Canine Diabetes

Diabetes mellitus is characterised by uncontrolled high blood sugar levels due to insufficient insulin production by the pancreas. Insulin is necessary for the uptake and use of glucose (sugar) by cells in the body. It is also important for the appropriate processing of other nutrients such as fat and protein.

In dogs diabetes is due to a lack of production of insulin in the pancreas, usually as a consequence of immune-mediated destruction – similar to type I diabetes in people. It can also occasionally result from chronic pancreatitis or even pancreatic cancer, however we would normally see other signs of these conditions such as pain, vomiting and poor appetite.

Diabetes in dogs is not usually caused by being overweight, however obesity causes insulin resistance which may lead to earlier onset of diabetes and will make management of the condition more difficult.

Other diseases including infections can also cause insulin resistance. This can lead to destabilisation of a diabetic patient so rapid intervention is advised if any other signs develop or you noticed changes in your pet's symptoms. Medications prescribed for other conditions, especially steroids, will also impact insulin requirement.
Hormones also have an effect on insulin effectiveness and entire female dogs should always be de-sexed to enable diabetic stabilisation.

Signs of Diabetes

- Increased thirst and urination – this may lead to inappropriate urination or incontinence (leaking urine on bedding while asleep)
- Increased appetite often with weight loss
- Lethargy or tiredness

Complications of Diabetes

In the longer term, especially if untreated or unstable, diabetes can cause other problems:

- Infections, especially cystitis (bladder infection)
- Cataracts often develop leading to blindness
- Nerve problems can develop leading to weakness and the back legs may collapse
- Diabetic ketoacidosis is a life-threatening condition caused by abnormal metabolism secondary to insulin deficiency; it often starts with vomiting and lethargy and can rapidly progress to collapse and death.

Diagnosis

Checking the glucose levels in the blood and urine is the first step in diagnosing diabetes. In dogs this is typically enough to confirm the diagnosis, although more general blood tests are recommended to rule out other concurrent conditions that may affect long term management.

Treatment & Management

Treatment of diabetes in dogs always requires injections of insulin, usually twice daily. The insulin stimulates the proper use and storage of glucose preventing the secondary effects of hyperglycaemia (high blood sugar).

Most dogs are treated with a product called caninsulin which is a medium-duration action (lente) insulin. This is a different concentration to insulin-products used in people and cats and it is really important to use the correct syringes. Use of the wrong syringe will result in the wrong dose which can be very serious.

Insulin dosing must be optimised for the individual which means regular checks to ensure the dose is appropriate and the blood sugar is not going too high or too low. The ideal monitoring tool is a blood glucose curve where measurements are taken at regular intervals through the day between insulin injections. This can be done in the clinic or you can learn to do blood glucose checks yourself with a monitor at home.

Insulin storage and administration

Insulin is a fragile protein-compound and can be easily damaged so appropriate storage and handing is essential:

- Insulin should be stored in the fridge to maintain it at a constant temperature
- The bottle should be stored upright and gently turned to mix prior to use but NOT shaken
- Insulin should be discarded 28 days after opening as it will deteriorate after this time
- Dose should be carefully drawn up as shown and checked prior to administration
- Injections should be 12 hours apart where possible (please discuss with your vet where this needs to be varied)
- Injections are given into the loose skin on the scruff of the neck as demonstrated
- It is best to vary the exact place you inject to avoid fibrous scarring in the long term which can affect insulin absorption

Feeding

It is important to maintain a consistent meal type, size and timing so the insulin requirement remains consistent. Meals should be at the same time as the insulin injections and minimise extras between meals.

Some dogs, particularly if they are difficult to stabilise, will benefit from a specific 'diabetic diet' which is designed for slower energy release after eating.
Diet may need to be adjusted for weight management as well.

Exercise

Exercise should also be kept reasonably consistent day to day, avoiding extremes, otherwise the insulin dose may not be appropriate for the amount of blood glucose required.
Monitoring
It is VERY important that your dog is monitored closely when starting insulin treatment. Insulin is started at a low dose and increased gradually (rarely more than once weekly) to ensure we do not cause hypoglycaemia (low blood sugar – see below).

Sometimes we will start by checking a sample around 6 hours after the insulin dose to see if we are getting a reasonable response to a dose. To fine tune dosing a blood glucose curve will usually be performed, where we hospitalise your dog and take regular samples throughout the day. This enables us to document the extent and duration of effect and the time of peak insulin action in each individual patient (the lowest the blood sugar gets).

These can be performed at home in some instances with a purchased glucometer, this is especially useful for animals that are anxious at the vets. There is also a continuous glucose monitor which can be temporarily implanted in the skin – this can be very helpful where monitoring is difficult or the diabetes is difficult to stabilise.

We may perform a fructosamine blood test which gives us an idea of recent glucose control. We also check urine samples for glucose levels and for signs of secondary infection.

It is also important to monitor water intake, appetite, demeanour and urination at home. Body weight will also be carefully monitored. Keeping a 'diabetic diary' can be very useful.

Other illnesses, such as infections, will often lead to insulin resistance so any issue should be treated promptly.

Long term

Dogs will continue to need insulin injections long term, however many remain stable on a consistent dose for some years. Frequency of check-ups will vary up to a maximum of every 6 months in a very stable patient.
The better the control of blood sugar within the desired range the lower the risk of complications.

Complications – Urgent

- Hypoglycaemia – if your dog's blood sugar drops too low you may start to see signs of weakness and confusion, your dog may appear blind or disorientated, this may progress to collapse, coma and even seizures.

If you suspect this is happening you must contact us immediately and feed the dog or rub honey or sugar onto the gums if they will not eat.

If you have a glucometer at home you can check the glucose at this time.

- Hyperglycaemia – very high blood sugar can occasionally cause similar signs of confusion

However this is much less common so if in doubt give food or sugar and contact your vet.

- Diabetic ketoacidosis – this usually starts with vomiting and lethargy and can be life-threatening

It is very important to get any illness seen to immediately in a diabetic patient as it may be serious.

Many dogs with diabetes can live a long and normal life on treatment but will need careful monitoring throughout their life. If you have questions about any aspects of treatment, including the impact of the condition on both you and your pet then please talk to your vet or nurse.

Website for more information: http://www.cat-dog-diabetes.com/