

Urology

euvg

FELINE LOWER URINARY TRACT DISEASE (FLUTD)

Risk factors: male neutered, obese, dry food, no outdoor access.

Dysuria, stranguria, haematuria, pollakiuria CONFIRM LOWER urinary tract disease.

These are NOT EXPECTED IN UPPER urinary tract disease (kidneys / ureters).

Advise owner to read icatcare.org



FLUTD is a global term that includes:

- Feline idiopathic cystitis (the majority of cases)
- Plugs (caused by inflammation – so these are idiopathic cystitis)
- Urethral obstruction (caused by spasm/plugs caused by inflammation – so these are idiopathic cystitis).
- Infection
- Masses
- Uroliths

Diagnosis:

Urine sediment

Ultrasound of urinary tract

FELINE IDIOPATHIC CYSTITIS

Painful inflammation, caused by intolerance to stress and defective glycosaminoglycans in the bladder.

Treatment:

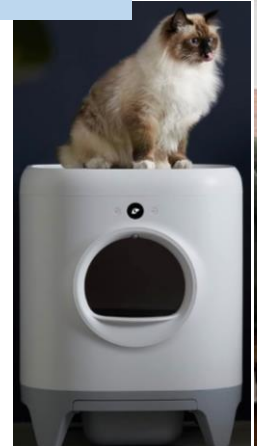
- Dilute the urine (less painful, lower risk of urolith formation): **WET food with added water.**
- Analgesia: metacam, buprenorphine, gabapentin.
- ↓stress :
 - scratch posts
 - wall shelves at a HEIGHT and with a good view**
 - at least 1 litter tray, 1 bed, 1 food bowl, 1 water bowl per cat
 - encourage hunting: allow to go out, hunting toys
 - feliway
- In refractory cases: amitryptiline
- **Nothing else helps!** (cranberries, glycosaminoglycans, flushing the bladder...)



Etsy.com
Amazon



PETKIT



Catios – how to build: <https://www.youtube.com/watch?v=sRnLxL3EKB0>



All the same, idiopathic cystitis!

Urethral obstruction: also give smooth muscle relaxant prazosin
(better than skeletal muscle relaxant dantrolene)

- Feline idiopathic cystitis
- Plugs
- Urethral obstruction
- Infection
- Masses
- Uroliths

Only <2% of young cats with FLUTD have infection!
More common in older cats.

Neoplasia of the lower urinary tract is rare in cats.
Renal lymphoma is not expected to cause stranguria, pollakiuria etc

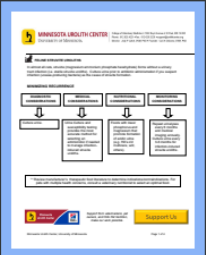
For any uroliths, follow the treatment/monitoring advised by Minnesota Urolith Centre.

- Canine Struvite
- Canine Struvite / Calcium Phosphate Carbonate
- Canine Struvite Dissolution
- Canine Struvite / Urate
- Canine Urate
- Canine Xanthine
- Feline Calcium Oxalate
- Feline Calcium Oxalate / Urate
- Feline Calcium Phosphate
- Feline Calcium Phosphate Carbonate
- Feline Compound
- Feline Cystine

FELINE STRUVITE UROLITHS

1 / 4

50%

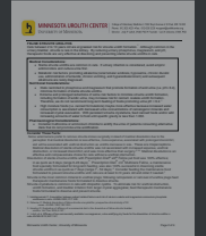


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FELINE STRUVITE UROLITHS

1 / 4

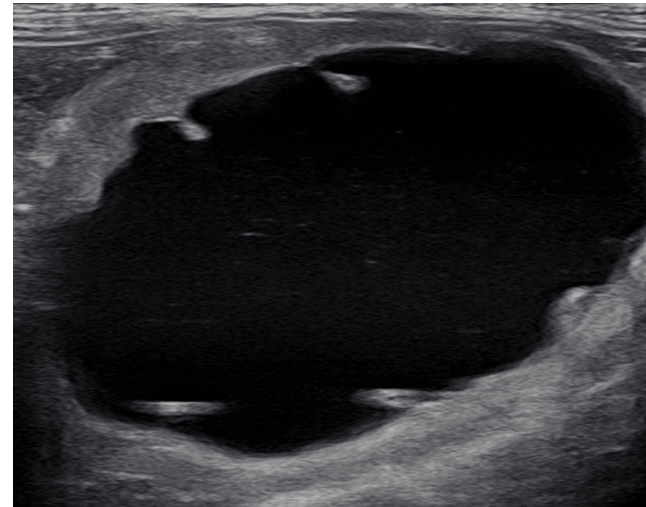
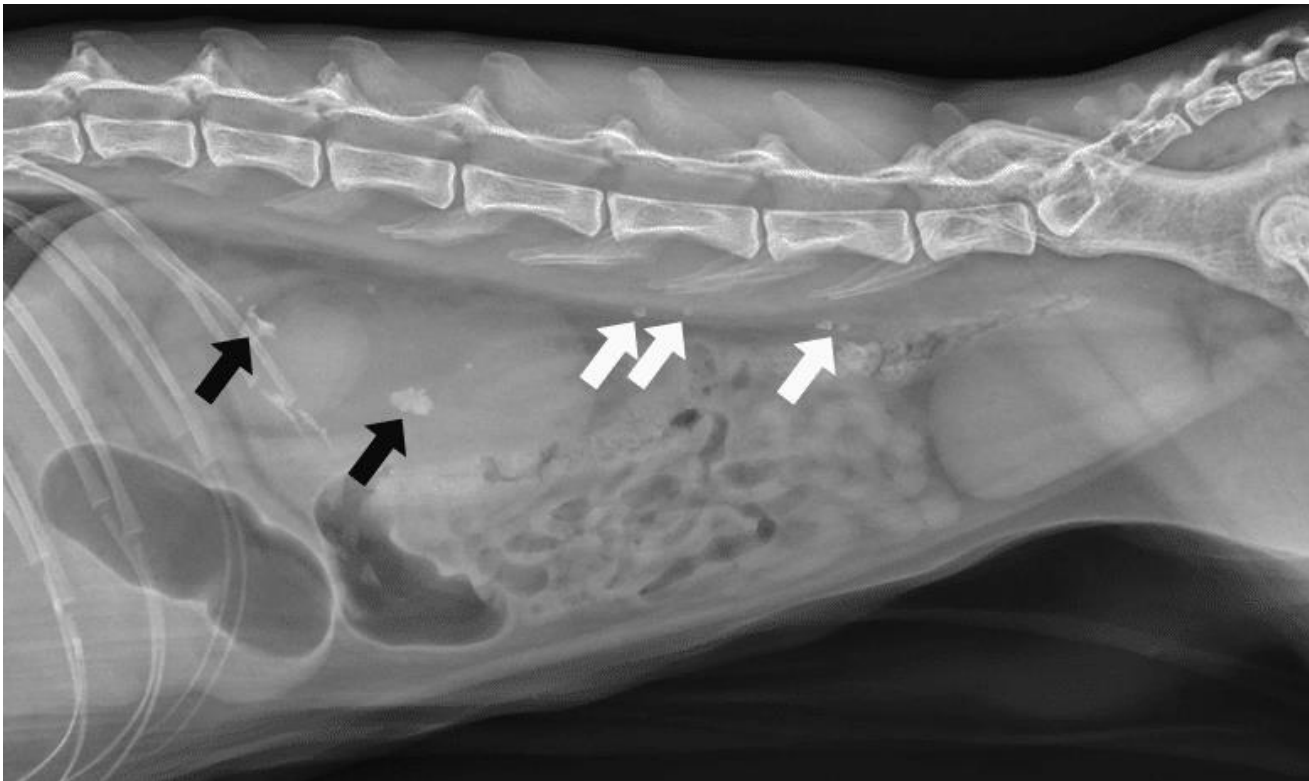
50%



2

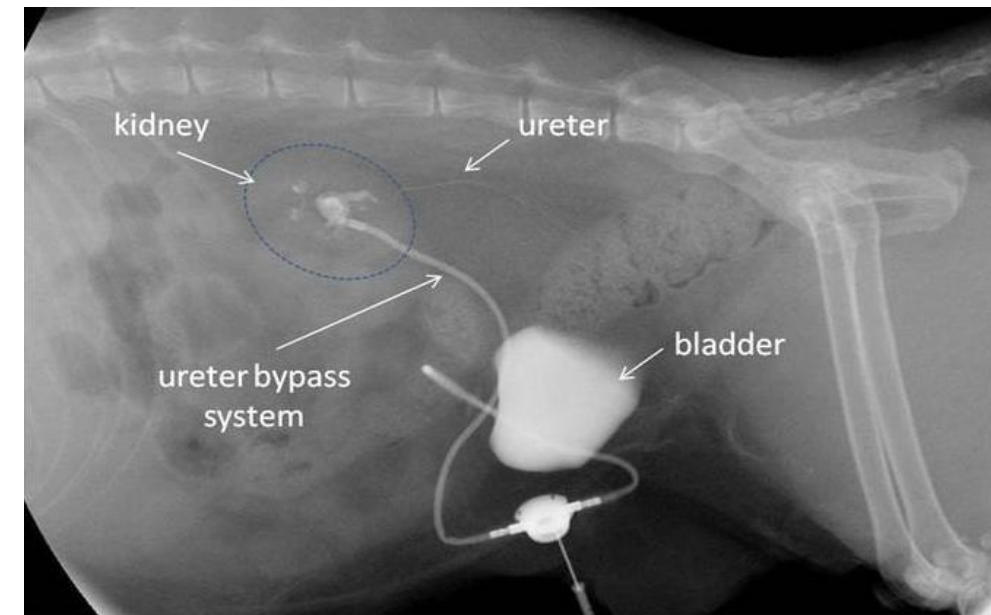
URETEROLITHS → "BIG KIDNEY, LITTLE KIDNEY":

- A previous ureterolith caused urinary obstruction on one side → chronic hydronephrosis led to atrophy of that kidney.
- Now, a ureterolith is causing hydronephrosis on the contralateral side → this kidney is large due to current hydronephrosis + hypertrophy to compensate for the other atrophic kidney.



Treatment:

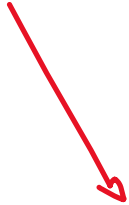
- ~100% ureteroliths are calcium. **NON DISSOLVABLE**
- For pain: buprenorphine. **NOT NSAIDs!**
- To push the urolith into the bladder: Hartmanns 2 maint + furosemide and prazosin when hydrated.
Effective in only 10%, try for a maximum of 3 days!
- Remove hydronephrotic, painful kidney surgically? Absolutely not, it's the kidney that is providing most of the GFR!
- Remove atrophied kidney, very small and abnormal on US? Absolutely not, it's still contributing for GFR and is not causing any problems now.
- Treat CKD as per IRIS guidelines.
- **SUB (subcutaneous ureteral bypass)**



Nephrology

AKI = functional dysfunction for <3 months.

CKD = functional or structural dysfunction for >3 months.



1st ↑SDMA

Abnormal kidneys on US (for example, polycystic)

2nd ↓USG

with normal SDMA, USG and creat are considered CKD IRIS stage 1

3rd ↑creatinine

When creatinine is ↑, there is no value in measuring SDMA

(except cats with little muscle mass, where you think creatinine is not reflecting the severity of CKD)

DD AZOTAEMIA:


1st rule out POST-RENAL

- **History** of urinary rupture or obstruction

2nd rule out PRE-RENAL

- **USG** > 1030 dog, 1035 cat

3rd confirm RENAL

- **USG** < 1030 dog, 1035 cat
in absence of extra-renal disease that
causes inability to concentrate urine
- 

DD PU/PD:

Most common:

- 2ry nephrogenic diabetes insipidus (NDI): ↓K, ↑Ca, liver, lepto*, pyelonephritis, steroids, pyometra/prostatitis*
- Osmotic diuresis: renal, DM, Fanconi & Fanconi-like syndrome*, Addison's*

Less common:

- ↑ GFR: hypertension, hyperthyroidism
- ↓ urea: PU, liver failure
- 1ry or psychogenic PD*
- Central diabetes insipidus (CDI): head trauma, brain tumour.
- 1ry NDI

***rare in the cat**

DIAGNOSIS OF AKI OR CKI IS NOT POSSIBLE WITHOUT URINE ANALYSIS!

(as a minimum, we need USG to rule out pre-renal, sediment to rule out pyelonephritis)

CKD MYTHS

Only older cats can have CKD.

WRONG: CKD can affect any age.

All CKD cats should receive weekly SC fluids.

WRONG: cats with chronic dehydration should be given weekly SC fluids. If the cat eats well (wet food helps maintain hydration) and drinks well (place several water bowls + fountain in the house), he doesn't need fluids.

All CKD cats should receive frequent IV fluids, as their creatinine improves after a few days.

WRONG: drop in creatinine after fluids is caused by dilution, if the cat is not dehydrated he doesn't need fluids.

Cats with CKD require antacids lifelong.

WRONG: GI ulceration in CKD cats is rare.

CONSENSUS STATEMENT

Consensus Statements of the American College of Veterinary Internal Medicine (ACVIM) provide the veterinary community with up-to-date information on the pathophysiology, diagnosis, and treatment of clinically important animal diseases. The ACVIM Board of Regents oversees selection of relevant topics, identification of panel members with the expertise to draft the statements, and other aspects of assuring the integrity of the process. The statements are derived from evidence-based medicine whenever possible and the panel offers interpretive comments when such evidence is inadequate or contradictory. A draft is prepared by the panel, followed by solicitation of input by the ACVIM membership that may be incorporated into the statement. It is then submitted to the *Journal of Veterinary Internal Medicine*, where it is edited before publication. The authors are solely responsible for the content of the statements.

ACVIM consensus statement: Support for rational administration of gastrointestinal protectants to dogs and cats

Summary of the guidelines:

- If you need a gastroprotectant, use omeprazole 1mg/kg q12h
- If you think q24h is enough, you probably don't need a gastroprotectant
- Ranitidine doesn't work in cats/dogs as an antacid or prokinetic
- There are 3 indications to use omeprazole:
 1. Regurgitation/reflux
 2. Evidence/high suspicion of GI ulcers (haematemesis, melaena)
 3. Intoxication with NSAIDs
- Except for the 3 situations above...

NOT TO BE USED in vomiting, anorexia, renal or liver disease, pancreatitis, when using steroids or NSAIDs!

Case 1

7y old FN DSH

Hx: PU, hyporexia, weight loss for 3months

Physical exam: N

Haematology: N

Bioch: ↑creat, ↑urea, ↓K

Problem List:

- Azotaemia
- PU
- ↓K
- Chronic GI signs



DD:

- 1st rule out POST-RENAL - no history of urinary rupture/obstruction
- 2nd rule out PRE-RENAL - USG
- 3rd confirm **RENAL** - urine analysis

DD:

Most common:

- 2ry NDI: ↓K, ↑Ca, liver, leptospirosis*, pyelonephritis, steroids, pyometra/prostatitis*
- Osmotic diuresis: **renal**, DM, Fanconi & Fanconi-like syndrome*, Addison's*

Less common:

- ↑ GFR: hypertension, hyperthyroidism
- ↓ urea: PU, liver failure
- 1ry or psychogenic PD*
- Central diabetes insipidus (CDI): head trauma, brain tumour.
- 1ry NDI*

***rare in the cat**

DD:

- Loss through V D PU (**renal**)
- ↓ oral intake
- Conn's
- Periodic hypokalaemia of the Burmese

Case 1

7y old FN DSH

Hx: PU, hyporexia, weight loss for 3months

Physical exam: N

Haematology: N

Bioch: ↑creat, ↑urea, ↓K

USG: 1020

Urine dipstick, sediment, culture: N

Diagnosis: **CKD confirmed on urine analysis.**

What would you do now?

1. IRIS staging and substaging.

2. Try to find the cause:

- FIV FeLV

- Electrolytes

- iCa

- imaging of the kidneys

- imaging of the adrenal glands if has hypertension or hypokalaemia (Conn's Syndrome)

IRIS Staging:

- creatinine (2 measurements in hydrated animal, at least 2 weeks apart): 4mg/dl

Sub-Staging:

- BP (several measurements): 170
- UPC (2 measurements at least 2 weeks apart, after ruling out infection): 0.3

Systolic Blood Pressure mmHg	Blood Pressure Substage
<140	Normotensive
140 – 159	Prehypertensive
160 – 179	Hypertensive
≥ 180	Severely hypertensive

UP/Cvalue		Substage
Dogs	Cats	
<0.2	<0.2	Non-proteinuric
0.2 to 0.5	0.2 to 0.4	Borderline proteinuric
>0.5	>0.4	Proteinuric

Stage	Blood creatinine* μmol/l mg/dl	
	SDMA# μg/dl	
	Dogs	Cats
1	<125 <1.4	<140 <1.6
	<18	<18
2	125 – 250 1.4 – 2.8	140 – 250 1.6 – 2.8
	18 - 35	18 - 25
3	251 – 440 2.9 – 5.0	251 – 440 2.9 – 5.0
	36 - 54	26 - 38
4	>440 >5.0	>440 >5.0

IRIS Stage 3, hypertensive, borderline proteinuric.

Treatment: follow IRIS guidelines



Stage 3 Feline patients:

The range of presentations for cats in Stage 3 is likely to be wide, from no clinical signs to quite marked extra-renal clinical signs. The main treatments mentioned

- Renal diet
- Water available at all times
- For hypertension: amlodipine
- For \downarrow K: Kaminox
- For $P > 1.5$:

Often within lab reference, but guidelines advise to keep between 0.9-1.5!

Feed renal diet exclusively for 6 weeks

After 6 weeks, if P still high (**FAST 12H BEFORE**), P binders at every meal.



Renal diet is the most important treatment!!

Cats/dogs with CKD who eat a renal diet live 3x longer, and have up to 6x fewer episodes of uraemia (compared with those who eat a normal diet)

It is NOT the same as feeding a senior diet + P binders!!

SURVIVAL TIME:

Stage 2: >> 4 years

Stage 3: 2 years

Stage 4: 1 month

Very different in the dog: survival for azotemic dog often <1 year.

Monitor every few months THE THINGS THAT LEAD TO CKD PROGRESSION:

1. ↑BP
2. ↑UPC
3. Pyelonephritis
4. ↓K
5. ↑iCa (NOT tCa!)
6. P>1.5

Also monitor PCV because severe anaemia can cause lethargy and...

severely anaemic CKD cats (PCV <20% **AND** clinical signs of anaemia) given darbepoetin live 3x longer!

1 mcg/kg SC q1week until PCV >25%, then q3weeks to maintain PCV at 25-35%
+ iron dextran 10mg/kg IM q1month (NOT IV – anaphylactic reactions!)

Aim to rise PCV no more than 3% per week! (risk of seizures, hypertension, pulmonary oedema, vomiting)
Do not use epoetin.

Case 2

7y old FN DSH

Hx: PU, hyporexia, weight loss for 3 weeks

Physical exam: N

Haematology: PCV 20%, non-regenerative

Bioch: ↑creat, ↑urea, ↓K



Diff-quik:

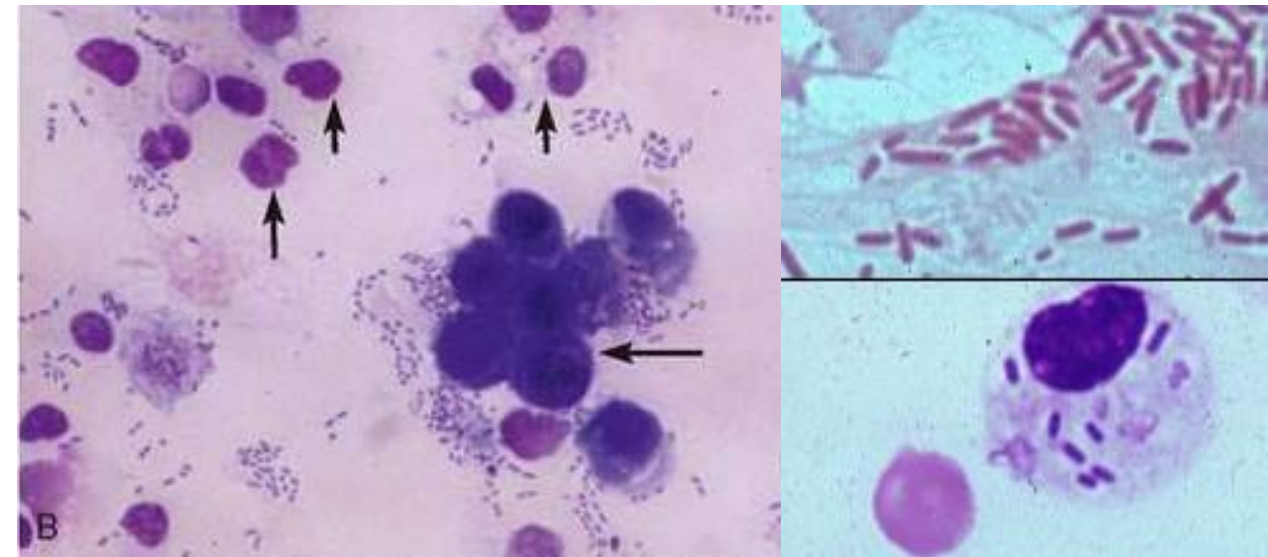
What is the first test you do investigate the azotaemia?

Urine analysis!

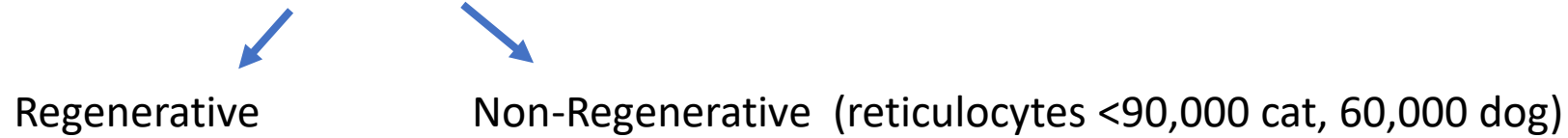
- USG <1035
- Dipstick
- Sediment

What is your diagnosis?

PYELONEPHRITIS



ANAEMIA



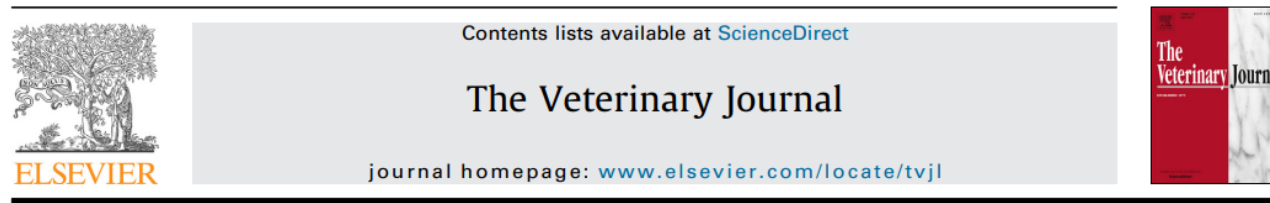
- Anaemia of Inflammatory Disease (previous “Anaemia of Chronic Disease”)
 - this can drop PCV to 15% in cats, 20% in dogs
- Pre-regenerative (4 days)
- CKD
- Iron Deficiency
- Non-Regenerative IMHA
- Bone marrow disease
- HypoT4 – dogs
- Addison’s - dogs

Treatment:

- Pyelonephritis → marbofloxacin ~3 mg/kg IV q24h then PO 3weeks.
- Rehydrate → Hartmanns
- Nausea → maropitant
- Stimulate appetite → mirtazapine
- Anaemia → wait

NOT Enro or Cephalosporins or Amoxi-clav!!

Reduce the dose in renal or liver disease: 2mg q48h



International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats



AKI can take 3 months to resolve (it may take 3 months to find out if this cat has CKD)