Indonesian veterinary clinics, although further validation is required. Elevated SDMA levels can appear in dogs with nonspecific clinical signs such as gastrointestinal and cardiovascular disorders (Sulistiawati et al. 2023). Prerenal conditions and hydration status influence SDMA levels, while age, sex, and lean body mass generally do not (Hillaert et al. 2021). However, certain breeds (e.g., boxers and greyhounds) and diseases (e.g., thyroid disorders, neoplasia, and diabetes) can affect SDMA concentrations (Sargent et al. 2020).

**FURTHER RESEARCH**

As SDMA use is expected to increase in veterinary practice in Indonesia, understanding its advantages and limitations for kidney disease diagnosis is crucial. The consideration of other conditions that affect the values is also essential. Further research is needed to fully establish how to diagnose kidney diseases in the Indonesian veterinary context.

**AUTHOR INFORMATION**

Corresponding Author

*AE: anitaes@apps.ipb.ac.id*

Division of Internal Medicine, School of Veterinary Medicine and Biomedical Sciences, IPB University, Jln. Agatis Kampus IPB Dramaga, Bogor, 16680, INDONESIA.

**REFERENCES**


