Learning objectives

- Understanding the medical value of SDMA beyond chronic kidney disease
- Reviewing SDMA test application in cases of concurrent diseases (case study)
- Understanding the application of updated IRIS guidelines
Glomerular filtration rate (GFR) = kidney function

- Glomerular filtration rate (GFR) is the best overall measure of kidney function
  - Filtration of blood is primary function of kidneys

- Kidney tubules modify glomerular filtrate
  - Control fluid volume
  - Regulate electrolytes, acid-base status
Why *early* detection of decreased GFR is important

- GFR best overall indicator of kidney function

- Once GFR persistently decreased to 30-50% of normal progression to end stage renal failure inevitable
  - Maladaptive hyperfiltration of remaining nephrons
  - Neuro-humeral activation, e.g., renin-angiotensin-aldosterone system
  - Renal fibrosis
  - Glomerulosclerosis

- Transient reversible decreases in GFR may cause cumulative function loss and lead to irreversible CKD
  - AKI – CKD continuum…
Limitations of traditional kidney diagnostics

**Creatinine**
- Late marker
- Impacted by other factors including muscle mass

**BUN**
- Late marker
- Impacted by other factors including diet, liver disease

**GFR**
- Expensive
- Not practical
- Rarely done in practice

**Specific gravity**
- Urine test
- Later marker
- Impacted by other factors and other diseases (e.g., diabetes)

**Urine protein:creatinine (UPC) ratio**
- Urine test
- False positives with UTI
- Can be normal with kidney disease

**Microalbumin**
- Urine test
- False positives
- Not specific for kidney
What is SDMA?

- Symmetric dimethylarginine—a methylated form of arginine in intracellular proteins of all nucleated cells
- Stable production of SDMA is part of daily cell activity
- Released into circulation when intracellular proteins are processed
- Excreted by the kidneys (>90%)
- Proven renal biomarker shown to correlate with glomerular filtration rate (GFR) in humans, dogs, and cats
- An increased SDMA indicates impaired GFR and decreased renal function

The IDEXX SDMA® Test is available from IDEXX Reference Laboratories
The Catalyst® SDMA Test is available to perform on the in-clinic Catalyst Dx® Chemistry Analyzer or the Catalyst One® Chemistry Analyzer.
SDMA is a biomarker of kidney function that is highly correlated with GFR$^{1-3}$

Sources:
7. Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
SDMA is more sensitive than creatinine

Creatinine doesn’t increase until up to 75% loss of kidney function\(^2,3\)

SDMA increases with as little as 25% loss of kidney function\(^1,2\)

Sources:
SDMA increases earlier than serum creatinine in cats and dogs with CKD

Retrospective, longitudinal studies in dogs and cats with CKD at Hill’s® Pet Nutrition dog and cat colonies

Cats\(^1\)
- 21 cats
- SDMA earlier than creatinine mean of 17.0 months (range 1.5–48 months)

Dogs\(^2\)
- 19 dogs
- SDMA increased on average 9.8 months (2.2–27 months) earlier than creatinine

Sources:
Studies demonstrate SDMA highly reliable, not affected by lean muscle

- **Creatinine** is often unreliable with loss of lean muscle mass.
- **SDMA** is reliable even with loss of lean muscle mass.

Sources:
What are their kidneys telling you?

Listen closer with IDEXX SDMA®

**Detects**

- diseases of the kidney sooner
  
  1\(^{1-3}\)

  - Chronic kidney disease
  - Acute kidney injury
  - Pyelonephritis
  - Upper urinary obstruction
  - Kidney stones
  - Glomerulonephritis
  - Congenital disease

**Reflects**

- other disease processes affecting the kidneys
  
  4

  - Hyperthyroidism
  - Vector-borne disease
  - Systemic hypertension
  - Cardiorenal syndrome
  - Lower urinary syndrome
  - Sepsis
  - Cancer
  - Drug toxicity

Sources:

4. Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
SDMA may be the first and only sign of decreased kidney function

- Creatinine: 75% loss
- USG: 66% loss
- SDMA: 25%–40% loss
What increased SDMA means…

 Courtesy of Dr. Jeff Niziolek
Any cause of decrease GFR may increase SDMA. Correct underlying cause and SDMA may normalize.

- **Prerenal**
  - Dehydration
  - Trauma/shock—hypotension
  - Anesthesia
  - Cardiac disease
  - Sepsis
  - Thrombosis, infarct
  - Burn injury, heat stroke
  - Transfusion reaction
  - Hyperviscosity, polycythemia

- **Renal**
  - Kidney disease: CKD, acute kidney injury, kidney stones
  - Infection/infectious: pyelonephritis, FIP, sepsis, heartworm
  - Immune mediated: Lyme nephritis, vasculitis
  - Metabolic: pancreatitis, hypercalcemia
  - Neoplasia: lymphoma
  - Toxin: lily, NSAID, ethylene glycol (antifreeze), aminoglycoside antibiotics

- **Postrenal**
  - Urethral obstruction
  - Ureteral obstruction
  - Urinary tract trauma/disruption: tear, rupture, blood clot
When do we assess kidney function in pets?

- Diagnostic testing for clinical signs of kidney disease
- Preanesthetic screening
- Diagnostic testing for clinical signs of other illnesses
- Treatment for hyperthyroidism
- Preventive screens during wellness visits
- Diagnostic testing for patients that have tested positive for vector-borne disease - even those without clinical signs
When should you run SDMA on your patients?

IDEXX SDMA® Test…

...is for all patients in all cases.

...results are clinically actionable.

...increases with active and acute kidney injury.

...allows for early diagnosis and management of CKD.
With the IDEXX SDMA® Test, over two times the number of pets could more reliably be diagnosed with kidney disease.

Source: Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
What to do when SDMA is elevated
Other evidence of kidney disease?

Yes

Evaluate complete urinalysis

Impaired GFR: ACT NOW

Detects diseases of the kidney sooner^1–3 and/or

Reflects other disease processes affecting the kidneys^4

No

Evaluate patient in 6 months

Recheck kidney panel in 2–4 weeks

Persistent elevation in SDMA concentration

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Sources:
4. Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
What are their kidneys telling you?

Listen closer with IDEXX SDMA®

**Detects**

diseases of the kidney sooner\(^1\)–\(^3\)

- Chronic kidney disease
- Acute kidney injury
- Pyelonephritis
- Upper urinary obstruction
- Kidney stones
- Glomerulonephritis
- Congenital disease

**Reflects**

other disease processes affecting the kidneys\(^4\)

- Hyperthyroidism
- Vector-borne disease\(^5\)
- Systemic hypertension
- Cardiorenal syndrome
- Lower urinary syndrome
- Sepsis
- Cancer
- Drug toxicity

**Sources:**

4. Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
### 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 anesthesia protocols

#### Monitor
- Monitor renal biomarkers
- Take steps based on the outcome
Impaired GFR: 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 anesthesia protocols**
- Fluids (intravenous or subcutaneous)
- Oxygen support prior to, during, and after procedure
- Adjust pain management
Impaired GFR: 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
Putting it all together: case example
11-year-old, neutered male domestic shorthair

**History**
- Lethargic past 3 days
- Decreased appetite

**Physical examination**
- Depressed
- Approximately 5%–10% dehydrated
- Right kidney slightly enlarged and painful
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference Range</th>
<th>Status</th>
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<td>BUN</td>
<td>10</td>
<td>5.7 - 12.9 mmol/L</td>
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<tr>
<td>Creatinine</td>
<td>168</td>
<td>71 - 212 µmol/L</td>
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<tr>
<td>IDEXX SDMA</td>
<td>37</td>
<td>0 - 14 µg/dL</td>
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<tr>
<td>BUN:Creatinine</td>
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<td>Phosphorus</td>
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<td>1.00-2.42 mmol/L</td>
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<td>Calcium</td>
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<td>1.95-2.83 mmol/L</td>
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<td>3.7 - 5.2 mmol/L</td>
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<td>Na:K Ratio</td>
<td>33</td>
<td>29 - 42</td>
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<td>119</td>
<td>114 - 126 mmol/L</td>
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<td>Anion Gap</td>
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<td>31</td>
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<td>CYSTOCENTESIS</td>
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<td>Clarity</td>
<td>HAZY</td>
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<td>Glucose</td>
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<td>Ketones</td>
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<td>Bilirubin</td>
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<td>Urobilinogen</td>
<td>NORMAL</td>
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<td>White Blood Cells</td>
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<td>Red Blood Cells</td>
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<tr>
<td>Bacteria</td>
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<tr>
<td>Epithelial Cells</td>
<td>RARE (0-1)</td>
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<tr>
<td>Mucus</td>
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7/1/16 (Order Received)
11/1/16 2:14 PM (Last Updated)

Source: URINE
Status: FINAL
Completed Culture Results: NO AEROBIC GROWTH
Lucky: Right ureteral obstruction
MANAGE – ureteral obstruction

- Medical management – if no response in 24 hr →
- Surgery
- Ureteral stenting
- Subcutaneous ureteral bypass (SUB)¹

- Adjust
  • Anesthetics
  • Analgesics
  • Antibiotics

Ureteral obstruction – medical management

- IV fluids, 4 ml/kg/h

- Mannitol, 0.25-0.5 g/kg over 20 min then CRI of 1 mg/kg/min x 24 h

- Prazosin, 0.25 mg/cat BID, 1 mg/15 kg bid in dogs

- No mannitol if heart disease

- Monitor body weight, electrolytes → adjust fluids as needed

- If no clinical, imaging, or laboratory improvement in 24 h → surgery
### IDEXX VetConnect PLUS

**MONITOR – serial labs, imaging, urine culture**

**Lucky**

<table>
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<tr>
<th>2016</th>
<th>JUL 12</th>
<th>JUL 12</th>
<th>MAY 3</th>
<th>MAY 3</th>
<th>FEB 22</th>
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<th>JAN 18</th>
<th>JAN 8</th>
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#### IDEXX Reference Laboratories

**3/5/16 (Order Received)**  
**3/5/16 1:13 PM (Last Updated)**

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<th>Upper Limit</th>
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<td>Creatinine</td>
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<td>71 - 212 μmol/L</td>
<td>150.3</td>
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<td><strong>IDEXX SDMA</strong></td>
<td>15</td>
<td>0 - 14 μg/dL</td>
<td>1.3</td>
<td>14</td>
<td>18</td>
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<td>BUN:Creatinine Ratio</td>
<td>24.3</td>
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<td></td>
<td>24.7</td>
<td>26.3</td>
<td>22.5</td>
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<td>Phosphorus</td>
<td>1.2</td>
<td>1.00 - 2.42 mmol/L</td>
<td>1.1</td>
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<td>Calcium</td>
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<td>3.1</td>
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<td>3.7 - 5.2 mmol/L</td>
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<td>Chloride</td>
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<td>114 - 126 mmol/L</td>
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<tr>
<td>TCO2 (Bicarbonate)</td>
<td>19.1</td>
<td>12 - 22 mmol/L</td>
<td>19</td>
<td>17</td>
<td>21</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Values are in mmol/L or μmol/L.*
International Renal Interest Society (IRIS) Guidelines
International Renal Interest Society

Who is IRIS?
- A board of 15 world-renowned independent veterinarians
- Comprises eleven different countries
- Expertise in nephrology

IRIS’s mission
“The mission of IRIS is to promote the discipline of comparative nephrology ... and to facilitate the better understanding, diagnosis, and treatment of renal (kidney) disease.”
Welcome to the website of the International Renal Interest Society*

This website is designed to bring you news and information regarding the work of IRIS. The mission of IRIS is to help veterinary practitioners better diagnose, understand and treat kidney disease in cats and dogs. We hope you find this site useful and informative.

**IRIS Guidelines**
- For assistance in your day to day management of patients with CKD.
  - IFRS Staging of Chronic Kidney Disease (CKD) - including algorithms.
  - IRIS Treatment Recommendations for CKD.
  - IRIS Staging of Acute Kidney Injury (AKI).

**Education**
- Provides additional information on specific aspects of kidney diseases.
- Contains regularly updated articles written by IRIS Board members.

**Emerging Themes**
- Current topics being discussed and investigated in veterinary nephrology.
- Includes occasional articles from IRIS Board members and invited authors.

**About IRIS**
- For information on:
  - Members of IRIS
  - IRIS and Dialysis Awards
  - Projects supported by IRIS
  - IRIS Newsletters
  - FAQs

Read more
IRIS guidelines for diagnosing, staging, and treating chronic kidney disease in dogs and cats


Download IRIS CKD Staging Guidelines under the recourse tab
Median survival time in cats by IRIS stage

<table>
<thead>
<tr>
<th>IRIS stage</th>
<th>2b*</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median survival (days)</td>
<td>1,151</td>
<td>778</td>
<td>103</td>
</tr>
<tr>
<td>Range (days)</td>
<td>2–3,107</td>
<td>22–2,100</td>
<td>1–1,920</td>
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</tbody>
</table>

n = 211 cats

*2b = Creatinine of 2.3–2.8 mg/dL (203–249 µmol/L)

IRIS guidelines for diagnosing, staging, and treating chronic kidney disease in dogs and cats

Step 1: Diagnose CKD

Step 2: Stage CKD

Step 3: Treat CKD

To diagnose IRIS stage 1 and early stage 2 CKD
One or more of these diagnostic findings

1. Creatinine increasing within the reference interval when no prerenal cause is apparent

2. Persistent increased SDMA* >14 μg/dL

3. Abnormal kidney imaging

4. Persistent renal proteinuria

Urine protein to creatinine (UPC) ratio
• >0.5 in dogs
• >0.4 in cats

* SDMA = IDEXX SDMA® Test

Creatinine reference interval versus IRIS staging cut offs
IDEXX creatinine reference interval study for cats:
A reference interval is determined, not created

175 feline patients
Adults of all breeds

7 clinics + 3 reference laboratories
Small-animal private practices from diverse geographic locations

Sample distribution
Determined from sample data, reference interval based on central 95%

Creatinine (μmol/L)

Source:
1. Data on file at IDEXX Reference Laboratories, Inc. Westbrook, Maine USA.
What happens if we change our upper reference limit¹ to 1.6 mg/dL?

### Distribution of creatinine in apparently healthy cats

<table>
<thead>
<tr>
<th>Creatinine (µmol/L)</th>
<th>Percent of cats with creatinine value</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>2.5%</td>
</tr>
<tr>
<td>140</td>
<td>95%</td>
</tr>
<tr>
<td>203</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

IRIS recommends staging CKD at Stage 1 with a stable creatinine of less than 140 µmol/L.²

---

**Sources:**


The math: The effect on our cat population

Distribution of creatinine in apparently healthy cats

Source:
1. Data on file at IDEXX Reference Laboratories, Inc. Westbrook, Maine USA.
### Stage CKD

<table>
<thead>
<tr>
<th>Stage</th>
<th>Creatinine in µmol/L</th>
<th>SDMA* in µg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>No azotemia (Normal creatinine)</td>
<td>Stage based on stable creatinine</td>
</tr>
<tr>
<td>Canine</td>
<td>Less than 125 (1.4 mg/dL)</td>
<td>Less than 18</td>
</tr>
<tr>
<td>Feline</td>
<td>Less than 140 (1.6 mg/dL)</td>
<td>Less than 18</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Mild azotemia (Normal or mildly elevated creatinine)</td>
<td>Stage based on stable SDMA</td>
</tr>
<tr>
<td>Canine</td>
<td>125–250 (1.4–2.8 mg/dL)</td>
<td>18–35</td>
</tr>
<tr>
<td>Feline</td>
<td>140–250 (1.6–2.8 mg/dL)</td>
<td>18–25</td>
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<tr>
<td>Stage 3</td>
<td>Moderate azotemia</td>
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<tr>
<td>Canine</td>
<td>251–440 (2.9–5.0 mg/dL)</td>
<td>36–54</td>
</tr>
<tr>
<td>Feline</td>
<td>Greater than 440 (5.0 mg/dL)</td>
<td>Greater than 38</td>
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<tr>
<td>Stage 4</td>
<td>Severe azotemia</td>
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<tr>
<td>Canine</td>
<td>Greater than 440 (5.0 mg/dL)</td>
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<tr>
<td>Feline</td>
<td>Greater than 440 (5.0 mg/dL)</td>
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</table>

* SDMA = IDEXX SDMA® Test

### Stage CKD: Substaging

<table>
<thead>
<tr>
<th>UPC ratio</th>
<th>Canine</th>
<th>Feline</th>
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<tbody>
<tr>
<td>Substage based on proteinuria</td>
<td>Nonproteinuric &lt;0.2</td>
<td>Borderline proteinuric 0.2–0.5</td>
</tr>
<tr>
<td></td>
<td>Nonproteinuric &lt;0.2</td>
<td>Borderline proteinuric 0.2–0.4</td>
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</table>

<table>
<thead>
<tr>
<th>Systolic blood pressure in mm Hg</th>
<th>Substage based on blood pressure</th>
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</thead>
<tbody>
<tr>
<td>Normotensive &lt;140</td>
<td>Prehypertensive 140–159</td>
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<tr>
<td>Hypertensive 160–179</td>
<td>Severely hypertensive ≥180</td>
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</tbody>
</table>

CKD treatment after IRIS 4-tiered staging w/
SDMA
Creatinine
Proteinuria based on urine protein: creatine
Systolic blood pressure
ISFM Consensus Guidelines on the Diagnosis and Management of Feline Chronic Kidney Disease

Recommendations based on quality of evidence for increased longevity and/or improved quality of life.
Renal diets: improve survival and quality of life

- ↓ protein
- ↓ phosphate
- ↑ caloric density
- ↑ B vitamins
- ↑ antioxidants
- ↑ omega-3 fatty acids
- ↑ potassium (cat)
- ↓ sodium
- Alkalinizing

Which most important?

Quality of evidence as an intervention
- Increased longevity: GOOD
- Improved QoL: GOOD
Renal diet in stage 1 CKD?

- 5 prospective studies → all show benefit
  - Delayed age-related declined in GFR
  - Improvement in GFR in stage 1 CKD (increased SDMA, normal creatinine)
  - Study periods 6-12 months

- SDMA increased with owner choice diets

- “Test diet” – fish oil, antioxidants, L-carnitine, botanicals, highly bioavailable protein, amino acid supplement or k/d® + supplements
  - Transitioned over 1 week, palatable

Manage inappetence, nausea, vomiting

○ Mirtazapine - ↓ vomiting, ↑ appetite, ↑ body weight
  • 0.5 mg/kg or 1.88 mg/cat q48h PO
  • 3.75 mg q48h Lipoderm gel transdermal
  • “Therefore mirtazapine may be useful adjunct.”

○ Maropitant - ↓ vomiting
  • 1 mg/kg q24h SC/IV
  • 2 mg/kg q24h PO

Proteinuria treatment in CKD: renal diet plus…

- Benazepril or enalapril, 0.25-0.5 mg/kg q12-24h starting dose (max 2 mg/kg/d)
  - SDMA/creat 5-7d and UP/C 4-8wk after start or dose adjustment

- Telmisartan, 1 mg/kg/d (max 2 mg/kg/d)

- Omega-3 fatty acid, 0.25-0.5 mg/kg/d EPA/DHEA

- Aspirin if albumin < 2.0 g/dl, 1-5 mg/kg/d dog; 1 mg/kg q72h cat

- Amlodipine - after maximal safe dose of ACEI/telmisartan
  - May decrease proteinuria in cats
  - Cat <4 kg 0.625 mg/cat/d
  - Cat ≥ 4 kg 1.25 mg/cat/d
Hypertension update – new normal SBP <140mm Hg

ACVIM consensus statement: Guidelines for the identification, evaluation, and management of systemic hypertension in dogs and cats

Mark J. Acerno, Scott Brown, Amanda E. Coleman, Rosanne E. Jepson, Mark Papich, Rebecca L. Steple, Harriet M. Syme

First published: 24 October 2018 | https://doi.org/10.1111/jvim.15331

<table>
<thead>
<tr>
<th>Normotensive (minimal TOD risk)</th>
<th>SBP &lt;140 mm Hg</th>
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<tbody>
<tr>
<td>Prehypertensive (low TOD risk)</td>
<td>SBP 140-159 mm Hg</td>
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<tr>
<td>Hypertensive (moderate TOD risk)</td>
<td>SBP 160-179 mm Hg</td>
</tr>
<tr>
<td>Severely hypertensive (high TOD risk)</td>
<td>SBP ≥180 mm Hg</td>
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</tbody>
</table>
Treating hypertension in feline CKD

- Amlodipine – if only hypertension
  - 0.625 mg/cat/d if BP<200 mmHg
  - 1.25 mg/cat/d if BP>200 mmHg
  - 2.50 mg/cat/d if refractory

- Telmisartan – if hypertension with proteinuria
  - 1-3 mg/kg/d
  - Semintra® label dose – 1.5 mg/kg q12h x 14 d, then 2 mg/kg q24h

- ACEi monotherapy not recommended in cats (minimal effect as sole agent)
  - Benazepril 0.5 mg/kg q12h

- Amlodipine effective and safe monotherapy for most
  - Telmisartan or benazepril added if needed
    - Both dilate efferent arteriole → ↓ GFR
    - Avoid in dehydrated cats
    - Monitor SDMA/creatinine
CKD – adjuvant treatments

- **Hydration**
  - SC, Feeding tube, indwelling SC catheter

- **Potassium**
  - Potassium gluconate 1-4 mEq/cat q12h

- **Anemia, PCV<20**
  - Darbepoeitin α 1 ug/kg/wk SC til PCV ≥ 25 then q2-3 wk
  - Iron dextran 50 mg/cat IM at start, repeat monthly prn

- **UTI**
  - Symptomatic – yes based on culture/susceptibility; empiric amoxi 11-15 mg/kg q8h
  - Asymptomatic (subclinical bacteriuria) – monitor only?

- **Antacids** – no

- **Calcitriol** - no
Key takeaways

- SDMA is more reliable than traditional diagnostics.¹⁻³

- Increases earlier than creatinine with acute and chronic kidney disease
- Not impacted by lean muscle mass
- You can now identify kidney disease earlier during the patient visit.⁴

- There is something that can be done if SDMA is increased.

- Investigate, manage, and monitor kidney disease earlier!
- IDEXX SDMA® Test Algorithm
- idexx.co.uk/sdma

- SDMA has been added to the IRIS CKD diagnosis and staging guidelines.

- The Catalyst® SDMA Test is now available.

- Same quality and reference intervals as the IDEXX SDMA® Test at IDEXX Reference Laboratories

Source:
4. Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
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