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How I treat diabetes mellitus

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Treatment of DM has several goals: to reestablish glycemia in order to eliminate clinical signs of polyuria/polydipsia and polyphagia, to prevent complications related to diabetes, and to avoid hypoglycemia. Establishment of a perfectly normal glycemia throughout the day is utopic. Some glucose values above the reference range are often tolerated. Indeed, a good control of diabetes is most often possible with glycemia
values kept between 5 and 15 nmol/L. In dogs and cats, therapy involves a combination of insulin therapy, diet, ‘exercise’ and correction of insulin resistance. In cats, hypoglycemic agents can sometimes be used, although in my opinion their use is often disappointing. Therefore, in the vast majority of cats, I will also advise insulin therapy initially. Diabetes can potentially be reversible in some cats (remission). The situation is very different in dogs which have persistent diabetes, except in intact bitches that develop diabetes during dioestrus. In these dogs, ovariohysterectomy may result in resolution of the diabetes. This lecture will focus on the newly-diagnosed diabetic dog or cat.

Insulin therapy
Depending upon its duration of action, insulin can be classified in 3 categories: short- (regular), intermediate- (lente, NPH, Caninsulin®) and long-acting (ultralente or PZI in the USA) preparations. Concentrations frequently available are 100 U/ml or 40 U/ml, thus it is very important to use the appropriate syringes. The more diluted insulin is convenient in cats and small dogs. Insulin preparations used in pets are produced by genetic engineering (recombinant human) or are of pork origin.

In cats: initial recommended dosage with an intermediate insulin varies from 0.25 to 0.5 U/kg (always ideal body weight!), i.e. 1 to 2 U per cat, twice a day. The message is: start low! If the owner’s schedule allows it, I always prefer to initiate treatment with 2 injections of intermediate acting insulin at 12-hour intervals. In many countries Caninsulin® is approved for dogs only, however it is also much used in cats. Glargine, a human recombinant type insulin (Lantus®, U-100) with ultra-long duration of activity has become available a few years ago. This insulin can not be diluted and dosage accuracy is improved when used with 0.3 ml syringes. The recommended dosage varies between 0.25 and 0.5 U/kg depending on the initial glycemia (cut off approximately 20 nmol/L). Although in theory this insulin has a long duration of action, this is very variable from patient to patient. Twice daily administration also seems often necessary.

In dogs: I initiate treatment with a dosage around 0.5 U/kg 2x/day with an intermediate insulin (Caninsulin®). Once treatment is initiated, the patient is discharged with appropriate instructions and monitored for any signs of hypoglycemia. Also, one or two blood glucose measurements at the anticipated peak of action of the intermediate insulin are performed (in hospital or at home through home blood glucose monitoring by the owner). It is in my opinion unnecessary to perform a complete glucose curve at this time. My experience is that dosage of insulin is very often increased much too quickly. Usually we wait 1 week before performing a blood glucose curve and before making adjustments in insulin dosage. Client communication is paramount: they must be informed of the clinical signs of hypoglycemia (lethargy, trembling, seizures) and on how to store and administer the insulin. I also inform them that usually 3 to 4 visits at one-week intervals are usually required to obtain an adequate control of the diabetes. In my experience, home blood glucose monitoring has greatly facilitated/improved monitoring of diabetic pets in the last years.

Diet-feeding schedule: it is important to prescribe an appropriate commercial diet, for each patient, either to favor weight loss in obese patients or to ensure weight gain in thin patients. In diabetics, palatability and acceptance of the diet are also essential. Semi-moist diets or diets containing simple carbohydrates are to be avoided. For owner’s convenience I tend to (at least initially) administer insulin injections and meal at the same time (every 12 h). The feeding schedule is adjusted if needed in light of the results of the blood glucose curve (sometimes a meal is added a few hours after each insulin administration if necessary and if possible for the owners). Pets (especially cats) that are used to ‘nibble’ or ‘graze’ should still be allowed to do so even when diabetic. The emphasis in cats is placed on the use of high protein and low carbohydrate diets which might facilitate the reversal of the diabetes.

Conclusion
Most dogs and cats with diabetes can be treated successfully and enjoy a good quality of life. However, this requires a good motivation from the veterinarian and the owner. A remission is possible in certain cases of feline DM or in intact bitches after ovariohysterectomy. Almost all diabetic dogs and many cats require insulin therapy and often 2 daily injections are necessary to obtain adequate control.

References