



**University of
Zurich**^{UZH}

**Zurich Open Repository and
Archive**

University of Zurich
Main Library
Strickhofstrasse 39
CH-8057 Zurich
www.zora.uzh.ch

Year: 2014

Feline diabetes mellitus - therapy

Reusch, C E

Posted at the Zurich Open Repository and Archive, University of Zurich
ZORA URL: <https://doi.org/10.5167/uzh-96633>

Originally published at:

Reusch, C E (2014). Feline diabetes mellitus - therapy. In: 30. SCIVAC Jahreskongress, Rimini, Italy, 29 May 2014 - 1 June 2014.

Therapy of feline diabetes mellitus

Prof. Dr. Claudia Reusch, Dipl ECVIM-CA

Clinic for Small Animal Internal Medicine, University of Zurich, Switzerland

The primary goal is to eliminate the clinical signs of diabetes, such as polyuria, polydipsia, polyphagia and weight loss by good glycemic control, to prevent complications (e.g. hypoglycemia, DKA) and thereby enable a good quality of life. Early treatment and good glycemic control is important to increase the chance of diabetic remission. However, this issue requires special attention and one should remember that aggressive insulin therapy and aiming for normal or near normal blood glucose concentrations increases the risk of hypoglycemia. We routinely discuss the possibility of diabetic remission with owners of newly diagnosed diabetic cats, however, we do not stress remission as the major treatment goal.

The administration of insulin is the most important part of the treatment regimen in diabetic cats and should be initiated as soon as possible after the diagnosis is established. Insulin therapy is superior to the currently available oral hypoglycemic drugs to reverse the negative effects of glucose toxicity and to increase the chance of diabetic remission. In overt diabetes mellitus, dietary management alone is insufficient and may lead to deterioration of the disease and potentially to DKA. Diet, however, is an important part of the treatment and the cat should be fed a low-carbohydrate-high-protein diet. According to the AAHA Diabetes Management Guidelines, the carbohydrate content should be as low as the cat will eat (Rucinsky et al, 2010).

In the last two decades, the manufacture and development of insulin for human use has undergone revolutionary changes, which have had important implications in veterinary medicine. First, insulins derived from animal sources are being more and more replaced by recombinant human preparations and will eventually disappear from the market. Although there are differences in the amino acid sequence, human insulins (and their analogues) are fortunately biologically active in cats. Second, insulin preparations for human use containing 40-IU/ml have largely been replaced by 100-IU/ml insulins. It is important that owners understand the difference, because two insulin preparations for veterinary use (Caninsulin® and ProZinc®) are supplied as 40-IU/ml and using the wrong syringe size would lead to substantial dosing errors. Third, new classes of insulins called insulin analogues have been developed. They were designed to improve the pharmacodynamic properties of insulin and render insulin absorption or insulin delivery to tissues more predictable. The currently

available insulin analogues are certainly just the start of a whole new area of insulin preparations.

Cats are unpredictable in their response to insulin and none of the insulin preparations described above are routinely effective to control the disease. We nowadays start treatment in diabetic cats with insulin glargine (Lantus®), PZI (ProZinc®) would also be a good first choice. Both, insulin glargine and PZI are recommended by the AAHA Diabetes Management Guidelines (Rucinsky et al, 2010). If a diabetic cat is well regulated with Caninsulin®, there is no reason to switch it to one of the other insulins preparations. Nearly all cats require insulin twice daily, therefore, we always start with BID administration. The initial dose in cats weighing < 4 kg is 1 IU/cat BID, and in cats weighing > 4 kg it is usually 1.5 IU/cat (-2.0 IU/cat) BID. In cats with a blood glucose concentration < 350 mg/dl (20 mmol/l) at the time of diagnosis, no more than 1 U/cat BID is given, independent of the body weight. The starting dose should not exceed 2.0 IU/cat BID, even in a very large cat. It is better to start conservatively (e.g. maximum dose of 1.5 IU/cat BID), than to risk hypoglycaemia during the first few days which may lead to owner frustration and potentially cessation of therapy. Very small cats (< 2 kg) are started on no more than 0.5 IU/cat BID. One of the most important periods in the owner's care of a diabetic pet is the time during which the veterinarian teaches the technical aspects of the treatment and explains the monitoring protocol. The owner should be instructed to mix the insulin correctly: the manufacturer of ProZinc® recommends gently rolling of the vial, whereas Caninsulin® should be vigorously shaken. Lantus® (and Levemir®) are clear solutions and need no mixing. After the initial work-up, the cat is discharged with insulin, syringes, diet and, if needed, treatment for any concurrent disease (e.g. urinary tract infection). We inform the owner about the fact that during the next 3 months, frequent re-evaluations and close monitoring are needed. Re-evaluations are scheduled as a minimum after weeks 1, 2-3, 6-8, 10-12, 14-16 and then approximately every 4 months. Additional appointments may be necessary in some cats. It usually takes between one and three months until adequate glycaemic control is achieved, and it is also during the first three months that the likelihood of diabetic remission is greatest. The latter should not be over-looked, as serious hypoglycemia may occur. We also introduce the general concept of home-monitoring after initial work-up, and the technique is taught after 2 – 3 weeks. Clinical signs of diabetes usually resolve when blood glucose concentrations can be kept below the renal threshold, ideally the lowest glucose concentration (glucose nadir) should be between 80 and 140 mg/dl (4.5 – 7.8 mmol/l), the highest glucose concentration between 180 and 270 mg/dl (10 – 15 mmol/l). At each re-evaluation, the owner is questioned about his/her opinion

on the cats overall health, water intake, urine output, a thorough physical examination is performed, body weight recorded and a serial blood glucose curve is generated. Fructosamine measurement may also be informative. If glycemic control is considered unsatisfactory, the insulin dose is increased in steps of 0.5 IU/cat per injection. It is possible that the insulin dose has to be increased several times until a reaction (clinically and with regard to blood glucose concentration) is seen. We usually make dose changes no more often than every 5 to 7 days. It is also possible that the type of insulin has to be changed. If duration of action is too short, a longer acting insulin should be used and vice versa. As mentioned above, Caninsulin® usually has a shorter duration of action than ProZinc® and Lantus®; in some cats, ProZinc® may have a longer duration of action than Lantus®, although there is variability between cats. Levemir® seems to have a slightly longer duration of action than Lantus®. However, there are substantial differences between diabetic cats and insulin preparation and insulin doses have to be adapted according to the need of the individual cat. If hypoglycemia is noted at any time, the insulin dose should be reduced and another re-evaluation scheduled soon thereafter. Most diabetic cats can be adequately controlled with insulin doses between 0.5 and 3 IU/cat BID, i.e. usually with less than 1.0 IU/kg BID. If insulin requirement increases to 1 IU/kg BID or more without achieving adequate control, further work-up for any disease causing insulin resistance is indicated.

Reusch CE: Feline diabetes mellitus: In: Ettinger SJ and Feldman EC: Textbook of Veterinary Internal Medicine. Saunders Elsevier, 1796-1816, 2010

Rucinsky R, Cook A, Haley S, Nelson R, Zoran DL, Poundstone M: AAHA diabetes management guidelines. JAAHA, 46, 215-224, 2010