Boehringer Ingelheim

Experience *the difference*

AAHA & ISFM[1,2] Recommended

Feline diabetes mellitus management guide

Treating feline diabetes with **ProZinc® optimises management**, so cats and owners can enjoy their best life together.

ProZinc®
(protamine zinc recombinant human insulin)

Experience
optimal management of diabetes

ProZinc® has a prolonged duration of effect of approximately 10 to 14 hours in cats.[3] This allows:

1. Optimal glycaemic control

- Recommended by the AAHA and ISFM[1,2]
- Improved quality of life[4]
- Control of glycaemia for the full 12-hour interdosing period (Fig. 1)

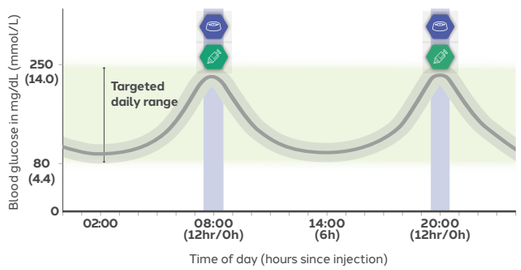
2. Flexible feeding options

- Accommodates for graze-feeding of meals and low carbohydrate snacks, which can help to reduce glucose peaks and troughs in cats fed twice daily
- Pet owners have more options when it comes to the feeding regimen

3. Monitoring based mainly on clinical signs

- If clinical signs are improving, blood glucose will be within the appropriate range for most of the day.
- Dose adjustments should be based primarily on clinical signs, supported by laboratory parameters where needed
- Cat owners should be encouraged to record presence/absence of clinical signs in the ProZinc® Home Care Journal

Figure 1. Example feline blood glucose curve



- This is an example of the curve that may be expected when cats are well-controlled on twice-daily ProZinc® with twice-daily feeding
- A different-shaped curve may be seen if the cat is a graze-feeder

Average blood glucose +/- daily variation | Insulin administration | Feeding

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Diagnosis
and initial management

Diagnosis of diabetes mellitus is based on[1]:

- **Clinical signs** – polyuria (PU), polydipsia (PD), polyphagia and weight loss. If the patient is anorexic, test for diabetic ketoacidosis (DKA)*
- **Laboratory results** – hyperglycaemia with glucosuria on at least two occasions. Fructosamine may be supportive in diagnosis and future management

Additional data to help detect concurrent disease includes[1]:

- Haematology
- Biochemistry and T4
- Full urine analysis, including culture
- Blood pressure

Management with ProZinc®[5]

- **Insulin-naive cats:** Start with **0.2–0.4 IU/kg twice daily**
- **Pretreated cats:** A higher starting dose of **up to 0.7 IU/kg** may be appropriate
- Treat concurrent inflammatory diseases (e.g. urinary tract infection, dental disease, skin disease, pancreatitis), which could interfere with the action of ProZinc®
- Taking the time to explain all aspects of diabetes management (including the importance of regular and accurate dosing) and to demonstrate preparing and administering ProZinc® helps familiarise owners with diabetic care
- Informing owners that the ProZinc® starting dose may need to be titrated helps owners to understand that it might take some time to achieve stabilisation
- The ProZinc® Cat Owner Brochure helps to familiarise owners with diabetic care and the ProZinc® Home Care Journal supports monitoring of clinical signs, exercise and weight.

Feeding

- Cats should be fed twice daily, approximately 12 hours apart and at the same time or just before insulin injections are given
- Some cats may be hungry between mealtimes. Graze-feeding of measured portions is acceptable, and owners should not hesitate to give hungry cats a small low carbohydrate snack

*If DKA is present, hospitalisation and emergency treatment are indicated.

Monitoring

General principles

Good control is based on[1]:

- **Improved clinical signs** (reduction in PU/PD and polyphagia, with maintenance/gaining of weight and muscle mass)
- No signs of hypoglycaemia or diabetes mellitus progression

Reassessments are recommended weekly until control is achieved, 1 month later and then every 3–4 months.

Evaluation of good control with ProZinc® is based primarily on improved clinical signs.

Cynthia R. Ward, VMD, PhD, DACVIM, College of Veterinary Medicine, University of Georgia

Monitoring blood glucose

Blood glucose curves are generally not required during the stabilisation phase with ProZinc®. Continuous glucose monitoring (CGM) or a 12-hour blood glucose curve may be helpful to check for short duration of action of insulin or suboptimal dosing if there are signs of hypoglycaemia, if clinical signs persist beyond 6 weeks, or if the dose reaches 1.5 IU/kg. It is recommended that factors such as compliance problems, diet change and concurrent disease are ruled out prior to carrying out CGM or a blood glucose curve.

If monitoring **serum fructosamine** is planned, the value at diagnosis would serve as a baseline. Repeating fructosamine is deemed appropriate once the patient has been on the same insulin dose for 2 to 3 weeks and then every second week until assessed as good control by improved clinical signs and a satisfactory fructosamine level (e.g. <400 µmol/L).

Home blood glucose monitors can be used to check for hypoglycaemia if the cat is showing suggestive clinical signs or to inform decisions on whether the cat should be given ProZinc® when inappetent. Owners should be discouraged from taking daily blood glucose measurements as this creates unnecessary stress for the cat.

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Reassessments

First reassessment

- Timing is based on owner confidence with injections – usually 7 days but earlier if owner requires additional support
- Ask the owner to demonstrate drawing up insulin and the injection procedure using sterile water for injection or saline
- Weigh the patient and ask about presence of clinical signs (PU/PD, appetite)

Further reassessments

- Continue reassessments and dose titration based on clinical signs approximately weekly until there is good control (see dose adjustment section)
- Ask about presence of clinical signs of both hyper- and hypoglycaemia
- Weigh the patient and assess muscle mass
- Check for compliance issues and concurrent diseases, which could interfere with insulin action

Week 6 reassessment

- Ask about presence of clinical signs of both hyper- and hypoglycaemia
- Weigh the patient and assess muscle mass
- If clinical signs persist:
  - Rule out compliance problems, activity or diet change
  - Check for concurrent diseases, which could be causing insulin resistance (e.g. acromegaly, hyperthyroidism, hyperaldosteronism, chronic kidney disease and inflammatory conditions such as bacterial infections and pancreatitis)
  - Consider CGM (e.g. with Freestyle Libre®) or a 12-hour blood glucose curve to rule out suboptimal dose
- No clinical signs: reassess in 1 month

3–4 monthly reassessments of the stabilised patient

- Assess history for presence/absence of clinical signs
- Weigh the patient, assess muscle mass and assess for concurrent disease
- Consider fructosamine if history is unreliable or incomplete

*The **ProZinc® Home Care Journal** helps you at each visit to assess improvement or worsening of clinical signs and changes in routine.*

Dose adjustments

General principles

- A decision to increase dose should be based on **continued presence of clinical signs** of hyperglycaemia
- It may take 6 weeks or sometimes longer for good control, so **be patient with your patient** and do not be tempted to increase the dose too quickly

Dosing increments

- If clinical signs are not improved, **increase insulin dose by 0.5–1.0 IU/cat/day.** Generally, any dose adjustment should be performed after several days (e.g. 1 week) since full action of insulin requires an equilibration phase

What if the patient is difficult to control?

If clinical signs persist:

- Rule out compliance problems, activity or diet change
- Check for concurrent diseases, which could be causing insulin resistance
- Consider CGM (e.g. with Freestyle Libre®) or a 14-hour blood glucose curve to rule out short duration of action of insulin and suboptimal dose

If CGM or blood glucose curve shows:

- **Symptomatic hypoglycaemia** (blood glucose <4.4 mmol/L with clinical signs such as lethargy, weakness, ataxia, seizures) or **Somogyi phenomenon***: Reduce insulin dose by 0.5–1.0 IU or restart stabilisation at 0.2–0.4 IU/kg
- **Normoglycaemia and normal fructosamine** with a dose <1.0 IU, the cat may be in **transient remission**: Withdraw insulin and recheck blood glucose in one month or earlier if clinical signs return

***For additional technical advice**, refer to the ProZinc® package insert or consult your Boehringer Ingelheim Technical Veterinarian.*

*Somogyi phenomenon is also known as a hypoglycaemic-induced hyperglycaemic event.

Feline Diabetes Mellitus Management Flowchart

Step 1: Diagnosis

DIABETES MELLITUS

Clinical signs
- Polyuria, polydipsia, polyphagia, weight loss

Laboratory results
- Hyperglycaemia with glucosuria on 2 occasions *or*
- Hyperglycaemia with glucosuria and high serum fructosamine

CONCURRENT DISEASE

Minimum database
- Haematology, biochemistry and T4
- Urine analysis including culture
- Blood pressure

Step 2: Initial Management

Initiate ProZinc® therapy **AT A DOSE OF 0.2–0.7 IU/KG** every 12 hours

Insulin-naive cats: Start with 0.2–0.4 IU/kg
Pretreated cats: Up to 0.7 IU/kg

Feed appropriate diet

Treat concurrent disease

Step 3: Monitoring

REASSESSMENT

Assess for presence of clinical signs
- History, physical examination, body weight (initially every 1–2 weeks)

± Laboratory results
- Fructosamine (every second reassessment)
- Blood glucose (BG) curve/continuous glucose monitoring (CGM)

Step 4: Dose Adjustment

PERSISTENT CLINICAL SIGNS

Increase dose by 0.5–1.0 IU/cat/day

If clinical signs >42 days or dose >1.5 IU/kg, rule out:
- Compliance problems
- Activity or diet change
- Concurrent disease
- Somogyi phenomenon
  - If confirmed, reduce dose by 50% or restart stabilisation at 0.2–0.4 IU/kg

RECHECK: 1–2 weeks

NO CLINICAL SIGNS

Continue current ProZinc® dose

RECHECK: 1 month then every 3–4 months

Encourage use of home care journal

SIGNS OF HYPOGLYCAEMIA

Reduce dose by 0.5–1.0 IU/cat/day
- Treat hypoglycaemia
- Administer next dose when BG >250 mg/dL (14 mmol/L)

RECHECK: 1 day then 1 week

Withdraw insulin

If cat is in transient remission diagnosed by:
- Dose <1.0 IU/cat
- Normoglycaemia
- Normal fructosamine

RECHECK BG: 1 month or if clinical signs

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For their best life together, prescribe ProZinc®:

- Recommended by the AAHA and ISFM[1,2]
- Improved quality of life[4]
- Flexible feeding options, including graze-feeding
- Monitoring and treatment based mainly on clinical signs

References: 1. Behrend E, Holford A, Lathan P, et al. AAHA diabetes management guidelines for dogs and cats. *J Am Anim Hosp Assoc.* 2018;54:1–21. **2.** Sparkes A, Cannon M, Church D, et al. ISFM consensus guidelines on the practical management of diabetes mellitus in cats. *J Feline Med Surg.* 2015;17:235-250. **3.** Nelson RW. Disorders of the endocrine pancreas. *Small Animal Internal Medicine.* 5th ed. In: Nelson RW, Couto CG, eds. St. Louis, MO: Elsevier; 2014;777–823. **4.** Gostelow R, Hazuchova K, Scudder C, et al. Prospective evaluation of a protocol for transitioning porcine lente insulin-treated diabetic cats to human recombinant protamine zinc insulin. *J Feline Med Surg.* 2018;20:114–121. **5.** ProZinc Summary of Product Characteristics (SPC). European Medicines Agency website. Available at: https://www.ema.europa.eu/en/documents/product-information/prozinc-epar-product-information_en.pdf. Accessed June 27 2022.

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