Diabetes Mellitus

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Diabetes mellitus (DM) literally means “sweet urine”. Diabetes occurs in pets due to a deficiency of, or resistance to, insulin in the body. Insulin, which enables the body to use utilize glucose, is produced by specialized cells in the pancreas called beta cells. Without insulin the body cannot move glucose into cells where it is needed. There are 2 types of diabetes that occur in dogs and cats. Type 1 (insulin dependent) means the body is not producing *any* insulin so insulin needs to be administered. Type 2 (non-insulin dependent) is due to a relative deficiency of insulin or an inability of the body to use the insulin that is made (insulin resistance). Type 1 is by far the most common type and the kind that we see almost exclusively in dogs.

In DM, glucose is unable to get into the cells so the body feels it is starving. Therefore, the patient eats more which raises the blood glucose level still higher. Once that occurs, the glucose level is so high in the blood it is lost in the urine. This makes the patient urinate more and, consequently, drink more. Most owners notice their pet drinking, urinating and eating more while losing weight. There are several factors which may be associated with the development of DM in dogs and cats such as genetics, immune-mediated destruction of beta cells, obesity, infection, pancreatitis and certain drugs. DM may also be seen in conjunction with other diseases such as heat cycles in an intact female dog, Cushing’s disease and growth hormone excess (acromegaly).

DM is diagnosed by bloodwork and analysis of the urine. Most diabetics are otherwise healthy. Diabetes may be treated with insulin injections given once or twice a day. There are numerous types of insulin and each is used for a specific reason. Based on past experience and the medical condition of your pet, your doctor will select the most appropriate insulin type. Although there are some cases where a dog or cat may recover from diabetes, most pets require insulin for life.

The patient is usually started on a low dose of insulin to minimize the risk of hypoglycemia (low blood sugar). It takes the new insulin dose about a week to equilibrate within the body. To ensure that the pet is on the appropriate dose and frequency of insulin, a glucose curve is then performed in the hospital. This consists of measuring the blood glucose every 2-3 hours for a 12 – 24 hour period. Based on these results as well as how your pet is doing at home, your doctor will adjust the insulin dose as needed. It often takes 3-4 months to get a new diabetic patient regulated and may require frequent visits to the vet initially. Once the patient is regulated, your pet may only need to be seen every 3-6 months.

There are several potential complications of DM in pets. Dogs are very prone to developing cataracts which may develop suddenly (i.e. overnight) and will cause blindness. In most cases however, cataract surgery can be done and vision restored. Cats may sometimes develop weakness in the rear limbs (diabetic neuropathy) which may or may not be reversed once the diabetes is regulated. Diabetic patients are also at a higher risk for developing infections due to a compromised immune system. Any infection can cause dysregulation of their diabetes. One of the common areas where we see infections is in the bladder so your veterinarian may need to culture your pet’s urine to ensure there are no bacteria present.

Some diabetic patients may develop ketoacidotic diabetes mellitus. Some pets may be diagnosed with DM because they go to see their veterinarian in a ketoacidotic crisis. These patients may have another disease (i.e. pancreatitis) which may predispose them to developing this problem. Ketones are metabolic products that commonly are present in small amounts in the body but diabetics cannot metabolize them effectively. These ketones accumulate and the patient becomes dehydrated, which can cause vomiting or diarrhea. This condition is life threatening if not recognized and treated aggressively. These patients require intensive care with IV fluids to correct dehydration and electrolyte imbalances. Any concurrent conditions may also need to be treated. Very short acting insulin must be used to correct the problem. Once the ketosis is corrected, the patient is treated as any other diabetic patient.

TREATING A DIABETIC PET AT HOME

Once your pet has been diagnosed with diabetes mellitus, you will be shown how to administer insulin injections at home. The needles used to give insulin are very small and pets typically tolerate the injections very well.
How the insulin is stored is very important. We usually recommend keeping it refrigerated, not frozen.
The type of syringe used to administer the insulin is also important depending on the type of insulin you are using (i.e. a U-100 syringe for 100 unit/ml insulin vs. a U-40 syringe for 40 unit/ml insulin).

The following is the procedure we recommend for insulin administration:

- Gently and completely invert the insulin vial 10 times. You may also gently roll the insulin vial between your palms. NEVER SHAKE THE INSULIN. This will cause it to lose its effectiveness.

- Draw air into your syringe equal to the amount of insulin that you are administering. Insert the needle into the vial and inject the air.

- With the needle in the vial, turn the insulin vial and syringe upside down and pull the correct number of units into the syringe.

- Check the syringe for bubbles. If bubbles are present, hold the syringe straight up and tap its side until the bubbles float to the top. Push the bubbles out with the plunger and then withdraw the correct insulin dose.

- Once your pet has eaten, grasp an area of skin on the back or side of your cat or dog between your index finger and thumb.
- Insert the needle into the fold of skin and inject the contents of the syringe.
- If you think that you have injected the dose incorrectly, **do not** repeat the dose.

Giving insulin is a serious procedure but over time you and your pet will get used to it. Although care of a diabetic patient is time-consuming and expensive, most pet owners find that it is a very rewarding experience. Please do not hesitate to call with your questions or concerns.

COMMONLY ASKED QUESTIONS:

Q. What if my pet doesn't eat his/her meal?

A. If this is the first time this has occurred, give half of the usual insulin dose. If it happens again at the next meal, skip the insulin and schedule a recheck appointment with your veterinarian. Loss of appetite may indicate that there your pet is not feeling well. Giving insulin on an empty stomach will increase the risk of hypoglycemia (low blood sugar).

Q. What are the signs of hypoglycemia and what do I do if my pet is showing these signs.

A. Some of the signs of low blood sugar are disorientation, staggering, vocalizing or seizures. Cats also may tend to vomit. If your pet is exhibiting these signs and is alert enough, you can try offering them some food as this will help increase the blood sugar. If your pet is having a seizure or is not alert enough to eat, you can rub some Karo syrup on the gums. If ANY of these signs are noted, skip the next insulin dose and talk to your veterinarian because a change in the insulin dose may be required.

Q. What do I do with used insulin syringes.

A. The safest thing to do is place them in an empty milk jug or coffee can and bring them in at the time of your next recheck appointment. We will dispose of them safely.

Q. Is there a special diet that I should have my diabetic pet on?

A. Recent research in this area indicates that, in cats, a higher protein, low carbohydrate diet may be helpful in stabilizing blood sugar throughout the day. In dogs however, we have found that a high fiber diet can help achieve this goal in many cases, but every dog is different. Your veterinarian will help you select the best diet for your particular situation.

Q. Should I modify my pet's routine in any way now that he/she has been diagnosed with diabetes?

A. One thing that may need to be changed is exercise. While exercise in moderation is fine, strenuous activity should be avoided. Muscles require glucose to function properly so increased activity may precipitate a hypoglycemic crisis.
Routine medications (heartworm preventative and flea control) and vaccinations can still be given normally.

Q. Where can I purchase insulin?

A. You may buy insulin from your veterinarian or he/she may call in a prescription to your local pharmacy.

Q. Should I check my pet's urine for glucose?

A. Only under special circumstances will we ask you to check your pet's urine for ketones or glucose. It is not usually a part of routine diabetes management.