VetVault CLINICAL
Small Animal Medicine

Ureteral stones

Yes, it's a thing!

WITH DR DAVE COLLINS

The basics

WHY ARE WE SEEING THEM?

1. Changed dietary components to
- minimise magnesium and phosphate, and
- acidify urine

in an effort to reduce struvite stones.

Flip side was a massive increase in calcium oxalate, and they love the upper urinary tract.

2. We're scanning more, so we're seeing more.

WHY ARE WE MISSING THEM?

Can present as any of the causes of acute kidney injury, eg

- Lily toxicity.
- Pyelonephritis.
- FLUTD

Ie - if we don't scan these we'll miss them.

What do they present like?

SIGNALMENT

Breeds - **Maine Coon, Siamese**.
Middle aged cats, 5-8, whereas a lot of our chronic kidney disease cats are geriatrics.
Uncommon in dogs.
Springtime when things are warming up and cats are getting further behind on the hydration seems to be a peak.

CLINICAL PRESENTATION

Painful, angry - previously nice cat is now a beast.

Vomiting and inappetence.

Abdominal pain.

Sometimes pyrexic.

Lower urinary tract signs.

Pro tip: you might suspect it when you've got a painful cat that's straining to urinate and you feel an empty bladder.

Look out for a syndrome called **big kidney little kidney.** Second kidneys obstructs acutely, while the first kidney obstructed and shut down years ago.
Differentials for this: cystic kidney disease, even lymphoma,.

DIAGNOSIS

Significant **azotaemia**, 3-500 creatine.

Urinalysis:

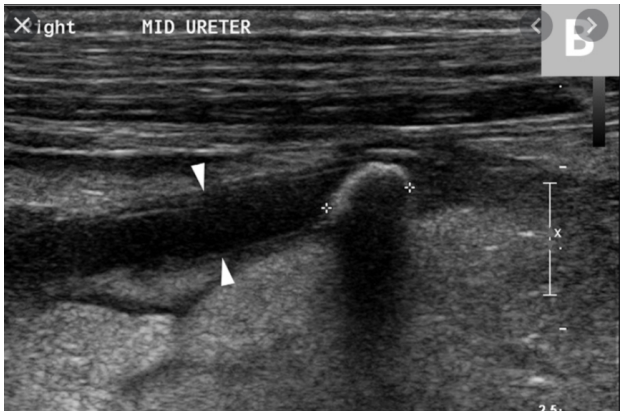
- Might see microscopic crystals. (CaOx, although if there is infection you might see struvite crystals!)
- May have infections. (Neuts and bacteria)
- **Pro tip: SG might be normal.** Often they can perfectly adequately concentrate the urine with the one kidney.

Radiography

Calcium oxalate mostly radiopaque, so it is worth shooting rads to try and confirm your suspicions.

Ultrasound

Normally on a scan the renal pelvis is collapsed and you don't see anything.
If a patient is on **fluids** or is PUPD or diuresing you might get them distended to **3 or 4 millimetres**.
Pyelonephritis: distended up to **4 or 5 millimetres**, fluid might be **more ecchogenic.**
Obstruction: almost no doubt if you're above **8 to 10 millimetres.**
Between 4 and 8 mm is tricky. If you turn the probe 90 degrees - get a transverse section of the pelvis. might see is a distended ureter extending from the renal pelvis, and you might see a hyperecchoic shadowing stone.



The renal pelvis will start distending within 48 hours.
Within two weeks of obstruction is there's 80% nephron loss in the kidney.

DIFFERENTIALS

Ureteral strictures.
Neoplasia, usually at the level of the trigone.
DSB's - dried solidified blood clots, sometimes in combination with a stone. From trauma.
Circum-caval ureter - anatomical abnormality.

Medical therapy

- They're essentially anuric and may become hyperkalaemic.
It's an emergency and you need to decompress that area immediately.

- Run acid base to see how bad the acidosis is and how bad the hyperkalaemia is.
If hyperK - Calcium gluclonate to try and stabilize the heart. Insulin and glucose to try and get the potassium down,.

- Antibiotics if evidence of infection on the urinalysis.

- Analgesia. Fentanyl CRI - Buprenorphine not strong enough. Be VERY careful with NSAID's.

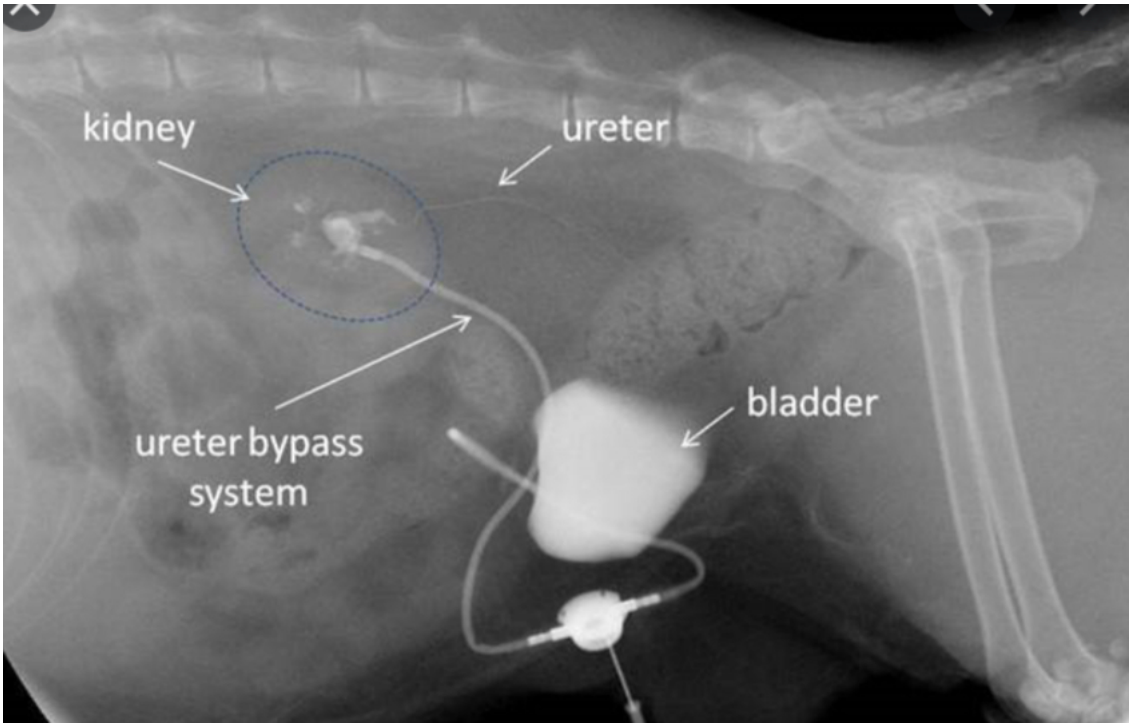
- Anti-emetics

- IV fluid support
BUT, like any acute kidney injury be **really careful with volume overload**. Volume overload can be detrimental to return of kidney function.
Do whatever you can to try and monitor the urine output. If reduced you could try

- Mannitol to try and diurese the stone out, particularly if you've got an idea that there's a small stone and it's in the distal ureter. Better than Frusemide, because it doesn't interfere with electrolytes, and mannitol has mild anti-oxidant effects which minimises some of the subsequent renal damage to kidneys. Don't do it if you think it's fully obstructed.

- Prazosin and amitriptolyne as an antispasmodic.

Surgery - subcutaneous urethral bypass



Ideal management.
Essentially an artificial ureter.
Drains the urine from the distended renal pelvis via the port and then into the nephrostomy tube and into the bladder.
Around 80% success rate in most studies.
Can last for up to three years.

Complications:

- Infection. Note - they form a biofilm, which makes them a real bugger to treat if they get infected.

- Can mineralise into the device and obstruct again.

Manage them with a solution called Tetra EDTA:
breaks down the calcium oxalate stones and prevents mineralization, and can also help with infections.

NEPHRECTOMY
Salvage procedure in some cases, but be very wary that the other side may obstruct down the line!