

Monitoring and Adjusting Intermediate or Long-Acting Bolus Insulin Treatment in Dogs: NPH, Lente, or PZI

Monitoring on the Initial Day of Treatment

- ◆ Initiate insulin therapy.
- ◆ Consider measuring fructosamine.
- ◆ If there is clinical concern for possible hypoglycemia or a need to more rapidly determine an appropriate dose, consider placing a CGM as insulin is started to allow dose titration every 3–7 days until glycemic control is attained.
- ◆ If glucose is <100 mg/dL at any time during initial BG monitoring or on CGM following the first insulin dose, consider:
 - Decreasing the insulin dose by 25–50% in dogs where the BG was obtained using a veterinary-calibrated PBGM.
 - Closely monitoring for signs of hypoglycemia if using a CGM, or confirming low readings with a PBGM.
 - A patient's BG response after starting an intermediate insulin can be highly variable initially, often requiring at least 3–5 days before a stable or consistent response is appreciated.
- ◆ The insulin dose should not be increased within the first 24 hr of starting treatment no matter how high BG may be.

Monitoring Until Control Is Attained

- ◆ Perform a BGC every 5–14 days until an acceptable dose is found or use a CGM to titrate the dose every 3–7 days.
- ◆ Review the client log, which should include any changes to DM clinical signs.
- ◆ Perform a physical examination, including body weight, at least every 2 wk until the appropriate insulin dose is determined.
- ◆ A fructosamine measurement can also be considered at 2 wk intervals.

Ongoing Monitoring After Control Is Attained

- ◆ Well-controlled diabetics should be evaluated every 3–6 months.
- ◆ Review the client log, which should include any changes to DM clinical signs.
- ◆ Perform a physical examination, including body weight.
- ◆ A BGC can be done or a CGM placed at each recheck; however, these assessments are best used to evaluate dogs with clinical signs suggesting loss of glycemic control or hypoglycemia.
- ◆ Semiannually, perform full systemic diagnostics including chemistry panel, CBC, urinalysis, triglycerides, and BP. A fructosamine measurement can be considered. Urine culture is only recommended if there are clinical signs of a urinary tract infection.
- ◆ Any time an insulin dose is changed, perform a BGC in 5–14 days or monitor with CGM.
- ◆ Using “spot checks” or isolated BG values by themselves is not recommended as a sole reason to increase an insulin dose but can sometimes be used to decrease the dose (if hypoglycemia is verified).

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FIGURE 5.1

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Insulin Adjustments if the Nadir Is <60 mg/dL (see also Figure 11.1)

- ◆ Remember that CGM readings do not always accurately reflect the patient's true BG; therefore, low CGM readings in a patient without clinical signs of hypoglycemia should be confirmed using a PBGM before adjusting therapy.
- ◆ If prolonged periods of hypoglycemia (i.e., 1–2 hr) are confirmed in a patient that is not showing clinical signs, offer the patient a small meal. Consider reducing the insulin dose by 10–25% at the next scheduled injection time.
- ◆ If clinical signs of hypoglycemia are present, treat as necessary (i.e., offer a small meal or provide a sugary solution and pursue further veterinary assessment). Withhold additional insulin until the hypoglycemia has resolved and BG is >250 mg/dL. When re-starting insulin, consider reducing the insulin dose by 25–50%.
- ◆ Obtain a BGC after the next dose to identify whether hypoglycemia recurs. If hypoglycemia recurs with the lower dose, continue to decrease the dose and obtain a BGC until hypoglycemia is resolved.
- ◆ Place a CGM or obtain a BGC in 5–14 days.

Insulin Adjustments if the Nadir Is >150 mg/dL

- ◆ If clinical signs of DM are present:
 - Increase insulin dose depending on patient body size and degree of hyperglycemia, commonly done in increments of:
 - 0.5-1 U/dose in small to medium-sized dogs.
 - 1-2 U/dose in medium to large breed dogs.
 - Place a CGM or recheck a BGC in 5–14 days.
- ◆ If clinical signs of DM are not present:
 - If weight is stable, leave the dose unchanged and recheck in 1–3 mo.
 - If weight is decreasing unintentionally, consider additional testing (such as fructosamine) or a trial dose increase. Place CGM or recheck a BGC in 5–14 days.
- ◆ Consider whether a condition causing insulin resistance is present when:
 - Insulin dose is >1.5 U/kg/dose with no response or fails to bring BG below 250 mg/dL.

Insulin Adjustments if the Nadir Is 60–150 mg/dL

- ◆ If clinical signs are controlled, no adjustment is needed.
- ◆ If clinical signs are not controlled, consider the following possibilities:
 - BGC is not reflective of overall control due to high inter-day glycemic variability. Consider placing a CGM.
 - The duration of insulin action is too short. If insulin is given once daily, consider *q* 12 hr therapy. If given *q* 12 hr, consider changing the insulin type.
 - The duration of insulin action is too long. If BG is still decreasing at the end of the insulin dosing interval, a subsequent dose may cause hypoglycemia. If insulin is given *q* 12 hr, consider *q* 24 hr therapy or giving a lower insulin dose in the evening. It would also be acceptable to try changing the insulin type.
 - The clinical signs are caused by another disease (see Section 7, Troubleshooting in Diabetic Dogs).
- ◆ When using basal insulins, nadirs around 70–80 mg/dL are often targeted for good control and may not warrant insulin dose adjustment.

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FIGURE 5.1, CONTINUED

Monitoring and Adjusting Intermediate or Long-Acting Bolus Insulin Treatment in Dogs: NPH, Lente, or PZI

Ongoing Home Monitoring

- ◆ Log food and water daily. Note any abnormal events like vomiting or lethargy.
- ◆ Log insulin doses daily.
- ◆ Note any signs suggestive of hypoglycemia. Reassess if persistent or recurrent.
- ◆ Consider periodically (once weekly) testing urine for negative glucose results in patients with tight BG control.
- ◆ Consider weekly urine glucose and ketone monitoring in patients with poorly controlled DM. If ketones are present, patient should be reassessed.

BG, blood glucose; BGC, blood glucose curve; BP, blood pressure; CBC, complete blood count; CGM, continuous glucose monitor; DM, diabetes mellitus; NPH, neutral protamine Hagedorn; PBGM, portable blood glucose monitor; PZI, protamine zinc insulin; U, unit

FIGURE 5.1, CONTINUED

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The 2026 AAHA Diabetes Management Guidelines for Dogs are available at aaha.org/diabetes-management-dogs

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