

Diabetes Mellitus

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Following on from our previous articles on the endocrine diseases such as Cushing's Disease and Addison's Disease, this article covers what is probably the most common endocrine disorder of them all, Diabetes Mellitus.

We seem to be seeing more cases of this disease and one can speculate as to why this is so. It is also becoming more common in humans so environmental factors and modern high carbohydrate diets may well be contributing factors.

Keeshunds, Samoyeds, Cairn Terriers, Poodles and Dachshunds seem to be over represented in statistical surveys so there may be some genetic factors involved. Entire bitches are more commonly affected than males so hormonal factors may also be present in the aetiology.

The disease results from a failure of the pancreas to produce the substance Insulin. The pancreas has a dual function, exocrine - the production of digestive enzymes such as amylase and lipase which digest fat and are secreted into the gut, and endocrine - the production of insulin which is secreted in to the blood stream. The 2 functions operate independently of each other and it is rare but not unknown for both parts of the pancreas to fail simultaneously.

Insulin is produced in cells called beta cells which are grouped together to form structures known as the islets of Langerhans, which I always think sounds like a jolly nice place in the Mediterranean to which to go for a holiday.

The function of Insulin is to allow glucose in the blood stream to enter into muscle tissue where it is metabolised by exercise. When insulin production fails muscle tissue becomes starved of glucose and cannot function hence weakness, tiredness and weight loss develops. In the initial stages appetite is often increased as the tissues of the body cry out for glucose and this combined with weight loss can often be a significant clue.

Glucose builds up in the blood stream and eventually spills out of the body via the urine dragging water with it causing increased urination. The body tries to dilute its high blood glucose concentration by taking on board more water which is seen as excessive thirst. The high concentration of sugar in the urine often leads to bladder and urinary tract infections. High levels of sugar in the lens of the eye will lead to clouding of the lens or cataract and this can sometimes be the first symptom that an owner will notice. Unfortunately these changes in the lens are not reversible with medical treatment so sometimes cataract surgery is required.

If the condition is not diagnosed and controlled the high blood sugar and low tissue sugar will lead to tissue degeneration. This will lead to depression, loss of appetite, vomiting and dehydration. Coma and death can then result from circulatory collapse.

Dogs with diabetes mellitus are usually presented because they are drinking and urinating excessively. A diagnosis can usually be made quite confidently by detecting glucose in the urine and a high blood sugar. Blood sugar alone is not a reliable diagnostic test as the blood sugar will go up and down a lot during the course of the day depending on when the dog has eaten relative to the test, the amount of exercise taken etc., so we now have a much more accurate test by measuring a substance called fructosamine which gives us an indication of what the dog's average blood sugar has been over the previous 3-4 weeks. If the fructosamine is high this is very diagnostic for diabetes.

Treatment in dogs, unlike man, can only be effected via insulin injections. The amount of insulin required will vary from individual to individual and the initial dose can only really be determined by intelligent guesswork. Hence diabetic patients are usually admitted for stabilisation since an overdose of insulin will

result in hypoglycaemia, or low blood sugar, which is far more dangerous than high blood sugar or hyperglycaemia and it is far preferable that this should happen in the surgery if it is going to so that prompt administration of glucose can be effected if necessary to reverse the situation.

Once the amount of insulin required has been established the animal can go home and the owner taught how to administer its daily insulin requirement and what to do should the dog become hypoglycaemic as a result of an insulin overdose. Blood samples can be checked at monthly intervals to measure the fructosamine to determine if the blood sugar levels are being maintained at an acceptable level and fine tuning adjustments made to the Insulin dose if necessary. Once confident that stability really has been achieved, three monthly blood sampling may be all that is required.

Just as in humans, diet control is an important part of the treatment and high carbohydrate foods should be avoided.

Most uncomplicated cases of Diabetes Mellitus can be successfully controlled and owners of diabetic dogs, after some not unnatural initial misgivings, usually become extremely confident about giving their animal its daily injection(s) of insulin and monitoring its progress. Most diabetic dogs will also quickly adapt to the new routine of being injected by their owners and rarely hold permanent grudges against them!

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