Feline lower urinary tract disease: An update

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Feline lower urinary tract disease (FLUTD) is just one of many acronyms that have been used to describe a common clinical presentation in cats. It is important to recognise that this does not constitute a diagnosis but describes a constellation of clinical signs, including haematuria, pollakiuria, stranguria, and inappropriate sites of urination. In many instances no underlying cause for this condition can be identified and the condition may then be known as idiopathic FLUTD (or iFLUTD) of FIC which is variably taken to stand for Feline Interstitial Cystitis or Feline Idiopathic Cystitis.

Interstitial cystitis (painful bladder syndrome) is a sterile cystitis that occurs in women more often than men and is also of unknown aetiology. Given the lack of understanding of both the feline and the human conditions it is easy to draw parallels but difficult to be certain that the conditions are necessarily alike. Even within cats it is unclear whether this syndrome represents just one disease, it could be a common presentation with various different causes. It is assumed that urethral obstruction in male cats (especially when due to urethrospasm alone) is a variant of this condition, but again this is difficult to prove when the cause of the condition is unknown and it is a diagnosis of exclusion.

Epidemiology of FLUTD

Older cats that present with FLUTD are often much more straightforward to manage than young cats because in most instances an underlying cause for their clinical signs can be identified. The following bar graph shows the underlying cause for signs of FLUTD in young and old cats. The definition of old cats in this study was 10 years, but there is a gradual trend with increasing age for idiopathic cystitis to be less likely, particularly if it is the first episode that the cat has suffered.

Data compiled by Bartges

In an older cat presenting with FLUTD signs, collecting a urine sample for measurement of specific gravity, dip-stick test, sediment examination and culture is always indicated. If, as is likely, a urinary tract infection is identified then an underlying cause for this should be sought.
If no UTI is identified in an older cat that is exhibiting signs for the first time then further diagnostic evaluation is indicated, generally imaging of the lower urinary tract to rule out urolithiasis and neoplasia. Only once these conditions have been ruled out should the condition be considered idiopathic.

**FLUTD in young cats**

In young cats with FLUTD no underlying cause for their clinical signs is identified in >65% of cases. These patients can be extremely frustrating to manage.

The clinical signs of FLUTD are typically episodic and resolve spontaneously in a few days unless urethral obstruction occurs. This means that whatever is used to treat an ‘episode’ may appear to be successful, even if it is not actually having any beneficial effect. Unfortunately recurrence of signs is common (39% within 18 months in one study). A sub-population of cats will have chronic disease, which may wax and wane in severity, but these patients are very difficult to treat.

Risk-factors for FLUTD have been identified although the results are inconsistent between studies. It is usually considered that the problem is more common in overweight, young-middle aged cats. Male cats tend to be over-represented in the published literature but this may be due to their tendency to develop urethral obstruction. A recent prospective study found that many cats show lower urinary tract signs without ever being presented for veterinary attention. In that study, which was based on questionnaire completion rather than veterinary attention being received, male and female cats were affected equally.

**What causes iFLUTD?**

Obviously if we knew the answer to this the disease would no longer be called idiopathic, but there are several theories:

1. **Infectious agents**

   Attempts to isolate bacteria and mycoplasma from urine have been consistently unsuccessful. In spite of this cats with iFLUTD are commonly treated with antibiotics and because the cats get better (not due to the antibiotics but because the signs spontaneously resolve) this provides apparent re-enforcement that a bacterial infection is present.

   Viral particles have been observed within urethral plugs examined with electron microscopy. Several viruses have also been isolated from urine including Herpes viruses and caliciviruses among others. A viral aetiology (by analogy with Herpes virus infections in other locations) could explain the episodic nature of the clinical signs and the recurrence of clinical signs, particularly in stressful circumstances.

2. **Crystalluria**

   Struvite crystals are found in >50% of cats with signs of FLUTD and in the same proportion of young cats without clinical signs. Crystals cannot directly damage the urethra or bladder mucosa. Uroliths (stones) are a potential cause of FLUTD accounting for 15-20% of cases. However, the presence of crystals does not mean that a cat has stones presently, or that it will develop them in the future. Over-zealous treatment to try to prevent struvite crystals may result in calcium oxalate crystals forming instead.

   Crystals may play some role in the development of urethral plugs and consequent urethral obstruction. However, crystals do not cause urethral obstruction on their own; inflammation and urethral spasm also needs to be present for this to occur. Urethral plugs appear to now be less common than they once were, with urethral spasm alone
being held responsible for the obstruction in around 80% of cats in recent studies\(^3\). This is also consistent with the recent observation that many cats can be treated with bladder decompression, sedation and fluid therapy alone, and will spontaneously start to pass urine again without ever placing a urinary catheter.\(^4\)

3. Deficient glycosaminoglycan (GAG) layer
Studies in cats with iFLUTD have documented decreased concentrations of urinary GAGs.\(^5\) Additionally, the epithelial barrier of bladders from affected cats are reported to be compromised, allowing increased penetration of irritating protons and potassium ions from urine to the submucosa, which may stimulate sensory neurons (C fibres).\(^6\) Neurogenic inflammation could then cause histamine release from mast cells, muscle contraction and vasoconstriction.

4. Sympathetic over-activity
It is known that stress may precipitate or aggravate iFLUTD in cats and some preliminary work suggests that an inappropriate stimulation of the SNS or derangement of the hypothalamic pituitary axis may occur in this condition.\(^7\)

Treatment of iFLUTD
A huge number of treatments have been proposed for iFLUTD. This should immediately alert you to the fact that none of them work very well, if at all.

1. **Feed canned food.** One study found that a lower rate of recurrence of clinical signs occurred when cats were fed canned rather than dry cat food.\(^8\) This has led to the current recommendation that all cats with iFLUTD should be changed onto canned food if at all possible. Unfortunately some cats are resistant to change and a diet change could be a stressor. In the recent prospective study of young cats there was no difference in the occurrence of signs in cats eating dry or moist foods but diet change was a risk factor.\(^2\)

2. **Increase water intake.** Since it is presumed that the response to eating canned food is due to formation of less concentrated urine then other methods of increasing water intake (adding flavouring, drinking fountains etc.) might also be beneficial. However, it is notable that these interventions have not actually been shown to decrease urine specific gravity, at least in the hospital environment.\(^9\)

3. **Reduce stress.** Some owners will recognise events that will trigger an episode of FLUTD in their cat. Some studies have supported this anecdotal observation.\(^10\) Avoiding stress is difficult but minimising overcrowding (feline and human), having many clean litter-boxes in different areas of the house, and providing environmental enrichment are all recommended. Diffusers for facial pheromones (Feliway diffusers) are also a benign treatment option and although they have not been proven to be beneficial the study that evaluated their use was very under-powered.\(^11\)

4. **Synthetic GAGs.** A placebo-controlled trial of pentosan polysulfate (conducted in the US where an oral formulation is available) did not demonstrate benefit.\(^12\) Subsequent studies have also been performed giving this product by injection, or instilling it directly into the urinary bladder of cats that have been obstructed, but the product has been equally ineffective.\(^13\) N-acetyl glucosamine (‘Cystease’ and similar) is a precursor of GAG and is available in the UK as a neutraceutical. A placebo-controlled trial of this treatment found that cats improved when treated with this, but also when treated with placebo.\(^14\)

5. **Amitriptyline.** This drug is a tri-cyclic anti-depressant that also has anti-cholinergic, antihistamine, anti-inflammatory and analgesic effects. It has been used to treat
iFLUTD and initial reports following its use in cats with chronic signs were quite encouraging. However, subsequently performed placebo controlled trials have shown that cats with acute episodes of iFLUTD treated with amitriptyline are more likely to develop UTIs and to suffer from relapses of their clinical signs than cats treated with placebo.\textsuperscript{15} It has also been observed that some of these cats, although initially stone-free, go on to develop urolithiasis. These may occur due to a tendency for cats treated with this drug to suffer from urinary retention.

6. **Non-steroidal anti-inflammatory drugs.** The use of meloxicam is widely advocated for cats showing signs of cystitis, due to concerns for their welfare.\textsuperscript{16} However it is notable that these drugs have only been studied in a limited manner in cats recovering from episodes of obstruction and have not been shown to have any effect on recovery.\textsuperscript{17}

**References**


