

Dr. Liz O'Brien's Top 10 Tips

1. Do your feline patients carry ID?

In Canada, **only about** 3% of lost cats are returned to their owners. Microchip both indoor & outdoor cats, and ensure their contact information is up-to-date.

2. Do you support early spay & neuter practices?

Every year, 40,000+ adoptable cats are euthanized in Canada. Early feline spay/neuter procedures are medically sound and provide a solution to overpopulation.

3. Do you know about the environmental needs of cats?

Cats are solitary predators and exceptionally territorial. Households with multiple cats need safe spaces for each individual feline to eat, drink, rest and use the litterbox.

4. Do you use the Cat Healthy Preventative Healthcare Protocols?

Developed by Canada's 6 board certified feline specialists, these protocols include everything **from understanding the needs of cats** to early disease prevention for infections and parasites.

5. Do you know how to care for fearful feline patients?

Cats are sensitive to sound, smell, movement and touch. Let them take control of the appointment. With cats, less is more and slow is fast.

6. Do you have your AAFP Cat Friendly Practice certification?

The **AAFP** Cat Friendly Practice certification allows clinics to promote their commitment to offering the best, trained care for their feline patients.

7. Does your clinic have a **Cat Champion?**

Choose a member of your veterinary team to identify Cat Healthy tips that can improve the "vet experience" for your feline clients.

8. Does your clinic visibly value cats in your practice?

Because dogs dominate a lot of the visuals in clinics, **cathealthy.ca** provides cat specific tools and resources to help clinics create a mutually welcoming environment.

9. Do your clients find travelling to the vet stressful?

Travelling is a roadblock, for many cat owners. Discussing Cat Healthy travel tips

with clients can reduce the stresses involved with visiting the vet.

10. Do your clients know when their cat is sick or in pain?

For preventative healthcare to work, cat owners need to look for behavioural changes. They **are an indication** to owners when it is time to seek veterinary care.

Understanding and Treating FIC – The Most Common Cause of Non-Obstructive FLUTD

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Feline idiopathic cystitis (FIC) is a complex disease process in cats that is not fully understood at this time. It results in the clinical signs of feline lower urinary tract disease (FLUTD). Cats may exhibit pollakiuria, periuria, dysuria, hematuria and stanguria, vocalization when urinating and sometime hair loss on the lower abdomen. The severity of signs and the frequency with which they recur is variable. FIC can be obstructive or non-obstructive in its presentation. It is the most common cause of non-obstructive feline lower urinary disease.¹ This disease is generally seen in younger and middle aged cats and is uncommonly diagnosed in cats greater than 10 years of age. In reported studies, excessive body weight, decreased activity, multiple cat households and indoor housing have been associated with increased of FIC. FIC is a diagnosis by exclusion of other known causes of FLUTD. Affected cats can suffer recurrent episodes of FLUTD, which generally resolve without treatment over the course of 3–7 days. FIC can present as an acute episode or develop into a chronic re-occurring condition.

Identifying the underlying cause of FLUTD can be problematic. The main differential diagnoses of FLUTD are FIC, urolithiasis, neoplasia and a bacterial infection. Bacterial infections are rare and most likely seen in older female cats with a low urine specific gravity or cats with glucosuria. The take home message from this lecture is **DO NOT** prescribe antibiotics routinely to cats with FLUTD. Rarely do cats have a bacterial infection, even when they have a urolith. The need for antibiotics should be based on a positive urine culture and treated according to the sensitivity results.

When a cat is presented with FLUTD a detailed history including information about the cat's age, home environment, census of other pets in the home, behaviour, diet (including treats), water intake and other concerns are critical. History is followed up with a thorough physical examination with attention to the palpation of the bladder. Is the bladder painful? Does palpation illicit urination? Does the bladder feel soft, thickened, firm? Does the cat have a urinary obstruction which requires immediate resolution? All cats with FLUTD require a basic urinalysis which includes visual assessment, specific

gravity, dipstick analysis, and sediment microscopy. Often cats with FIC present with an empty and uncomfortable bladder so that collection of a sample by cystocentesis may not be possible at the time of presentation. However, frequently these cats will pass a small amount of urine when their bladder is palpated or in a collection box. While not ideal, this is often enough urine to start ranking the differential diagnosis. Depending on the above findings, further investigations should then include radiographs of the abdomen and if needed ultrasound imaging of the bladder to identify urolithiasis or neoplasia. Urine culture and sensitivity should be carried out for any cat with a low specific gravity or glucosuria. and blood tests if there is evidence of systemic disease. Urine cultures should be obtained only by cystocentesis to prevent false positive results from contamination during a free-flow sample Older cats and immature cats that develop signs of FLUTD have a higher index of suspicion for the other potential causes of FLUTD. Cats with FIC tend to have highly concentrated urine (SG.>1.045)². There is usually haematuria and proteinuria, often mild pyuria and there may be a generalized thickening of the bladder wall.

While the condition currently remains, by definition, an idiopathic disorder, recent developments in understanding of the neuro-hormonal abnormalities that exist in affected cats suggest that the signs develop from an inability to cope with chronic stress. This may manifest in a number of ways, including the development of bladder inflammation and pain.² No cure is currently available for FIC, and treatment options are aimed at keeping the cat's clinical signs to a minimum, and increasing the disease-free interval. FIC can become a chronic, frustrating disease. Excellent client communication with the client is required. MEMO therapy, analgesics, diet and possibly other pharmacologic agents can be of benefit in treating acute and chronic cases.

Environmental modification is a key factor in the management of FIC, since stress clearly plays an important part in the pathophysiology of the disease. Multi-modal environmental modification (MEMO) was evaluated in client-owned cats with FIC. Implementing MEMO as the sole management strategy with FIC was found to be successful in the majority of cats followed over a one - year period of time.³ Meeting the environmental needs of the cat and understanding the cat as a species is critical. Cats are not inherently social and in the wild are solitary hunters. They tend to be solitary and are territorial and although they are hunters, they are also prey. These traits make it challenging for cats to live in close proximity to other cats. 'Silent bullying' often goes unnoticed, but it is a major cause of chronic stress to the less dominant cat. After the diagnosis of FIC is made, a questionnaire should be completed by the client to establish a thorough environmental history followed by the recommendations for MEMO. For suggestions on developing a questionnaire, as well as a good client resource, the reader is referred to the following websites: <http://www.indoorcat.org/> and <http://www.cathealthy.ca>.

To meet the needs of each cat within the house, each individual cat must have free access to its own key resources, ideally positioned out of sight of the other cats. Key resources are food and water bowls that are sited apart from each other, clean uncovered litter trays (one box per cat, plus one) in various locations around the home, resting places at different vertical heights with some that only fit one individual cat, and scratching posts and scratching resources. Cats need mental and physical activity several times a day and cat families need to make time in their day to play with their cat

as they would their dog. Putting the hunt back in meal-time using feeding toys is a good form of entertainment for the “predator” in the cat. As cats that develop FIC tend to be overweight, a weight loss program with a strict calorie counted amount of food fed per day is critical.

Although a statistically significant difference was not found when Feliway® was used in a home compared to placebo in cats with FIC, cats that had Feliway® used in the environment had a trend for fewer bouts of FIC and reduced negative behavioral traits. Calming nutraceuticals such as Zylkene® or Anxitane® may be helpful. Diets such as Royal Canin Calm® or Royal Canin Urinary/Calm® and Hill’s Multicare C/D Stress® can be helpful in the long-term management of FIC by reducing the frequency and intensity of recurring episodes of lower urinary tract signs. To achieve this aim, they need to be fed as the cat’s sole source of nutrition and used consistently in the long term.

A primary objective in managing the painful signs of FIC is to encourage the production of large volumes of dilute urine ($SG < 1.035$). Any measures which will increase the cat’s water intake are likely to be helpful. Feeding canned food is particularly effective, as is offering the cat palatable fluids to drink (chicken or fish stock, water from tinned fish, etc.). Adding extra water to canned or dry foods works well. Monitoring of the success of the owner’s attempts to increase water intake can be done via regular analysis of the urine samples collected at home or in the clinic. Aim is to keep the urine SG below 1.035.

Clinical signs of acute FIC resolve spontaneously in as many as 85% of cats within 2-3 days, with or without treatment. Assessing the efficacy of any medical treatment for FIC is made difficult by the self-limiting nature of this disease. When a cat is diagnosed with FIC, analgesic therapy should be initiated for the acute management of the disease. These cats are painful and the pain needs to be treated in a multi-modal fashion with opioids and NSAIDs. Prazosin hydrochloride may be helpful to relieve urethral spasm, but it is not generally useful in the non-obstructed FIC patient. It is important that the client appreciates that all current treatments for FIC are merely palliative and that without application of multi-modal environmental modification (MEMO) and measures to increase water intake, the FIC episodes will recur and will require continued management.

A variety of other drugs have been tried in cats with chronic re-occurring FIC, but little evidence exists as to their efficacy. These drugs need to be used only after environmental strategies, diet changes (if necessary), and behavior modifications have failed. Parenteral and oral glycosaminoglycan precursor (GAG) supplements have been recommended for management of FIC and for interstitial cystitis in women, but to date, published studies have not shown significant effect in cats.^{4,5} From the proposed mechanism of action, it can be predicted that if treatment is used, it will need to be long term. Amitriptyline showed no evidence of benefit in short-term use in cats^{6,7}, but has been reported in uncontrolled trials to successfully decrease clinical signs of severe, recurrent FIC.⁸ Clomipramine (Clomicalm®) used in recurrent cases of FIC has shown anecdotal improvements in some patients. Other drugs such as fluoxetine (Prozac®)

have been reported to help cats with inappropriate urinations with variable success rates.

DO NOT USE ANTIBIOTICS! Antibiotics are not indicated in cats with FIC and should be reserved for cats with bacterial infections. Corticosteroids are one of the few classes of drug that have undergone placebo controlled trials for treatment of FLUTD. Despite much anecdotal evidence to the contrary, they did not appear to have any effect in reducing the severity of the signs of FLUTD or the duration of the episodes.⁹

References

1. Buffington CAT. Idiopathic cystitis in domestic cats - beyond the lower urinary tract. *J Vet Intern Med.* 2011;25:784
2. Defauw PAM, *et al.* Risk factors and clinical presentation of cats with feline idiopathic cystitis. *J Feline Med Surg.* 2011;13:967–975.
3. Buffington CAT, *et al.* Clinical evaluation of multimodal environmental modification (MEMO) in the management of cats with idiopathic cystitis. *J Feline Med Surg.* 2006;8:261–268.
4. Wallius BM, Tidholm AE. Use of pentosan polysulphate in cats with idiopathic non-obstructive lower urinary tract disease: a double-blind randomised placebo-controlled trial. *J Feline Med Surg.* 2009;11:409–412.
5. Gunn-Moore DA, Shenoy CM. Oral glucosamine and the management of feline idiopathic cystitis. *J Feline Med Surg.* 2004;6:219–225.
6. Kraijer M, *et al.* The short-term clinical efficiency of amitriptyline in the management of idiopathic feline lower urinary tract disease: a controlled clinical study. *J Feline Med Surg.* 2003;5:191–196.
7. Kruger JM, *et al.* Randomized controlled trial of the efficacy of short-term amitriptyline administration for treatment of acute, non-obstructive, idiopathic lower urinary tract disease in cats. *J Am Vet Med Assoc.* 2003;222:749–758.
8. Chew DJ, *et al.* Amitriptyline treatment for severe recurrent idiopathic cystitis in cats. *J Am Vet Med Assoc.* 1998;213:1282–1286.
9. Osborne CA, *et al.* Prednisolone therapy of idiopathic feline lower urinary tract disease: a double-blind clinical study. *Vet Clin North Am Small Anim Pract.* 1996;26:563–569.

Diabetes Mellitus: Is Remission a Reasonable and Achievable Goal?

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Diabetes Mellitus (DM) is a common feline endocrinopathy which is probably increasing in prevalence. Most cases are primary and similar to type II diabetes in humans, which results from abnormal secretion of insulin from the pancreatic B cells and peripheral insulin resistance. The diagnosis of DM is made based on characteristic clinical signs of diabetes mellitus (polyuria, polydipsia, polyphagia, and weight loss), and documentation of hyperglycemia and glycosuria. In cats it may be complicated by the occurrence of marked stress hyperglycemia. When making a diagnosis of DM in cats, it is important not only to document persistent hyperglycemia and glucosuria, but also to rule out other diseases that may cause similar clinical signs. Measurement of fructosamine concentrations or urine glucose of samples collected in the home environment may allow the clinician to distinguish between stress induced hyperglycemia (and resultant glycosuria) and persistent hyperglycemia due to diabetes mellitus. Therapy for diabetes should be instituted as soon as possible after diagnosis.

The main goal of therapy is to achieve normal blood glucose levels without the need for insulin therapy, commonly termed diabetic remission. Diabetic remission is usually defined as the ability to maintain normal blood glucose without insulin treatment for 4 weeks without the reappearance of clinical signs. Clinicians need to accept that not all cats will achieve remission and in these patients the goal is to minimize the clinical signs without causing hypoglycemia and improve the patient's quality of life. The duration of remission is highly variable and unfortunately, at least 25% of cats that achieve remission subsequently become overtly diabetic and must receive insulin again. Since tight glycemic control is required to achieve remission, there is an increased chance of hypoglycemic episodes. This risk/benefit needs to be discussed with the client. Some client's busy lifestyles can make this a challenging situation. Successful management of cats with DM includes minimizing clinical signs, improving quality of life, preventing complications such as DKA and diabetic neuropathies and achieving remission when possible.

Administration of insulin and dietary modification are the principal therapies used for management of diabetic cats. A recent study showed that cats with newly diagnosed DM have a fair to good prognosis, with 46% living longer than 2 years.¹ However, since 30 % of cats affected with DM are euthanized within their first year of treatment due to the emotional and financial burden of insulin treatment and the required veterinary care, achieving diabetic remission is the ideal goal for every feline patient faced with this disease. Intensive glycemic control after diagnosis has been shown in humans with DM type11 to improve long – term remission rates. It appears that the same holds true for our feline patients. Cats receiving treatment for diabetes within 6 months of diagnosis with twice daily insulin treatment aimed at euglycemia in conjunction with the cats been fed an ultra-low carbohydrate diet have the best chance of remission.

Which cat will go into remission??? Studies are suggestive that DM remission in the cat is likely to occur through reversal of glucose toxicity. As in humans, cats that have experienced more prolonged hyperglycemia will have experienced a greater deterioration of beta-cell function resulting in a lower chance of remission. There is no factor that consistently predicts diabetic remission in the cat but the shorter the duration of DM, the faster glycemic control is achieved and those patients with less severe hyperglycemia when starting appear to be factors that are

favorable. A retrospective cohort study showed that cats without hypercholesterolaemia were more likely to achieve remission. In one study, diabetes as a potential result of recent corticosteroid treatment was associated with nearly 50 percent remission. A lack of diabetic neuropathy has also been associated with future remission, but neuropathy is a result of prolonged hyperglycemia so this should not be a surprise. Early client recognition, early diagnosis and intensive treatment with BID insulin and ultra-low carbohydrate diet are key.

One of the challenges we face as veterinarians is the opportunity to diagnose this disease in the early stages. Cats are “masters of disguise” They also do not receive regular veterinary care. Often by the time we see the patient and diagnose the disease, the cat already has lost weight and muscle mass, has a poor hair coat, glucotoxicity, diabetic neuropathy and possibly is in DKA. Using every opportunity, a veterinary team has to teach cat owners the importance of early disease diagnosis by receiving regular veterinary care and teaching the subtle signs of illness is critical. The author recommends using Cat Healthy as a resource to educate every client that comes through our doors. In addition, once diagnosed with diabetes, the Cat Healthy website <http://www.cathealthy.ca> has a series of educational videos about diagnosis, treatment and outcome for the newly diagnosed diabetic cat family. The Cat Healthy Protocols contain a compliance section which lists other useful resources for the family as they start the journey of insulin treatment and blood glucose monitoring for their cat. The earlier we diagnose and treat the disease, the better chance we have of remission.

The use of an ultra-low carbohydrate diet has been mentioned already. Low carbohydrate diets reduce post prandial hyperglycemia in people. It seems the importance of a low carbohydrate diet in the cat is equally important. A study giving twice daily showed a 12-week remission rate of 17% in cats fed diets with variable carbohydrate content and a 12-week remission rate of 40% in diabetic cats fed an ultra-low to low carbohydrate diet. The Bennett study reported a greater chance of remission in diabetic cats fed a low CHO diet than those fed a high fibre diet. Obesity is common in DM cats. If present, it should be addressed with a therapeutic weight-loss diet and an energy-restriction plan. Listed below in Table 1 are the calorie distribution of the veterinary prescription diets commonly fed to our diabetic patients.

Table 1. Calorie distribution (% of metabolizable energy from protein, fat and carbohydrates) and crude fiber content (g/1000 kcal) of U.S. feline diets for the management of diabetes mellitus (data from manufacturer's product guides)

Name	Caloric distribution (% of metabolizable energy)			Crude fiber (g/1000 kcal)
	Protein	Fat	Carbohydrate	
Hill's Prescription Diet m/d dry	43.3	41.5	15.2	11
Hill's Prescription Diet m/d canned	45.7	40.7	13.6	15
Royal Canin Veterinary Diet Diabetic dry	46	29	25	12.6
Royal Canin Veterinary Diet Diabetic canned	51	35	14	18
Purina Veterinary Diet DM dry	49.7	37.4	12.9	2.8
Purina Veterinary Diet DM canned	38.8	58	3.2	6.1

The clinician's choice of insulin is always an interesting discussion. Cats can go into remission with the use of any insulin. The type of insulin used for the best chance at achieving remission may be less important than factors such as the presence of concurrent diseases, initiating the treatment as soon as possible and the plan for close monitoring. Diseases such as Acromegaly and Cushings disease can be causes of a lack of response to insulin. Co-existing pancreatitis can also have an effect on the blood glucose levels and requirement for insulin. Clinicians should be familiar with at least two types of insulins that are

appropriate for treating cats as it is difficult to predict in advance which insulin is best for an individual cat. Glargine has been proposed as the optimum insulin for diabetic cats based on the relatively high remission rate reported in some studies using this insulin, but this may be because it is the most frequently studied insulin. The predominant use of PZI in a study assessing the influence of low CHO diets achieved similar remission to a study examining twice daily glargine. Further studies are required to compare if there are different rates of remissions between the different insulins. The availability of a PZI insulin licensed for cats in Canada with a long expiry date is a benefit to our feline patients. The resources available with a veterinary licensed insulin is of great benefit to the veterinary team and the client. Listed in table 2 are the commonly used insulins for cats with diabetes in Canada.

Table 2. Comparison of insulin products for treatment of feline diabetes mellitus

Insulin	Licensed in cats	Manufacturer	Formulation	Action	Dose*
ProZinc	Yes	Boehringer Ingelheim	U40 recombinant PZI	Nadir 5–7 hours Duration 8–9 hours	Start 0.25–0.5 U/kg, BID Median maintenance dose 0.6 U/kg, BID
Vetsulin, Caninsulin	Yes	Merck	U40 Porcine zinc	Nadir 4 hours Duration 8–12 hours	Start 0.25–0.5 U/kg, BID Median maintenance dose 0.5 U/kg, BID
Lantus	No	Sanofi Aventis	U100 Insulin glargine (recombinant human analog)	Nadir and duration not determined in diabetic cats	Start 0.25–0.50 U/kg, BID Median maintenance dose 2.5 U/cat, BID
Levemir	No	Novo Nordisk	U100 Insulin detemir (recombinant human analog)	Nadir and duration not determined in diabetic cats	Start 0.25–0.50 U/kg, BID Median maintenance dose 1.75

					U/cat, BID
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*Based on lean body weight

Teaching our clients to be comfortable to take blood glucose levels at home is critical for remission. "In clinic" blood glucose curves are inaccurate and a diagnostic method of the past. Having a few team members on staff that can guide the clients through the early stages of diabetic monitoring and treatment is critical and will greatly improve the chance of remission. Commonly used protocols are to "Spot Check", do home blood glucose curves or multiple daily monitoring. What protocol is needed will be determined by the client's schedule and lifestyle and the individual patient's needs. It appears that remission is likely only achieved in those cats that received long term glucose monitoring.

In conclusion, the earlier we diagnose DM in our feline patients and initiate treatment with twice daily insulin in conjunction with an ultra- low carbohydrate diet, the better chance we have of diabetic remission. Teaching clients to monitor blood glucose levels at home is a critical part of the plan as well. Remission in the diabetic cat is possible! The majority of the studies referenced in these lecture notes were taken from an article in The Veterinary Journal which did a systematic review of twenty-two studies on factors influencing remission rates and predictors of remission in the feline. The journal article is referenced below.

References

1. Callegari C, Mercuriali E, Hafner M, *et al.* Survival time and prognostic factors in cats with newly diagnosed diabetes mellitus: 114 cases (2000–2009). *J Am Vet Med Assoc.* 2013;243:91–95.
2. Gostelow R, Forcada Y, Graves T, Church D, Niessen S Systemic review of feline diabetic remission: Separating fact from opinion The Veterinary Journal 202 (2014) 208-221