Veterinary Centre
Feline Diabetes Mellitus

INFO Sheet

What is Diabetes?

Diabetes mellitus is a condition in which the body cannot properly produce or respond to the hormone insulin. This results in elevated levels of the sugar glucose in the blood, which is the main source of energy for the body.

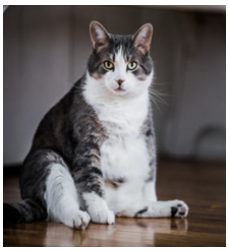
Like the human body, the cells in a cat's body need sugar in the form of glucose for energy. However, glucose in the blood requires insulin, a hormone produced by the pancreas, to "unlock" the door to cells. Insulin attaches to cells and signals when the time is right to absorb glucose. By absorbing glucose, cells in fat deposits, the liver, and the muscles get vital fuel while lowering levels of glucose in the blood.

In Type I diabetes, blood glucose concentrations are high because of a decrease in insulin production. In Type II diabetes, glucose levels are high because cells in the body do not respond appropriately to insulin. In both Type I and Type II diabetes, cells cannot access the nutrients they need even though there is plenty of sugar in the blood, because insulin can't transport the sugar from the bloodstream into the cells that need it.

Cats with diabetes most commonly suffer from the Type II form of the disease.

Risk Factors

The most important risk factors identified for the development of diabetes in cats include obesity, increasing age, physical inactivity, male gender, and the use of glucocorticoids (steroids) to treat other illnesses such as feline asthma. In some countries, Burmese cats appear to have a higher risk of developing diabetes than other breeds.



Obese cats are up to four times more likely to develop diabetes than ideal weight cats, so the most important thing a cat owner can do to decrease their risk of developing diabetes is to maintain a healthy weight and encourage physical activity through daily play.

Clinical Signs

The two most common signs of diabetes noticed by owners at home are weight loss despite a good appetite and increased thirst and urination.

Weight loss may be noticed at home or during a routine examination with the veterinarian. In both Type I and Type II diabetes, the cells in the body are unable to absorb glucose from the blood and become starved of energy. To get the energy it needs, the body turns to other sources, breaking down fats and proteins to feed glucose-starved cells. This breakdown results in weight loss, despite an increased appetite.

Excessive thirst and urination can also signal diabetes in a cat. High levels of sugar in the blood can overwhelm the ability of the kidney to filter glucose, allowing sugar to "spill out" of the blood and into the urine. This high urine glucose concentration can actually pull excessive amounts of water into the urine, resulting in increased urine volume, increased urinary water loss, dehydration, and a compensatory increase in thirst.

In some cases of uncontrolled diabetes, cats may experience damage to the nerves in the hind limbs, resulting in a "plantigrade" stance of the hind limbs (walking or standing with their hocks on, or close to, the ground). This is not painful, and will often resolve with treatment.

Diagnosis

Your veterinarian will diagnose diabetes mellitus by demonstrating persistently elevated glucose levels in a cat's blood and urine. This testing, along with consistent clinical signs, will lead to the diagnosis of diabetes.

A single blood glucose reading in a veterinary clinic may not be sufficient to diagnose diabetes in all cases. Cats can develop a short-term elevation in blood glucose as a response to stress, known as stress hyperglycaemia. In these uncertain cases a lab test known as a fructosamine concentration can be helpful. This test gives a rough average of a cat's blood glucose concentration over the last two weeks, so would not be affected by stress hyperglycaemia.

Other tests will likely be recommended by the veterinarian to rule out other diseases which might be contributing to a cat's clinical signs, such as a urinary tract infection, chronic kidney disease, pancreatitis or hyperthyroidism.

Treatment

The main goals of treatment for feline diabetes are:

- Restoring normal blood glucose concentrations
- Stopping or controlling weight loss
- Stopping or minimising signs of increased thirst and urination
- Avoiding inappropriately low blood sugar due to treatment (hypoglycaemia)

These goals are best achieved through a combination of insulin and dietary therapy.

Insulin

Injectable insulin is a mainstay of treatment for feline diabetes. Unlike humans with Type II diabetes, oral medications to reduce blood sugar such as glipizide have not shown to be consistently effective in cats.

While there are a number of insulins available, we recommend starting treatment with glargine insulin (**Lantus™**).

Insulin injections are given under the skin (subcutaneously) approximately every 12 hours. While giving injections may seem daunting, most owners can be taught to administer these injections at home quite easily and due to the very small needle size, cats tend to tolerate these injections very well. Though ideally injections should be spaced 12 hours apart, varying injection times by 1-2 hours when needed will not adversely affect a cats' treatment.

Diet

A diet low in carbohydrates has been shown to improve blood sugar regulation in diabetic cats. Wet food diets are recommended as a primary diet and any supermarket wet food is likely to be sufficiently low in carbohydrates. Only prescription, low carbohydrate biscuits should be fed (e.g. Royal Canin Diabetic Biscuit for Cats). For cats who are overweight when diagnosed with diabetes, slow, controlled weight loss under the close monitoring of a veterinarian is very important to achieve better control over blood glucose levels.

The optimal timing of meals for diabetic cats is controversial. Many veterinarians recommend feeding at the time of insulin injection to avoid a dangerous drop in blood glucose levels. However, there is no definitive evidence that the timing or frequency of meals in diabetic cats protects them from insulin-induced hypoglycaemia. With a low carbohydrate diet, free choice feeding may be acceptable for cats who prefer to "graze" throughout the day. If food must be withheld for any reason, such as an anaesthetic procedure, it is generally recommended to give 50 percent of the usual dose of insulin, with careful follow-up monitoring to ensure good glycaemic control.

Monitoring

Close monitoring by both the owner and the veterinarian is an essential part of treatment for a diabetic cat. Regular monitoring will help determine the ideal insulin dose for each cat as well as help avoid complications, such as hypoglycaemia or uncontrolled diabetes and diabetic ketoacidosis. Regular assessments of weight, water intake, and appetite should be recorded to help determine if treatment goals are being met.

Blood glucose curves are the ideal way to monitor blood sugar regulation during treatment. During a blood glucose curve, the cat's blood sugar will be checked right before receiving an insulin injection, and then every 1-4 hours throughout the day. This helps make sure that the average blood glucose is within an acceptable range, and that the value does not drop dangerously low at any time throughout the day. These assessments may need to be performed regularly when a cat is first diagnosed with diabetes in order to determine the appropriate dose of insulin, but can be spaced out further once the diabetes is more well-regulated. Even in a stable cat, blood glucose curves should still be performed every 3-4 months, as insulin needs can change over time.

Eventually, many cat owners can learn to perform blood glucose curves at home. This helps avoid stress hyperglycaemia and inappetence experienced by many cats in the veterinary clinic, and can therefore give more accurate results. Blood can be collected at home from an ear vein or paw pad, and should be read on a blood glucose monitor.

It is very important that owners who monitor blood glucose readings at home do NOT change their cat's insulin dose without first consulting with their veterinarian.

If performing a blood glucose curve is not an option, a fructosamine concentration can be used to get a rough estimate of blood sugar control over the last two weeks with a single blood sample. However, this is not an ideal way of monitoring a diabetic cat, as it only measures the average, rather than the blood sugar highs and lows throughout the day, and these are often more important in determining the success of their treatment.

Possible Complications

Insulin therapy lowers blood glucose, possibly to dangerously low levels. Signs of low blood sugar (hypoglycaemia) include weakness, lethargy, vomiting, lack of coordination, seizures, and coma. Hypoglycaemia can be fatal if left untreated, so any diabetic cat that shows any of these signs should be given oral glucose in the form of honey, corn syrup or glucose syrup and brought to a veterinarian immediately. It is important, however, that owners not attempt to force fingers, food, or fluids into the mouth of a convulsing or comatose cat.

Diabetic cats with uncontrolled diabetes may develop a condition known as ketoacidosis. This occurs when cells starved for glucose begin to break down fats for energy, a process that creates chemicals called ketones, which make the blood more acidic. Ketoacidosis is considered a medical emergency, and cats diagnosed with this complication require hospitalisation for ideal management.

Prognosis and Remission

Though there is no cure for feline diabetes, the prognosis for a good quality of life is good with adequate management at home. With early, aggressive treatment of diabetes, many cats will enter a state of diabetic remission, meaning they are able to maintain normal blood sugar levels without insulin injections. Older cats, cats who have previously received steroid medications, and cats treated with glargine insulin have been shown to be more likely to go into diabetic remission, but the most important factor is starting insulin therapy early and monitoring closely. If a cat has not entered diabetic remission within the first six months after diagnosis, it will almost certainly require life-long insulin injections. Cats who have achieved diabetic remission should continue to be fed a low-carbohydrate diet and receive close monitoring, as some will eventually require insulin therapy again.