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Increased SDMA on preanaesthetic testing, how to quickly assess and address

LVS 2022

Objectives

- The positions on performing preanaesthetic testing
- Rapid review of what SDMA is and why it increases in cats and dogs
- Introduce the purpose of kidney biomarkers in preanaesthetic screening
- Learn how to quickly and appropriately address an increased SDMA in a preanaesthetic patient
- Consider follow up options on cats and dogs post anaesthetic

There are two camps when it comes to preanaesthetic testing

- Limited benefit to preanaesthetic testing
- Especially in juvenile to adult animals
- Delays procedures
- Increases cost to owner

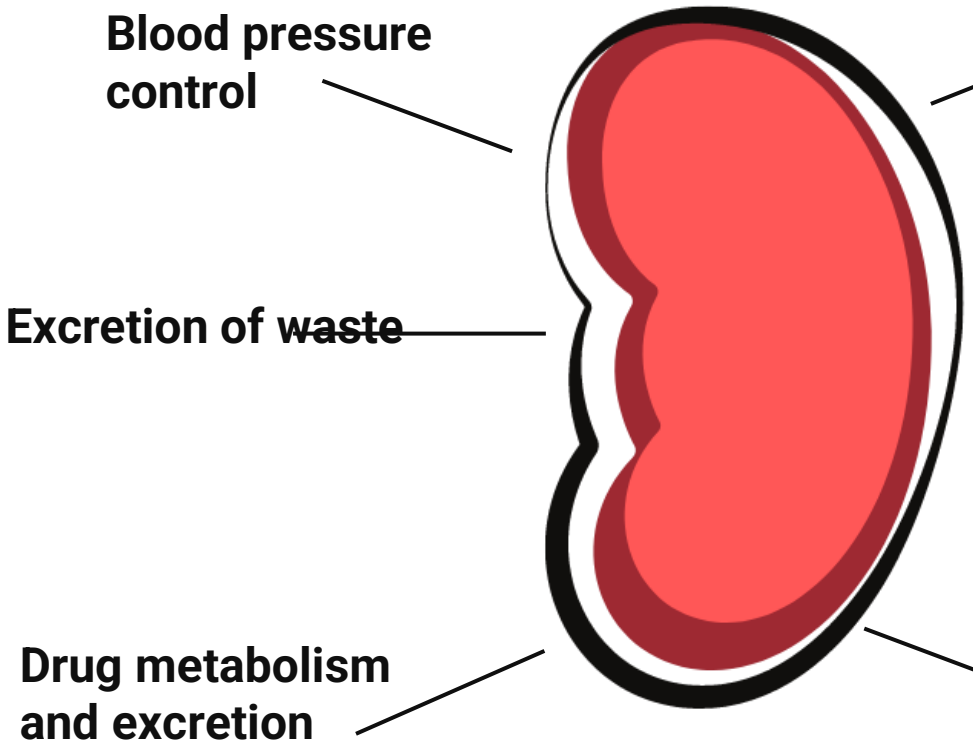
- Discoveries unknown systemic illness
- Improves anesthetic choices
- Important in Senior and Geriatric patients
- Improves care, regardless of cost

Much of this is based on human literature and preanaesthetic data – but our patients cannot tell us if something is wrong:

- Physical Exam and History
- Relevance of the testing (age, previous illness, breed)
- Owner comfort

Canei DH, Pereira ME, de Freitas MN, Trevisan YPA, Zorzo C, Bortolini J, Mendonça AJ, Sousa VRF, de Almeida ABPF (2021) Biochemical, electrolytic, and cardiovascular evaluations in cats with urethral obstruction, Veterinary World, 14(8): 2002-2008.
Mitchell K, Barletta M, Quandt J, Shepard M, Kleine S, Hofmeister E. Effect of routine pre-anesthetic laboratory screening on pre-operative anaesthetic-related decision-making in healthy dogs. *Can Vet J*. 2018;59(7):773-778.
Mitek A et al, Client perceptions of the value of veterinary anesthesiologist involvement with anaesthetic and pain management, benefits of a preanaesthetic consultation, and quality of care for dogs undergoing elective orthopedic surgery JAVMA 2019 (155): 1143-1149

The purpose of kidney biomarkers in preanaesthetic screening

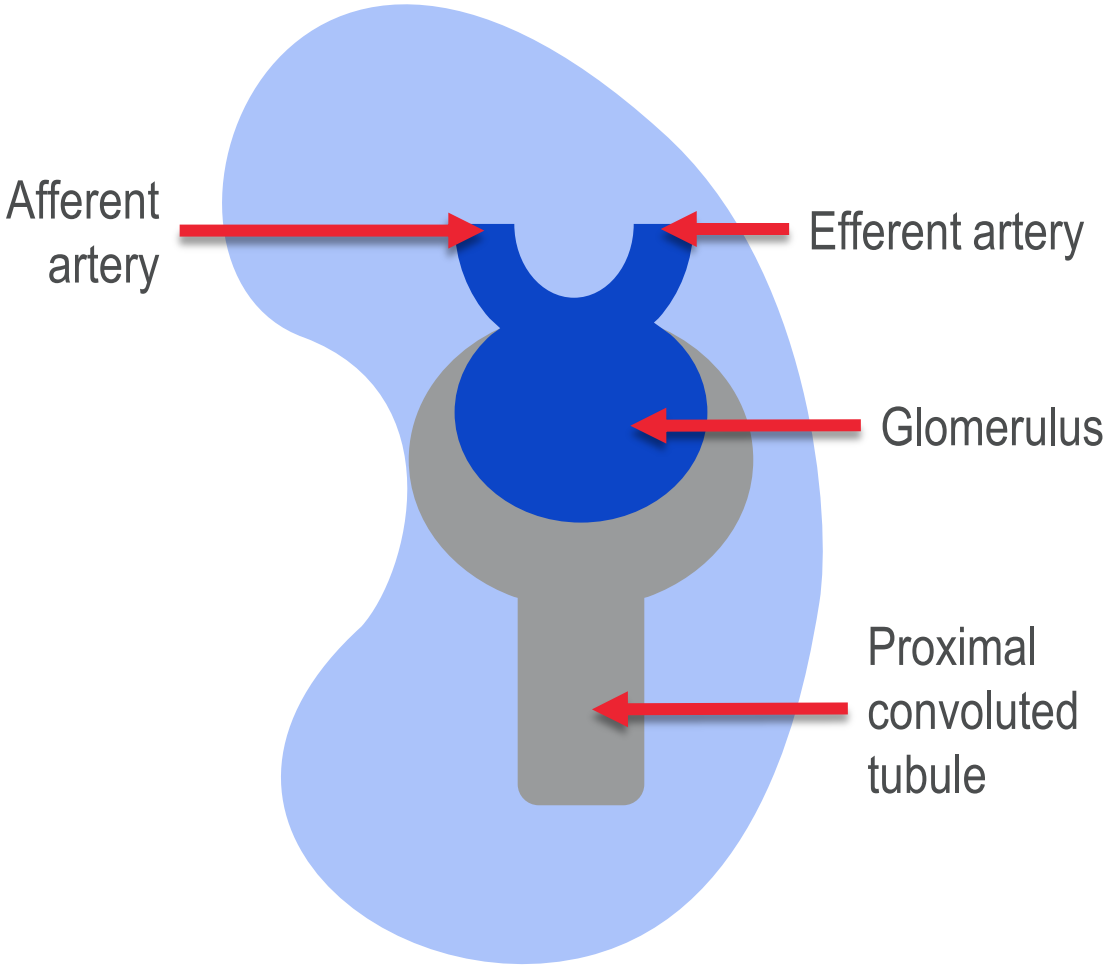


preanaesthetic bloodwork can be your chance to create a baseline for cats and dogs

Age at testing	Juvenile	Adult	Senior/Geriatric
% Abnormalities	<2%	2-6%	16%

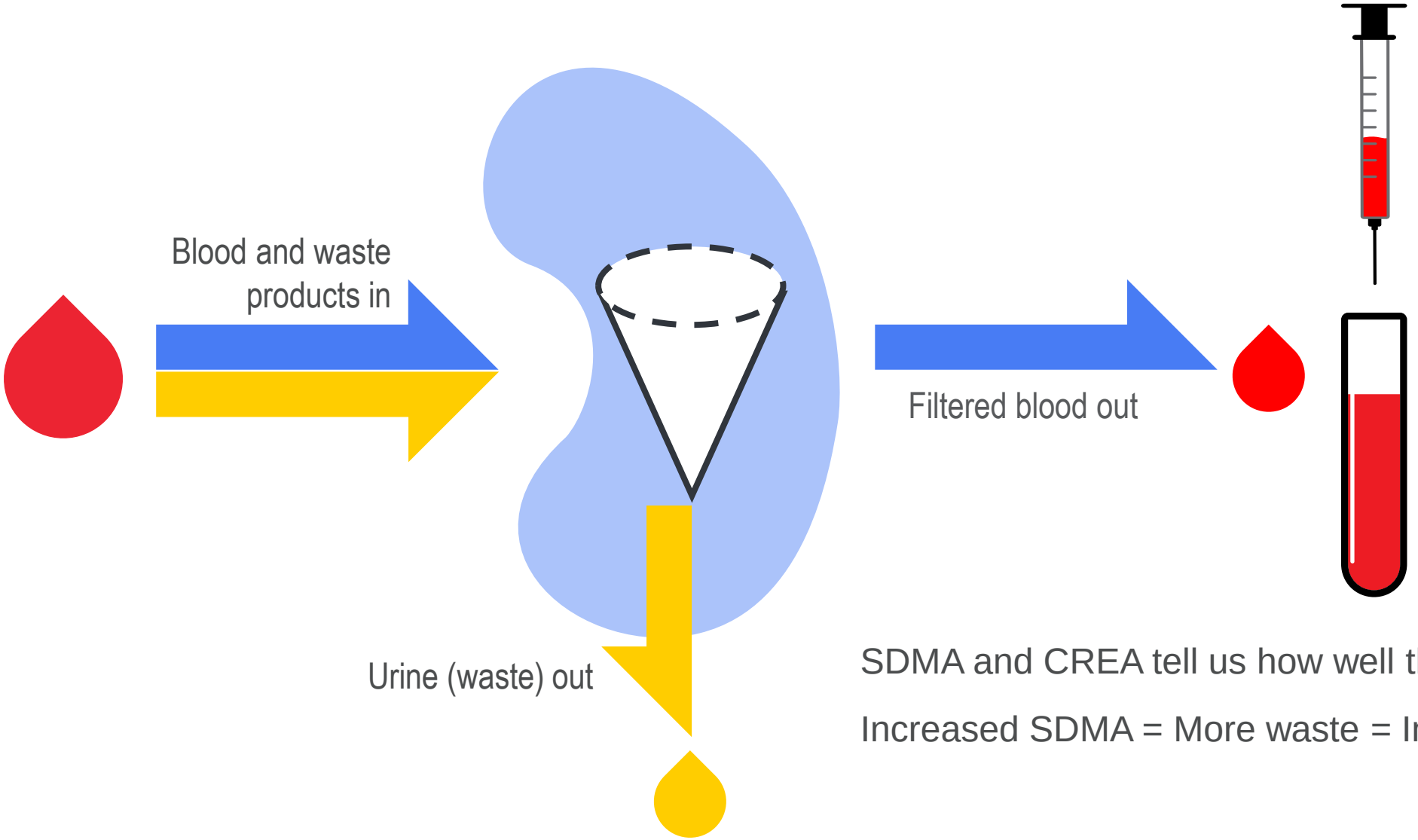
Robertson SA, Gogolski SM, Pascoe P, Shafford HL, Sager J, Griffenhagen GM. AAFP Feline anaesthetic Guidelines. *Journal of Feline Medicine and Surgery*. 2018;20(7):602-634. doi:10.1177/1098612X18781391

SDMA is highly correlated to GFR



- Glomerular filtration rate (GFR)—measurement of how well the kidney is functioning
- Controlled at the level of the glomerulus
- SDMA is highly correlated to GFR
- An elevated SDMA = Impaired GFR

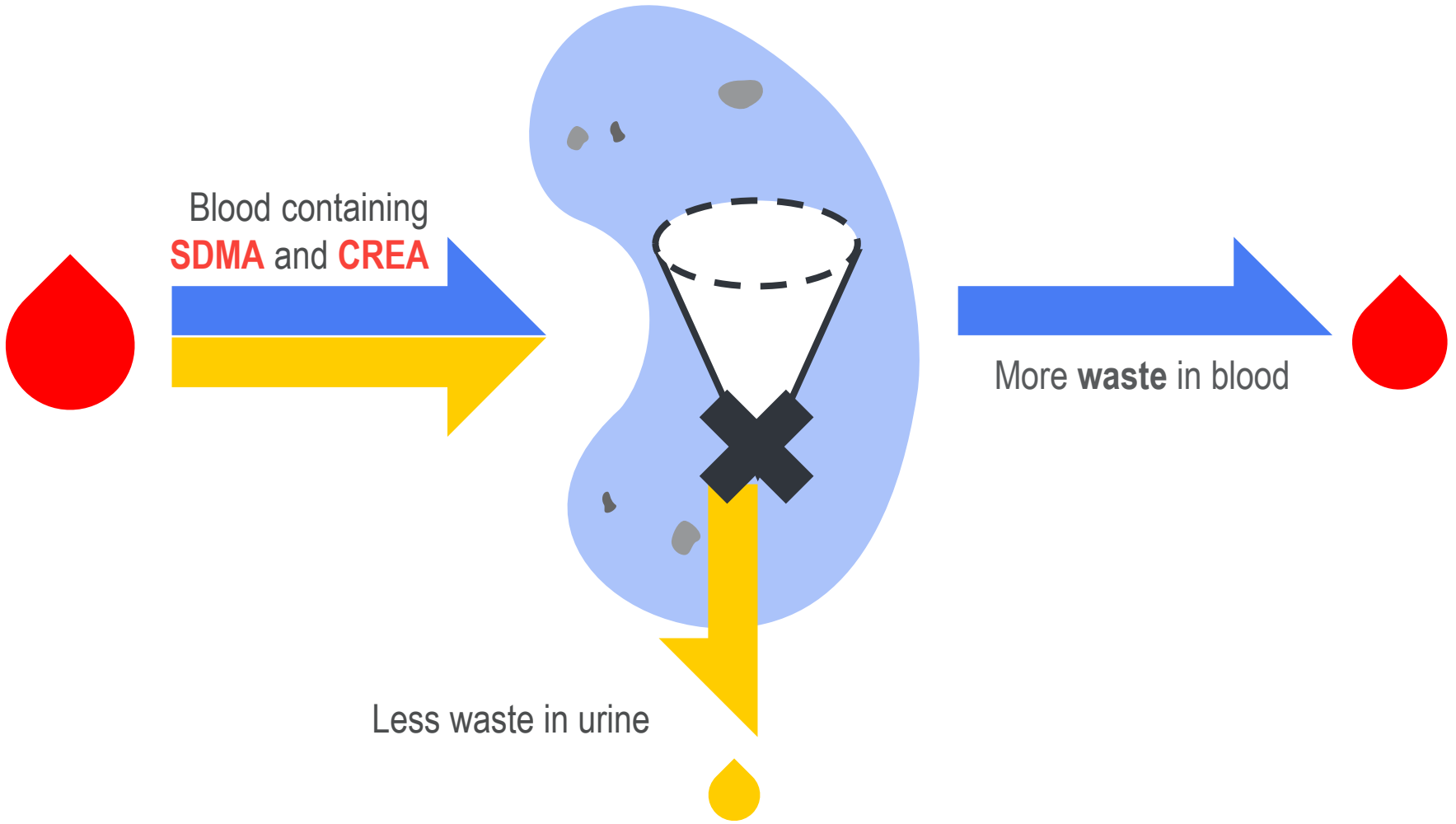
The kidneys function to filter out waste from the blood



SDMA and CREA tell us how well the kidney is filtering

Increased SDMA = More waste = Impaired GFR

When kidney disease happens



Kidney disease leads to decreased filtration

Impaired GFR = Increased **SDMA**

Classify the SDMA increase and make realistic choices

15-19 µg/dL

Generally, if UA WNL, exam and history are normal, ok to proceed

Age
Fasted (food versus food and water)
Known comorbidities

Urinalysis

USG, Sediment, proteinuria

Exam again, revisit history

Retinal, palpate kidney
Ask owner again about change in habits
Blood pressure evaluation

≥ 20 µg/dL

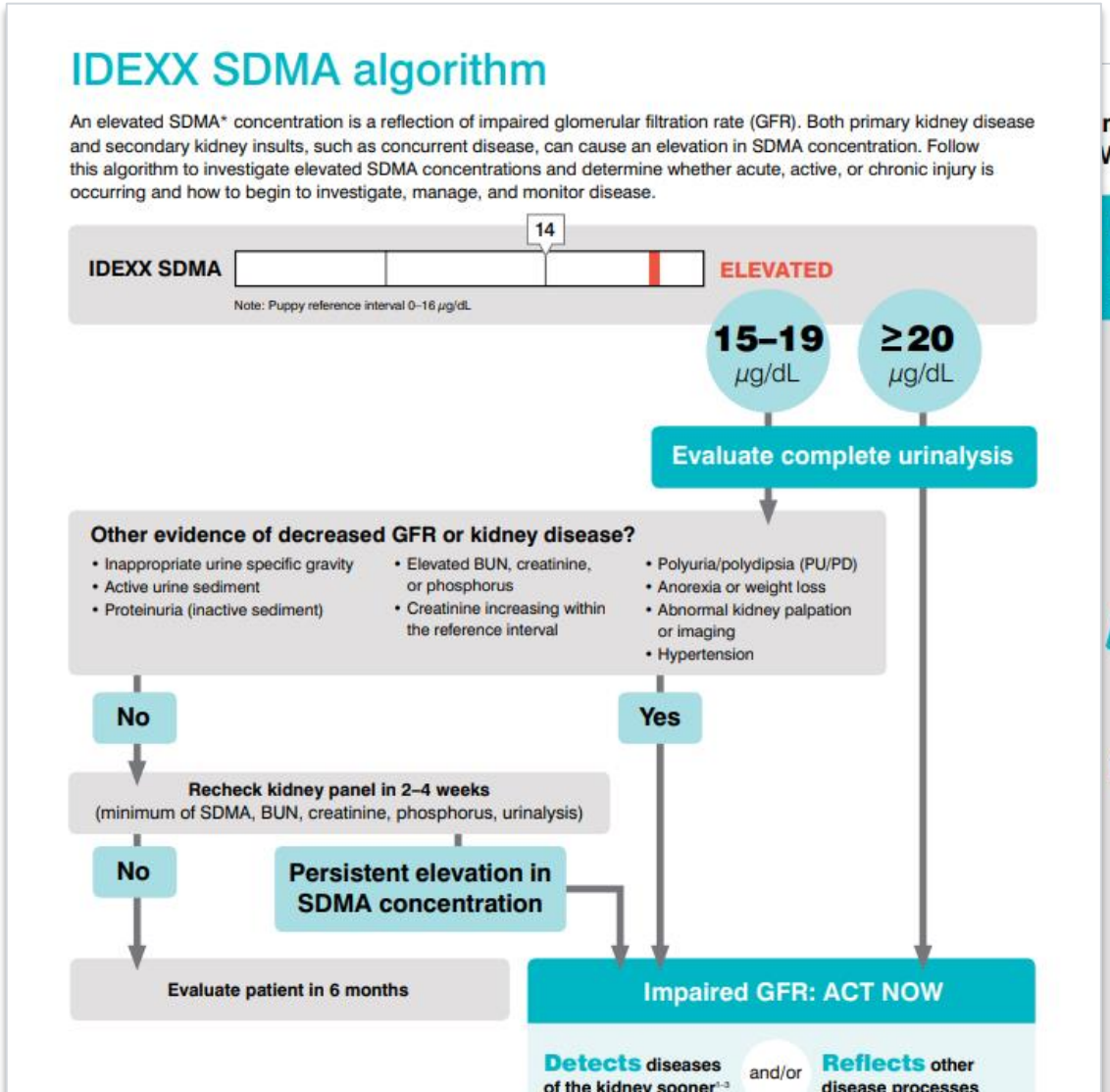
Generally, additional diagnostics are warranted, delay anaesthetic

Consider the nature of the procedure

Consider anaesthetic choices and support

Consider your owner and client patient relationship

What to do when SDMA is increased



IDEXX SDMA algorithm

An elevated SDMA* concentration is a reflection of impaired glomerular filtration rate (GFR). Both primary kidney disease and secondary kidney insults, such as concurrent disease, can cause an elevation in SDMA concentration. Follow this algorithm to investigate elevated SDMA concentrations and determine whether acute, active, or chronic injury is occurring and how to begin to investigate, manage, and monitor disease.

IDEXX SDMA — 14 — ELEVATED

Note: Puppy reference interval 0–16 µg/dL

15–19 µg/dL

≥20 µg/dL

Evaluate complete urinalysis

Other evidence of decreased GFR or kidney disease?

- Inappropriate urine specific gravity
- Active urine sediment
- Proteinuria (inactive sediment)
- Elevated BUN, creatinine, or phosphorus
- Creatinine increasing within the reference interval
- Polyuria/polydipsia (PU/PD)
- Anorexia or weight loss
- Abnormal kidney palpation or imaging
- Hypertension

No

Recheck kidney panel in 2–4 weeks
(minimum of SDMA, BUN, creatinine, phosphorus, urinalysis)

No

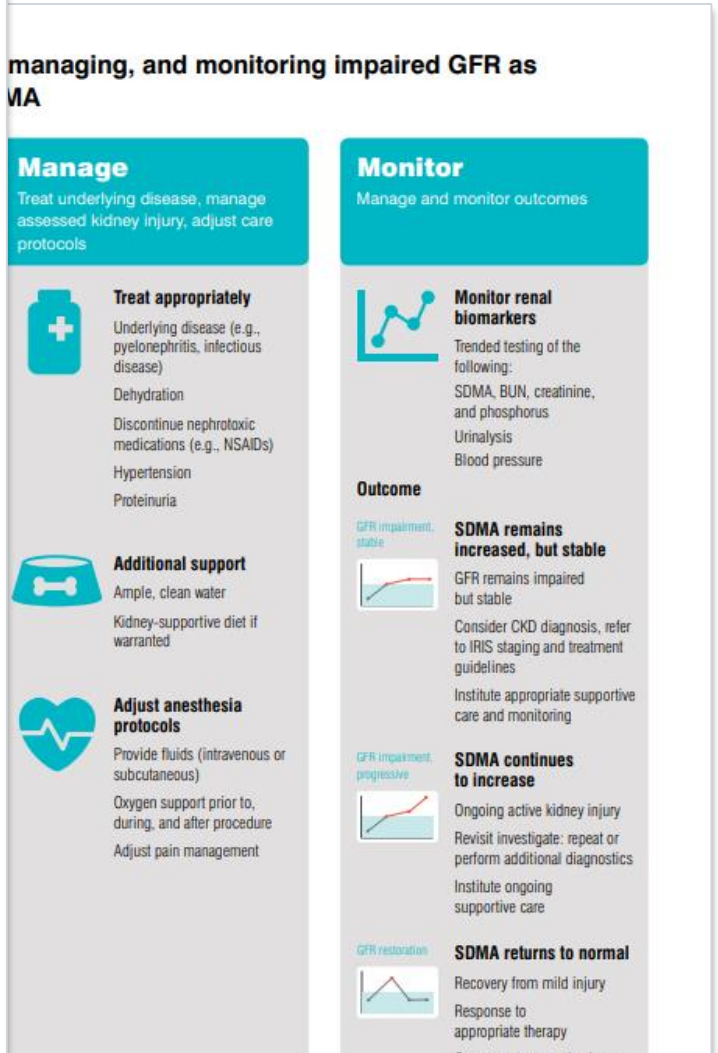
Evaluate patient in 6 months

Persistent elevation in SDMA concentration

Yes

Impaired GFR: ACT NOW

Detects diseases of the kidney sooner[1-3] and/or **Reflects** other disease processes



managing, and monitoring impaired GFR as MA

Manage

Treat underlying disease, manage assessed kidney injury, adjust care protocols

Treat appropriately

Underlying disease (e.g., pyelonephritis, infectious disease)

Dehydration

Discontinue nephrotoxic medications (e.g., NSAIDs)

Hypertension

Proteinuria

Additional support

Ample, clean water

Kidney-supportive diet if warranted

Adjust anesthesia protocols

Provide fluids (intravenous or subcutaneous)

Oxygen support prior to, during, and after procedure

Adjust pain management

Monitor

Manage and monitor outcomes

Monitor renal biomarkers

Trended testing of the following:

SDMA, BUN, creatinine, and phosphorus

Urinalysis

Blood pressure

Outcome

GFR impairment, stable

SDMA remains increased, but stable

GFR remains impaired but stable

Consider CKD diagnosis, refer to IRIS staging and treatment guidelines

Institute appropriate supportive care and monitoring

GFR impairment, progressive

SDMA continues to increase

Ongoing active kidney injury

Revisit investigate: repeat or perform additional diagnostics

Institute ongoing supportive care

GFR restoration

SDMA returns to normal

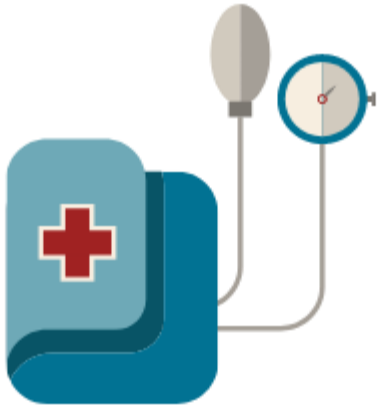
Recovery from mild injury

Response to appropriate therapy

idexx.com/sdma

Anaesthetic consideration with a mild increase in SDMA

Avoid anaesthetics which induce hypotension



Monitor blood pressure

IV catheter access, and administer appropriate fluid pre-procedure, intra-procedure and post-procedure

Provide pre and post oxygenation

Avoid nephrotoxic medication

An increased SDMA on preanaesthetic lab work requires follow up

Persistence Study:

Within 12 months of a single mild increase in SDMA, 72% of patients risked impaired kidney function

48% of patients risk ongoing (persistent) impaired GFR.

24% of patients that were persistent risk additional impaired GFR.

Source: Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA. 092_White-Paper_20012109S103.

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IDEXX

Recommendations:

Post-anaesthetic/kidney profile repeat at 5-7 days

- Biochemistry (kidney parameters including SDMA)

If persistently increased or + 3 ug/dL from previous value – reassess all kidney health parameters (UA, CBC, Blood Pressure, consider imaging)

If within the reference interval (0-14 ug/dL) recommend follow up in 6-8 months

IDEXX

Impaired GFR: Investigate, manage, and monitor

Investigate

- Investigate an underlying cause
- Consider performing additional diagnostics
- Assess for a concurrent condition

Manage

- Treat appropriately
- Provide additional support
- Adjust anaesthetic protocols

Monitor

- Monitor renal biomarkers
- Take steps based on the outcome

Impaired GFR: Investigate

Investigate

Investigate an underlying cause

- Urinary tract infection (UTI/pyelonephritis)
- Toxicity (e.g., NSAIDS, ethylene glycol, lilies)
- Acute kidney injury
- Systemic hypertension
- Chronic kidney disease (CKD)

Consider performing additional diagnostics

- Urine culture and minimum inhibitory concentration (MIC) susceptibility
- Infectious disease testing
- Abdominal imaging
- Urine protein:creatinine (UPC) ratio (proteinuria)
- Blood pressure

Assess for a concurrent condition

- Hydration status
- Thyroid status (feline)

Impaired GFR: Manage

Manage

Treat appropriately

- Underlying disease (e.g., pyelonephritis, infectious disease)
- Dehydration
- Discontinue nephrotoxic medications (e.g., NSAIDs)
- Hypertension
- Proteinuria

Provide additional support

- Ample, clean water
- Kidney-supportive diet if warranted

Adjust anaesthetic protocols

- Fluids (intravenous or subcutaneous)
- Oxygen support prior to, during, and after procedure
- Adjust pain management

Impaired GFR: Monitor

Monitor

Monitor renal biomarkers

Trended testing of:

- SDMA, BUN, creatinine, and, phosphorus
- Urinalysis
- Blood pressure

Take steps based on outcomes:

SDMA remains increased, but stable

GFR impaired but stable

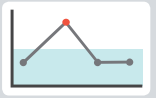
- Consider CKD diagnosis, refer to IRIS staging and treatment guidelines
- Institute appropriate supportive care and monitoring

SDMA continues to increase

GFR impairment is progressive

- Ongoing active kidney injury
- Revisit investigate: repeat or perform additional diagnostics
- Institute ongoing supportive care

SDMA returns to normal



GFR restores

- Recovery from mild injury
- Response to appropriate therapy
- Compensatory mechanisms
- Recheck 6 months–1 year

Key Takeaways

- SDMA is helpful and additive to preanaesthetic testing
- Increases in SDMA can be efficiently dealt with by considering the clinical context, and the severity of increase
- Communication with owner is very important
- Follow up is simple but necessary