



Diabetes Mellitus in Cats

By Dr. Susan Little

Diabetes mellitus, a common disease in both animals and people, was first recognized in cats over 75 years ago. Most commonly found in middle-aged to older felines, it is estimated to occur in one in 400 cats. Although it is a potentially serious disease, veterinarians have learned a great deal in recent years about how to treat diabetic cats effectively, so they may enjoy good health and quality of life.

Effects of diabetes

Glucose is a type of sugar found in the bloodstream of all animals, as well as in certain foods. It is the end product of carbohydrate metabolism in the body and is the chief source of energy for living organisms. Insulin is the primary hormone that controls this metabolism and the storage of fuel sources found in food.

In diabetes, secretion of insulin from the pancreas may be impaired or the body's cells may be resistant to the actions of insulin. As a result, the body's ability to regulate blood glucose levels is compromised. Diabetes mellitus alters the body's functions and ultimately causes the normal metabolism of carbohydrates, proteins and fats to be profoundly disturbed.

Cells need glucose for energy to sustain life. In a normal animal, insulin helps glucose enter most of the body's cells. In

diabetic animals, however, glucose cannot adequately enter cells, causing it to accumulate in high levels in the bloodstream (this is called hyperglycemia) and in the urine. As a result, the body's cells do not receive the nourishment they need, forcing the cat's body to break down fat tissue and the protein of muscle tissue in a futile attempt to supply the needed energy.

Typical signs

Diabetes is usually seen in cats over six years old. It can develop in any breed, age or gender, but the most typical patients are older, overweight, neutered male cats.

Owners of diabetic cats will notice a change in their pet's behaviour. Specifically, the cat will become increasingly thirsty and hungry. In addition, the owner may observe an increase in the frequency and amount of urine produced. A diabetic cat may also seem lethargic, frequently napping, and its coat may be dull with flakes of dandruff.

Affected cats may also exhibit a flat-footed gait with their hind feet, rather than walking up on their paws. This condition is called tibial neuropathy and is a result of the effect of prolonged high blood glucose on the animal's nerves.

While diabetic dogs and humans often develop cataracts, cats generally do not.

Photo by J. Schroder, Port Hope, Ont.



Most diabetic cats remain bright and alert. However, if an owner has not recognized the signs of diabetes early, a condition called ketoacidosis can develop and the cat may become very ill if medical care is not sought. Cats in this situation may become depressed, weak and dehydrated and, in extreme cases, may fall into a coma. As well, they may experience vomiting, diarrhea, loss of appetite and severe weight loss. Therefore, it is important to be aware of the signs of diabetes so the condition can be recognized and treated early.

Diagnosis

In addition to performing physical examinations, veterinarians will use laboratory analyses of blood and urine samples to diagnose diabetes mellitus. Occasionally, frightened or stressed cats may also have a fairly high blood glucose level, which can be confused with diabetes. However, a relatively new blood test, called a fructosamine test, can help distinguish between true diabetics and cats with stress-induced high blood glucose.

Treatment

Treatment of diabetes depends on the patient's status. Severely ill cats will need to be treated intensively in the hospital for several days to stabilize them. These patients may require intravenous fluid therapy to rehydrate them, special short-acting insulin therapy to stabilize their blood glucose levels and other therapies to correct electrolyte imbalances. As well, any other present illnesses must be identified and treated. Diabetic cats that are stable at the time of diagnosis may not need to be hospitalized and can instead be treated at home.

Diabetes mellitus in cats can commonly be controlled with insulin therapy at home. Owners provide their cat with a small amount of insulin once or twice a day. With special syringes, designed to measure the very small amounts of insulin needed and very fine to make injections comfortable, the allotted insulin is injected under the cat's skin. Before taking a diabetic cat home, owners will be instructed by their veterinarian about the techniques to properly handle and administer these injections.

Insulin preparations vary in their action. Some are short-acting while others are long-acting. Short-acting insulins reach

peak activity in the body quite quickly and several doses will be needed per day, while long-acting insulins may not reach peak activity for 12 to 24 hours, requiring fewer injections.

In general, cats metabolize insulin more quickly than other animals, so the longest-acting insulins are usually chosen to treat diabetic cats. Veterinarians may choose long-acting recombinant human ultralente insulins or a veterinary insulin.

It is important to note cats have different responses to insulin and, therefore, the insulin treatment regime needs to be tailored to an individual cat's needs. Variations in diet, exercise and other disease conditions will all markedly affect the need for insulin.

With home treatment, a diabetic cat is given a small starting dose of insulin once or twice daily and its progress is monitored. This entails observing the cat's appetite, water consumption and urination, reporting any changes to a veterinarian. If the therapy needs to be modified, a series of blood glucose readings (called a blood glucose curve) are performed in the hospital over a 12-hour period, which will help determine what adjustments are necessary.

As well, owners of diabetic cats can be taught to take blood glucose readings at home, using a lancet and portable blood glucose meter, like those used by human diabetics. Results can then be relayed to the veterinarian, who will determine if changes in the insulin dose are required. Owners should never make changes in the treatment regime of a diabetic cat without first consulting a veterinarian.

Although oral therapy (pills) is used to control diabetes in some people, it is generally less effective in controlling diabetes in cats and may take up to 10 weeks to start showing any benefits. It is also more costly than insulin.

Dietary therapy

Previously, studies showed high-fibre diets could lower insulin requirements and blood glucose levels. However, recent research points to diets high in protein and low in carbohydrates as effective in controlling diabetes in cats. For some diabetic cats, this type of diet alone may control the disease.

Whatever diet is chosen for a diabetic cat, it is important to control the amount of food and the feeding times, as directed by a veterinarian.

Potential complications

The most serious complication of insulin therapy is hypoglycemia or low blood glucose, usually in the late afternoon at the peak of insulin activity. If this happens, the cat will become weak, lethargic and disoriented and may stagger on its feet. Left untreated, this situation may progress to seizures and, in rare cases, even death.

If mild signs are observed, the cat should be fed immediately and the veterinarian consulted. If severe symptoms occur, a teaspoon of corn syrup smeared on the cat's gums will increase

Understanding Corneal Ulcers

blood glucose levels sufficiently, providing enough time to get emergency veterinary help.

Food or fluids should never be put down the throat of an unconscious or seizing cat, as they may accidentally enter the airways. It is also not wise to put one's fingers in the mouth of a seizing cat, as serious bite wounds can occur.

Long-term monitoring

Once a suitable insulin dose has been determined for the affected cat, the required dosage should be maintained until a veterinarian instructs otherwise. While it may seem tempting to vary the insulin dosage by observing clinical signs in diabetic cats, this will lead to poor control of the disease. Periodic blood glucose curves, taken either in the hospital or at home, will help determine if the insulin dose needs to be adjusted over time.

The fructosamine test can also be used to monitor diabetic cats. This simple blood test can be performed in conjunction with a checkup.

It is important for owners of diabetic cats to monitor several behaviours on a daily basis, including appetite, attitude, water consumption, physical activity and urination. On a weekly basis, it is also helpful to weigh the cat at home to monitor for fluctuations. Any persistent changes should be reported to a veterinarian.

Commitment

Beyond the monetary cost of diagnosing, stabilizing, treating and maintaining a diabetic pet, there is a time commitment required of owners. Such a commitment may seem daunting at first, but it can be very rewarding for both owner and cat. It will add to the quality of life and is paid back in years of healthy companionship.

There have been occasions where diabetes in a cat proves to be a temporary illness and, after a period of insulin treatment, the animal is slowly weaned off medication and controlled by diet alone. While some such cats may return to insulin dependence in the future, they can have many months or even years when insulin is not required. 🐾

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"Rosy," photo by Blair Adams, Stoney Creek, Ont.

By Peter Saunders

When you choose a dog or cat, two of the first features you are likely to notice are its eyes. Whether they appear alert, sad, warm, stony, bright, soulful or alien, the eyes are often a prime attraction to pet owners, particularly when dealing with the more "ornamental" breeds. However, what you may be less likely to consider is the fragile nature of these organs.

Ophthalmology (the scientific study of eyes) is of significant interest to veterinarians, who see pets with a range of eye-related problems. One of the common first signs of ocular deterioration is a corneal ulcer. While efforts can be made to prevent difficulties, in some cases, these ulcers occur all too easily and naturally in cats and dogs.

The cornea is a sensitive membrane on the eyeball, a shiny and clear "window" comprising three layers: Descemet's membrane, the stroma and, at the surface, the epithelium. An ulcer is created when there is an erosion of the epithelium and into the stroma.