

Diabetes in Cats

So... your cat has just been diagnosed with diabetes mellitus (sugar diabetes). There are a lot of new words you've just heard, mentions of needles and blood samples, new diets, vet visits and costs! Take some time now to educate yourself about your cat's condition. It will all seem overwhelming at first, but in no time you'll have the hang of it and be breezing through.

So, what is diabetes mellitus?

Diabetes mellitus (referred to as diabetes from now on) is a disease resulting from the lack of production or lack of appropriate response to insulin. Insulin is a hormone secreted by the pancreas which is like the "key" to the "gate", allowing glucose (sugar) in the bloodstream to enter the body's cells to provide energy. Type-1 diabetes (common in dogs) is when the body has a partial or complete lack of insulin production. Type-2 diabetes (85-90% of cats) is when the body does not respond appropriately to insulin. Factors contributing to type-2 diabetes include:

- Obesity
- Inactivity
- High carbohydrate diets
- Breed
- Drugs
- Pancreatitis (inflammation or infection of the pancreas)
- Old age

How do I know my cat has diabetes?

Because the glucose in the bloodstream is unable to enter the body's cells, it builds up in the bloodstream and once it reaches a certain level, it spills out of the bloodstream and into the urine. Demonstrating persistently high blood glucose readings and high glucose readings in the urine is the basis of diagnosis, along with the usual clinical signs. You may have noticed:

- Increased thirst: this is because all the glucose in your cat's urine drags lots of water through with it, making your cat lose water in the urine and be thirsty.
- Urinating a lot: see above.
- Increased appetite: this is because all of the energy from food is trapped in the blood, not the tissues, so your cat feels like it needs to eat more.
- Weight loss: the energy from the food is being lost from the blood and through the urine.

Sometimes it can be difficult to tell if your cat has diabetes or a combination of other diseases. Sometimes we need to perform other tests (eg. Fructosamine level) to confirm it.

When we diagnose your cat with diabetes, we will usually want to check that he/she is otherwise healthy. This will typically include a complete physical examination, complete blood profile and a urine culture. There are some diseases which are more common in cats with diabetes (eg. A urinary tract infection) which can interfere with the success of treatment and require investigation and treatment.

What do we do for my cat now?

Since most cats have type-2 diabetes, our aim is to reverse the factors that have contributed to decreased insulin sensitivity. Over time this will include:

- Weight reduction if your cat is overweight
- Changing to a high protein, low carbohydrate diet (eg. Hill's m/d)
- Increase activity levels
- Assist the body with supplemental insulin

We now routinely use a long-acting, "peakless" insulin for cats with diabetes, given twice daily. This means that your cat is less likely to have periods of really high blood glucose, or periods of dangerously low blood glucose. Since your cat's blood glucose levels will stay mostly within the normal range, and since other contributing factors will be being managed, this gives your cat a greater chance of going into **remission**.

Remission? You mean my cat can be cured?

Well, in some cases – yes! By remission though, we mean no requirement for supplemental insulin. *However*, the changes you have now made to your cat's lifestyle must be maintained. Even so, some cats will develop a requirement for insulin again over time.

Remission will typically occur within the first 12 weeks of treatment. Regular monitoring is essential for detecting if remission is occurring. Typically, insulin dose reductions will be made during this time until it is considered safe to stop treatment. Sometimes signs of hypoglycaemia will be seen, occasionally requiring hospitalization (see below).

The chance of your cat going into remission is increased by seeking prompt veterinary treatment, performing thorough home monitoring and correcting inappropriate diets.

Treatment Specifics

Once we have confirmed that your cat has diabetes, we will begin treatment.

1. Begin insulin therapy

Usually your cat will stay in hospital or visit for the day during the first 3 days. We will administer a long-acting insulin under the skin by injection and then take serial measurements of your cat's blood glucose during the day. Usually, your cat's glucose levels will not stabilize in this initial period *however* we are most keen to ensure that his/her glucose levels do not drop dangerously low.

All being well, we will make an appointment with you during this period to instruct you how to administer the insulin.

The insulin will need to be kept in the fridge. It must not be diluted with anything as this will affect the pH and its performance. Generally, an opened bottle can be used for 6 months.

2. Make adjustments to the diet

In the wild, cats eat a mainly protein diet. However, many commercial cat foods now contain an abundance of carbohydrate. It is speculated that this may be one of the main factors contributing to the rise of diabetes in cats.

Research has shown that a high-protein, low-carbohydrate diet is best for cats with diabetes. We recommend Hill's Prescription m/d diet. Changes to your cat's diet must be made slowly over a number of days.

Feeding the same food, in the same amount, at the same times each day are important in keeping your cat's diabetes well controlled. Since keeping home prepared diets consistent is nearly impossible, we recommend a commercial diet.

Many diabetic cats will be obese at the time of diagnosis. This was likely a contributing factor to developing diabetes. In order to achieve good diabetic control, and hopefully remission, we need to slowly decrease your cat's bodyweight to the normal range. We can assist you in making the necessary changes. We will monitor your cat's weight at each visit.

Although oral medications are available to help treat diabetes, their use has been limited for a number of reasons: they are often harder to administer than a needle; they are usually inadequately effective without insulin; they are usually slowly effective (decreasing your chance for remission) and their benefit has not been well-documented.

3. Treat/manage concurrent diseases

Infections and other metabolic diseases can interfere with our treatment of diabetes as well as causing further suffering for our cats. Urinary tract infections are very common in diabetic cats because their urine is more dilute and contains sugar which bacteria like to eat! In older cats, kidney disease is common and can make monitoring of diabetes a little more complicated, since cats with kidney disease will drink a lot anyway. An overactive thyroid

gland can cause increased hunger and may mask signs of inappetence from poorly controlled diabetes. Knowing these things in advance through routine screening tests at diagnosis will make the diabetic process much simpler.

4. Stabilisation and home monitoring

We frequently request to see your cat every 1-2 weeks during the initial 12 weeks of treatment. We usually have them come in for the day for a **glucose curve**. This is important because we need to know if your cat is not controlled and also if your cat is going into remission and needs a lower dose of insulin.

- **Glucose curve:** please administer breakfast and insulin at home at the normal time (unless usually given after 8:30am) and drop your cat in to us between 8:30 and 9am. We will take a blood glucose reading every 2 hours to monitor the response of the body to the current insulin dose. We will make an appointment with you for after 5pm that day to discuss the results.
- **Fructosamine level:** sometimes a cat is so stressed in hospital that it spikes a really high glucose reading (“stress hyperglycaemia”). Fructosamine is a test we can request from the laboratory from one blood sample. It gives an indication of the average glucose control over the last 2 weeks. It is a handy test, though not very specific

You can monitor the progress of your cat at home too! Assessing appetite and measuring 24-hour water intake are the hallmarks of home monitoring. Some cat owners may feel that they would like to monitor their cat’s blood glucose at home and we can assist you to learn this technique. Sometimes, the urine is checked for the presence of glucose too. Please keep a record of these observations.

- **Appetite:** is it normal, increased or decreased? Is there food left in the bowl where usually your cat would “inhale” all of it? Is there a new preference for wet food over dry food?
- **Thirst:** is your cat back and forth to the water bowl? Having long drinks of water? Urinating a lot and leaving the litter really wet? Is the litter now a lot drier than it was before diagnosis? Measuring water intake weekly is desirable – simply measure out a pre-determined amount of water into the bowl and measure how much is left at the same time the following day (this can be tricky in multi-pet households). A normal cat will consume between 10-60mL/kg/day and a well-controlled diabetic cat should drink 20-70mL/kg/day (depending if wet or dry food the main diet).
- **Energy levels and demeanor:** How does your cat feel? Is he/she back to their normal selves? Is he/she depressed, lethargic, “skitty”, disoriented, smoochy, relaxed?
- **Urine glucose:** by using only a sprinkle of litter in a clean litter tray, the urine will not be completely absorbed and you can dip a “urine stick” into the urine. The presence of glucose in the urine is undesirable in a well-controlled cat. Conversely, the absence of glucose from urine over a prolonged time may indicate that your cat’s

blood glucose is too low (ie. Too much insulin) or that your cat is going into remission.

- **Blood glucose readings:** By purchasing a blood glucometer from the local pharmacist you are prepared to take blood glucose readings from your cat. We will assist you in learning the technique. Choosing a model that requires only a tiny drop of blood is desirable. Usually we only want to know the glucose level of your cat just before their next meal and needle. Some cats become so stressed in a hospital environment that their blood glucose level is 10 points higher than normal. In this case home monitoring is desirable.

Complications

1. Diabetic ketoacidosis

Some cats will be really unwell when first diagnosed. Their body has been breaking down fat to feed itself and in the process producing small acids called “ketones”. In large amounts, these ketones acidify the entire body and cause all sorts of complications. Hospitalisation and intensive care with iv fluids and frequent administration of short-acting insulin will be necessary. Sometimes these cats will pass away before they can be stabilized. The stabilization process frequently takes 3-4 days. Once stabilized, the process of diabetic control takes place as above.

Be aware that diabetic cats undergoing treatment can develop this condition if not sufficiently supplemented with insulin or if they develop another disease which puts their body under stress.

2. Hypoglycaemia

Sometimes, a cat being treated for diabetes will develop a dangerously low blood glucose level. Symptoms include:

- Hunger
- Restlessness
- Shivering
- Incoordination and disorientation
- Convulsions
- Coma and death

This can be the result of: an overly high insulin dose; remission starting; an accidental insulin overdose; other illness causing inappetence or vomiting; other illness putting stress on the body.

If you see symptoms of hypoglycaemia, immediately offer your pet some food. If they won't eat it you'll need to have some glucose syrup on hand to rub onto the gums (be careful to avoid being bitten). Honey or golden syrup are reasonable alternatives. You should see improvement within 15

mins. Once improved, continue to offer small amounts of food during the next 12 hours. If your cat does not improve within 15 mins, or if he/she deteriorates during this time, you need to call the vet (day or night, this is an emergency).

If this occurs within 6 hours of their next scheduled insulin dose, skip the next dose entirely and then go back to the normal routine for the following dose. Schedule a glucose curve at the vet for the next few days – your cat may need a reduced insulin dose.

If this occurs more than 6 hours before the next scheduled insulin dose, give half the usual dose at the scheduled time and then go back to the normal routine for the following doses. Again, schedule a glucose curve at the vet.

3. It's just not working

Very occasionally we find it very difficult to adequately control a diabetic cat. This is an exceedingly frustrating thing for the pet, their carers and the vets involved. Several factors can contribute. These generally include:

- Too much insulin being given and getting a rebound high blood glucose level (Somogyi Phenomenon)
- Too little insulin being given
- Incorrect injection technique
- Lack of stability in feeding, time of insulin injections, type of food etc
- Concurrent disease
- Inactive insulin (out of date, kept out of fridge, bad batch)
- Development of antibodies to the insulin

4. Unwillingness to treat

Sometimes, a client will feel it's too difficult or expensive to manage a diabetic cat. We understand and support this point of view. Intensive treatment and monitoring of a pet is a big undertaking. More than that, some cats will never tolerate being poked, prodded and transported around. We urge you to discuss all of these concerns with the vet before making any final decisions. You *will not* be judged.

Guideline to Costs

Diagnosis and stabilisation of a "healthy" diabetic cat

| | |
|---------------------------|----------|
| Consultation | \$75 |
| Hospitalisation 3 days | \$105 |
| Glargine Insulin Bottle | \$42.80 |
| Blood Glucose Readings | \$198.60 |
| Full Bloods | \$155 |
| Urinalysis in-house | \$33.00 |
| Urine Culture | \$142.10 |
| Antibiotics (if required) | \$30 |
| Prescription food | \$44.40 |

Total: \$825.90 (nB. This is an estimate only. Costs may be higher or lower)

Diagnosis and stabilization of a ketoacidotic diabetic cat

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|------------------------------|----------|
| As above: | \$825.90 |
| Intravenous fluids | \$100 |
| Extra hospitalization 3 days | \$105 |
| Extra blood glucose readings | \$198.60 |
| Repeat urinalysis | \$33 |
| Regular Insulin | \$42.80 |

Total: \$1305.30 (nB. This is an estimate only. Costs may be higher or lower)

Regular costs of maintaining a diabetic cat: monthly

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|---------------------------|----------------|
| Blood glucose curve (1-4) | \$66.20-264.80 |
| Glargine Insulin | \$42.80 |
| Needles x 6 | \$10 |
| Prescription food | \$44.40-100 |

Total: \$163.40-\$417.60 (nB. This is an estimate only. Costs may be higher or lower)

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