



### Treatment

Effective treatment is based on a combination of client goals, finances, implementation of the treatment plan, and the patient's response. It is very important to establish goals with the owner at the initiation of treatment and to maintain a frequent, open dialogue.

#### Goals

- Regulate blood glucose
- Achieve stable, appropriate body weight - set and achieve a Body Condition Score (BCS) goal and maintain normal Muscle Condition Score (MCS)
- Reduce or eliminate clinical signs of hyperglycemia (e.g. PU/PD/PP)
- Avoid hypoglycemia
- Avoid complications associated with sustained hyperglycemia
- Achieve good quality of life (OSU has a tool called "How Do I Know When it's Time?" See link in digital toolkit.)
- Avoid diabetic ketoacidosis
- Avoid peripheral neuropathy
- Achieve possible remission

#### Feeding Recommendations and Diet

- Maintain weight if good BCS
- Provide low carbohydrate diet
- Manage obesity
  - Loss of 0.5-2% of body weight per week (e.g. 0.3 lbs/0.137 kg per week for a 15 lb/6.8 kg cat)
  - Protein >5g/100 kcal, carbs 3g/100 kcal
  - Low carb diet <12% metabolizable energy (ME) fed to achieve target BCS
  - *Pet Nutrition Alliance Calculator Tool* (See link in digital toolkit)

#### Insulin Therapy

"There are many insulin formulations available worldwide, some specifically licensed in cats, which can be used to manage feline DM safely and effectively, especially when combined with an appropriate diet. The choice of insulin used by a clinician will depend on availability, familiarity, and the properties of the insulin itself. Additionally, in some countries, regulations may limit the first-line choice to certain veterinary registered products." (*ISFM Guidelines on Diabetes Mellitus, page 239*)

Type	Formulation	Duration of Action	Starting Dose	Median Maintenance Dose
Lente (Vetsulin/Caninsulin)	U40	Medium-acting (8-10 hours)	0.25-0.5 U/kg q12h 0.11-0.23 U/lb q12h	0.5 U/kg q12h
Glargine (Lantus)	U100	Long-acting (12-24 hours)	0.25-0.5 U/kg q12h 0.11-0.23 U/lb q12h	2.5 U/cat q12h
PZI (Prozinc)	U40	Long-acting (13-24 hours)	0.2-0.7 U/kg q12h 0.1-0.3 U/lb q12h	0.6 U/kg q12h
Detemir (Levemir)	U100	Long-acting (12-24 hours)	0.25-0.5 U/kg q12h 0.11-0.23 U/lb q12h	1.75 U/cat q12h

\*This table was created based on the *ISFM Guidelines on Diabetes Mellitus*.

#### Initial Treatment

- Dosing initiated at 0.25-0.5 U/kg q12h (Most average cats are initiated on 1 U/cat q12 hrs. Round to the nearest half unit if more precision is required.)
- Schedule demonstration to teach proper insulin handling and administration.
- Recommend client daily treatment log listing dose, administration of feeding and insulin times, any observations, food and water intake, and urine output assessment. Discuss monitoring protocols.
- Hypoglycemia is unlikely if a cat is started in 1 U q12h and many practices do not hospitalize when starting insulin therapy.

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### Treatment continued

#### Initial Treatment continued

- If hospitalization is decided upon: Day 1 begin with BG readings every 2 hrs unless BG below 150 mg/dl (8.3 mmol/L) then check hourly. (Some examples for hospitalization might include: if the owner was not able to observe and monitor the cat during initial treatment, if the owner requires more in depth assistance during initial treatment, preference of the practitioner to observe the cat or check BG q2hrs after the first dose [hypoglycemia following a standard first dose of insulin is unlikely, however the first dose effect is somewhat unpredictable], or a cat with DKA.)
- Identify and treat pain.

#### Monitoring Protocols

There are various ways to monitor a patient's response to insulin and determine dose adjustments. The method(s) used should be tailored to best meet the needs of both the cat and the owner.

##### *Intensive*

This protocol may be considered in a patient with a good likelihood of diabetic remission. The owner must be willing to monitor the cat closely and be able to follow directions.

- BG is checked at home three times a day
  - Before each insulin injection
  - 6-10 hours after the morning dose
  - Insulin dose is adjusted as necessary
    - Goal is to keep BG between 80 mg/dl (4.4 mmol/L) and 220 mg/dl (12.3 mmol/L)
    - Clear, written guidelines regarding dose adjustment must be provided to the owner
      - Adjustments are usually made in 0.5 U increments
      - Insulin dose should not be increased more frequently than q3 days
      - Insulin dose must be decreased if hypoglycemia is identified (see References list – Roomp 2009)

##### *Standard*

This protocol supports, but does not require, at-home BG monitoring and is a suitable choice for many diabetic cats, particularly those with comorbid conditions.

- Recheck examination in clinic 5-10 days after starting insulin
  - Patient weight checked and compared to expectations
  - Clinical signs (PU, PD, PP) and any other owner concerns are discussed
  - BG curve evaluated
    - Performed at home the day before examination (preferred), or
    - BG curve performed in the clinic (consider the impact of stress on these values)
  - Recheck diagnostics if previously abnormal as appropriate
  - Adjustments are usually made in 0.5 U increments
- Goals:
  - BG nadir >80 mg/dl (4.4 mmol/L)
  - BG peak <300 mg/dl (16.6 mmol/L)
  - BG <250 mg/dl (13.8 mmol/L) for most of the day without hypoglycemia
  - Avoid PU >50 mL/kg/day or approximately 8 oz for a 10# cat
  - Avoid PD >100 mL/kg/day or approximately 16 oz for a 10# cat
  - Patient examination + BG curve (home or clinic) q5-7 days until stable, then q3-6 months
  - Assessment of serum fructosamine may be useful if stress hyperglycemia is a concern, or if BG values do not correlate well with clinical signs, weight change, etc.

##### *Loose*

This protocol relies primarily on clinical signs (water intake, urination) and body weight to make insulin adjustments. This protocol may be a suitable choice if the owner's time or resources are limited. (see References list – Restine 2019)

- Attempt to keep BG below 350 mg/dl (19.5 mmol/L) if possible for most of the day
- Recheck examination and follow-up are still needed based on the individual cat