



Troubleshooting

Treating diabetic cats is not always straightforward and can be affected by a variety of factors.

Uncontrolled Blood Sugar

- Review home care, administration, and daily treatment logs
- Review insulin handling: storage; gentle handling of large, fragile protein structure; and drawing up product correctly (i.e., inversion of vial, ensure not drawing up air)
- Ensure correct measurement of required dosage: review technique, observe client drawing up insulin
- Ensure correct syringes being used: U-40 for 40 U/ml and U-100 for 100 U/ml insulins
- Ensure correct technique for subcutaneous administration: review with client, observe client administering insulin
- Ensure diet recommendations are being followed

Infection

- Appropriate diagnostic testing for infections should be pursued:
 - Urinalysis
 - Urine culture/sensitivity
 - *Note: inactive sediment in urinalysis with dilute urine does not rule out a UTI*
- Appropriate treatment of concurrent infections:
 - Treatment of urinary tract infection based on urine culture and sensitivity testing
 - Treatment of skin infection
 - Treatment of parasites

Dental Disease

- It may not be possible to achieve diabetic regulation until concurrent dental disease is treated.
- Management of concurrent dental disease should not be delayed as this may impact insulin responsiveness.
- Appropriate care for dental disease should be pursued:
 - General anesthesia
 - Dental radiographs
 - Surgical extraction of diseased teeth
 - Scaling and polishing of healthy teeth

Acromegaly/Hypersomatotropism

Pituitary tumor with excessive production and secretion of growth hormone

- Effects: Insulin resistant DM secondary to excess growth hormone, anabolic effects of excessive IGF-1, space occupying effect of pituitary macroadenoma
- Physical changes: weight gain, a broadened face, enlarged feet, protrusion of mandible, increased interdental spacing, organomegaly, poor coat
- Test: Serum IGF-1 concentration > 1000 ng/mL supports this diagnosis. Note: IGF-1 results may be unreliable in untreated diabetics; testing after 6 weeks of exogenous insulin is recommended. (*see References list – Niessen 2007*)
- Cats with hypersomatotropism will require insulin dosages in excessively high ranges (2-70 U daily)

Hypoglycemia

- Potentially higher risk in tightly controlled patients
- May be associated with the onset of remission
- Signs include lethargy, ataxia, dilated pupils
- Treat with corn syrup, over the counter glucose gels/paste, or sugar water with care to avoid aspiration. Attempt to apply any treatments to the gums
- Emergency veterinary visit (requires an informed client)
- Withhold insulin until hyperglycemic again and restart with lowered dose
- Confirm there has not been overdosing or double dosing

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Troubleshooting continued

Somogyi Effect

- Rebound hyperglycemia as a counter regulatory response to low blood sugar
- Mediated by effects of adrenaline, cortisol, growth hormone, and glucagon
- Observed as a BG <70 mg/dL (3.8 mmol/L), followed by a steep rise exceeding 400 mg/dl (22 mmol/L)
- Documented cases are rare but if suspicions are present, 18 to 24 hour BG curves may be needed to identify

Switching Insulin

- No wash out period required
- Start at the newly diagnosed patient dose (0.25-0.5 U/kg q12h based on lean body weight)
- Switching insulin should be considered only if duration of effect is an issue or after other troubleshooting has failed to determine a cause for uncontrolled blood sugars

Stress (Excitement) Hyperglycemia

- A particular issue in feline patients
- Blood glucose (BG) values of 144-360 mg/dL (8-20 mmol/L) may be falsely elevated due to stress
- Acute mobilization of glucose
 - BG may exceed the renal threshold (approximately 260 mg/dl [14-16 mmol/L] and result in glucosuria)

How to differentiate from true DM

- Urinalysis - there is risk of false positive due to stress glucosuria
- Home urine testing for glucose or have owner bring in urine sample from home
- Home BG testing
- Repeat testing in clinic (with pre-visit sedation, using Feline-Friendly Handling, and pre-visit analgesics where pain may be causing stress)
- Measurement of serum fructosamine
- Plasma beta-hydroxybutyrate (>0.22-0.58 mmol/L)

Client Factors to Consider

- Understanding of treatment, administration/home monitoring, clinical signs, and when to call immediately
- Compliance and follow-through at home and with routine appointments
- Daily routine and household factors (travel, work/social schedules, other household pets and humans, stress of client and cat)
- Multi-cat households where it might be difficult to measure food/water intake and urine output
- Finances and resources