Feline idiopathic cystitis: The veterinary nurse's role in the treatment and management.

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Feline urinary tract issues may result from a number of different aetiologies including infection, neoplasia, urolithiasis, neurological disorders, anatomic abnormalities and inflammatory conditions. The name Feline lower urinary tract disease (FLUTD) may not be wholly representative of the condition, the role that stress has on the urinary system is starting to become more fully understood. Of the feline patients seen in first opinion practice approximately 7% present with urinary disorders. With increases of the prevalence of risk factors such as obesity there is the potential that there will be more cases being presented.

| Age | Most commonly seen in cats between one and ten years. |
| Gender | Males and females have a similar risk of non-obstructive FIC. Prevalence of urethral obstruction is more common in males |
| Neuter Status | Neutering in both males and females is associated with an increase in risk. |
| Food | An increase in dry food consumption can increase risk factor. |
| Weight | Excessive weight (obesity) will increase the risk of FIC. |
| Water Consumption | A decrease in water consumption can greatly increase the risk. |
| Activity Levels | Animals that have a more sedentary lifestyle are more likely to develop FIC. |
Veterinary practices are more likely to see an increase in FIC cases when the weather is poor. Possibly due to cats unwilling to urinate outdoors in wet weather.

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Table 1: Risk factors associated with increases in FIC cases.

Urine is a composite of a complex solution of both organic and inorganic ions. Crystals can grow and form when an imbalance occurs in this complex solution. There are several reasons that can cause these imbalances. Diet, decreased water consumption, urine pH alterations or relative lack of inhibitors of crystallisation can cause the solubility of a particular crystal to be exceeded. This result is crystal aggregation and growth. Clinical signs of FIC include haematuria, proteinuria, dysuria, polakiuria and/or urethral obstruction.\(^1\) A full diagnostic work up is recommended in all cases, including blood work and imaging, (Figure1).

It is recommended that all cases are given advice on all aspects of husbandry. Dietary manipulation can aid in reducing the risk factors of uroliths, but there are many other factors that need to be taken in to consideration and addressed. Nurse clinics are an ideal place to convey all this information. The aims of the nurse clinic would be to include:
- A full history of the environmental factors needs to be taken for the cat, this includes other pets in the household, any changes at home (builders, new baby) and give advice regarding these factors. Discuss strategies to reduce any stressors for the cat.

- Diet manipulation,

- To aid the animal in order to obtain an ideal body condition score if required.

Recommendations should be given to clients about preventative measures in all cats. There are clear risk factors associated with FIC, some cannot be helped, and age, breed and gender, others, such as lifestyle and obesity can. Neutering does play a significant impact on the risk of bladder stones, the risk of oxalate increasing seven fold, struvite 3.5 fold. Educating the owner to ensure an adequate water intake, and limiting weight gain post neutering is vital.

Nutrition.

Struvite crystals (MgNH₄PO₄.6H₂O) are commonly seen in cats suffering from FIC. Dietary recommendations for these cats include avoiding excessive dietary protein, avoiding excessive levels of the minerals that are used within the crystals (magnesium and phosphorous), increasing water consumption. Urinary pH needs to be within the recommended urinary pH range, as the crystals form in an alkaline environment. A range of 5.9 to 6.1 is ideal for dissolution, whereas 6.2 to 6.4 is recommended for prevention. The average urinary pH of domestic cat consuming a natural diet (small rodents) is pH6.3.

Acidifiers are used to prevent struvite uroliths. Cats receiving long-term dietary acidifiers can suffer from a transient negative potassium balance, with phosphoric acid and ammonium chloride acidifiers. Long-term potassium depletion will stimulate ammonia synthesis at the same site as chronic metabolic acidosis. Acidifying therapeutic veterinary diets need to have potassium levels in excess of the NRC minimum allowance of 0.6% (DMB). The use of urinary acidifiers alongside an acidifying food is not recommended, as it can lead to
metabolic acidosis. The alterations in pH may increase the solubility of some of the solutes within the urine, and in some cases decrease the solubility of other. This complex and competing interplay between nutritional requirements of the management of oxalate and struvite urolithiasis requires a careful selection in the long-term dietary control of FIC.

Excessive levels of protein need to be avoided in cases where struvite crystals and alkaline urine is present. High protein level can influence pH; a prime example of this is the difference in urine pH between cats and dogs. Cats have higher protein consumption than dogs, and therefore an increased urinary pH. Increasing the protein level in the diet also increases urinary calcium excretion, uric acid and oxalate excretion. Excess dietary protein should be avoided by feeding a food that contains 30-45% DM protein.1

Diets that promote urinary tract health do tend to have a higher fat content. This is due to the increased energy density which overall reduced mineral intake. When metabolised, fat produces the highest metabolic water contribution, which also benefits the animal. Due to the increased fat content some veterinary therapeutic diets are not available in a dry form. Obesity is a major risk factor of FIC, and a diet with a higher fat content may not be the indicated diet in this circumstance.

Cats that suffer from FIC and are overweight need to be placed on an obesity diet. Many of which have higher fibre content. The quantity of calcium being absorbed from the digestive system can be reduced by certain sources of dietary fibre. This can be beneficial with cats suffering from recurrent calcium oxalate urolithiasis.

Struvite precipitates form when the urine becomes supersaturated with magnesium, anionic phosphate and ammonium. Therapeutic diets avoid excess dietary magnesium, but low
urinary magnesium concentrations have the potential to increase the risk of the formation of calcium containing uroliths. Highlighting the importance of regular urinalysis, when on a therapeutic urinary diet. The intake of magnesium and calcium also influences urinary phosphate concentrations.

The addition of sodium into the diet is occasionally utilised in order to aid in increased water intake. Increasing the salt content of the diet can aid in diuresis and lowers the urine specific gravity.

Water.

Water intake is a vital factor in cats with FIC or a predisposition to FIC. The solute load of the diet influences total water intake by a large factor. Use of a moist diet is preferred, and additional water can also be mixed in if required. Encouragement to increase the consumption of water can also be achieved by increasing access, by placing more bowls of water around the cat’s environment. A choice over type and size of water bowls used needs to be considered. Cats can be deterred by the use of fresh tap water due to the chlorine content. Use of bottled, pre-boiled water or water that has been left to stand will have little or no chlorine that can be detected by the cat.

Increases in water consumption will increase the total volume of urine produced. Crystals precipitate out into the urine when supersaturation occurs. Urine becomes saturated when the salt content completely dissolved within the fluid. Any additional salt or decrease in the relative fluid volume will result in precipitation of the salts, hence the requirement for
large volumes of more dilute urine. Owners are recommended that the animal’s urine should remain dilute and have no strong smell, most owners will have difficulty with this as most cats will urinate outside.

Urinalysis should be performed on a regular basis, at least every three to six months. Sediment analysis along with pH and specific gravity are all good indicators of overall health. FIC can result in haematuria and proteinuria. Fresh urine samples should be used when performing urinalysis. Samples obtained via cystocentesis should be used when obtaining samples for bacterial culture and sensitivity. Voided samples and those not examined immediately can have false positives for bacteria and crystalluria. Many owners will need guidance on how to obtain urine samples from their cats.

GAG Supplements.

The use of nutraceuticals in cases of FIC is commonplace. GAGs and chondroitin are widely used in order to provide a protective lining to the bladder. In the healthy animal there is a GAG layer that lines the urothelium in the bladder, and contributes towards the protection of the bladder wall from substances (e.g. crystals) present within the urine. Cats suffering from FIC can have a decreased excretion of urinary GAGs, and deficiencies in the GAG layer can contribute to urothelial damage, and ulceration and inflammation to the bladder wall. The edges of the crystals can cause trauma to the lining of the bladder resulting in haematuria. These types of nutraceuticals do not prevent reoccurrence of the crystals, but can aid in the reoccurrence of some of the clinical signs. Evaluation of treatment should be made over a sufficient period of time, (e.g. 3-6 months).
Feeding a cat with FIC.

The choice of diet is dependent on two factors, the body condition of the animal and results of the urinalysis. Correct identification of the type of crystals present (if any) and the pH of the urine is necessary. Use of a diet that promotes urinary health tends to be aimed to prevent struvite formation. Use of these diets in cats with a predisposition to calcium oxalate uroliths may increase the risk of urolith formation. A full dietary history of the cat is required, including any treats, supplement (especially if containing calcium) and whether or not the owner gives the cat milk. Both treats and processed human food (processed meats) are high in mineral levels, such as phosphorous, and should be avoided.

Use of a moist diet is preferable, as is *ad libitum* feeding. This might not be possible if the cat is overweight with this feeding scenario. When any animal consumes food, gastric acid is secreted and creates a temporary net acid loss from the body, and alkalisation of the urine. This is referred to as the postprandial alkaline tide. The alkaline tide is caused by secretion of bicarbonate into the blood by parietal cells of the stomach. A transient bicarbonisation is produced and increase urinary pH. Acidifiers in the diet will offset this increase in pH. If the diet is offered free choice (*ad libitum*), the cat will eat little and often. These feeding habits result in a smaller but more prolonged alkaline tide. This can reduce the likelihood of struvite precipitate formation.

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gender, others, such as lifestyle and obesity can. Neutering does play a significant impact on the risk of bladder stones, the risk of oxalate increasing seven fold, struvite 3.5 fold. Educating the owner to ensure an adequate water intake, and limiting weight gain post neutering is vital.

**Reducing Stress in Cats.**

The influence of behavioural responses in the cat have been widely linked to the occurrence of FIC in cats. Clients need to be made aware of this link and given appropriate advice in order to help their cat. Many cats can be presented to the veterinary practice for behavioural problems with inappropriate urination, medical issues needs to be ruled out prior to instigation of behavioural treatments. Any of the following behavioural traits can be indicators of stress.

- Food intake disorders (anorexia or over-feeding)
- **Overgrooming** (bald areas) or undergrooming (matted or soiled fur)
- House soiling, inappropriate urination or defecation.
- Decreasing levels of activity, increased resting or feigned sleep.
- Appearing withdrawn (reduced desire to play or interact), hiding.
- Extreme vigilance and heightened startle response.
- Defensive aggression towards people and other cats in the household, e.g. hissing.
- Increased dependency or social withdrawal (dependent on personality type).
- Changes in patterns of behaviour, e.g. spending a more significant amount of time indoors, irrespective of normal seasonal changes.
- Urine spraying.
Helping the client to understand these sometimes very subtle signs can be very difficult for clients. In multi-cat households the presence of other cats can be the main cause, and removal of the cause is impossible. Owners need to be supported in order to make changes to the household to help the stressed family member. There needs to be sufficient resources in the household in order to reduce competition for them. This means that more litter trays, food bowls and water bowls are required than cats within the household. All of these resources need to be separate from one another, as cats do not like to eat, drink or eliminate in the same area. Also take into consideration the type of cat litter that is utilised, as cats do have preferences. Multimodal environmental modifications (MEMO therapy) was found to be exceptionally useful in cases of FIC\textsuperscript{5}. MEMO involves gaining a full thorough environmental history. A detailed client history form, alongside additional client and veterinary resources can be found online at http://indoorpet.osu.edu/veterinarians/research/index.cfm.

**Stress and Anxiety Modification Supplements.**

There are several commercially available nutritional supplements and diets that contain specific nutrients and dietary ingredients that can aid in reducing stress and anxiety. These include L-tryptophan and milk protein hydrolysate (MPH). Tryptophan is an essential amino acid that is a precursor of serotonin in the brain. Tryptophan has shown to decrease anxiety, stress-related behaviours and house-soiling when placed in the diet after eight weeks.\textsuperscript{6} MPH is a source of peptide which exhibits many biological effects, including a positive effect on the management of anxious disorders in cats,\textsuperscript{7} and acts as an anti-depressant in dogs.\textsuperscript{8}
Further reading:

Guidelines for achieving the environmental needs of cats have been published by the International Society of Feline Medicine and the American Association of Feline Practitioners⁵.

References.


Figure 1: Uroliths removed from a neutered female cat with intermittent signs of cystitis.

Figure 2: Use of different litter substrates can really benefit cats, you may need to be inventive.