

Canine Diabetes Mellitus

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Diabetes mellitus (DM), a common endocrine disease affecting middle-aged to older dogs, is diagnosed when persistent blood glucose (BG) elevations (>300 mg/dL) are documented on a routine serum chemistry or glucometer reading with excess urinary glucose excretion. Clinical signs include weight loss despite an increase in appetite, poor coat quality, and behavior changes (eg, lethargy, weakness), as well as increased urination and water intake, which typically result when the BG concentration surpasses the renal absorptive threshold (180–220 mg/dL¹). Approximately 50% of dogs will develop bilateral cataracts within 6 months of DM diagnosis, with around 80% becoming affected within 16 months.²

It is ideal to assess glucose concentrations in a nonstressful environment; however, the impact of stress on a dog's glucose concentration is minimal compared with that on a cat's. Assessing serum fructosamine concentration is also useful for documenting persistent hyperglycemia by providing retrospective information about the average BG concentration 1–3 weeks before sampling.^{3,4}

TREATMENT

Canine DM is managed with insulin and dietary therapies. The treatment goals are to minimize clinical signs and prevent complications (eg, hypoglycemia, ketoacidosis); completely resolving a dog's insulin requirement (ie, achieving diabetic remission) is unlikely.

The author relies on porcine insulin zinc suspension (Vetsulin, vetsulin.com) or neutral protamine Hagedorn (NPH) insulin. Note that porcine insulin zinc suspension is a veterinary-specific product containing 40 IU/mL insulin, thus requiring U-40 insulin syringes (ie, 40 units/mL) for administration; NPH, however, is a human insulin product containing 100 IU/mL insulin and requiring U-100 insulin syringes (ie, 100 units/mL). Insulin dose is based on the BG curve result, where a glucose reading is obtained before a meal and concurrent insulin injection and then every 1–2 hours for up to 8–12 hours. Curves should be performed 7–10 days after insulin initiation and/or dose adjustments.

Dietary therapy is aimed at weight loss (when appropriate) and minimizing the impact of meals on the postprandial glycemic response. The latter is achieved by minimizing carbohydrate and fat content while increasing fiber content.^{5,6}

CLIENT EDUCATION

Clients should be educated about proper insulin injection techniques, proper insulin handling and storage, and maintenance of consistent feeding and injection schedules. They should be counseled on signs of hypoglycemia (ie, weakness, collapse, seizures) and how to respond if these signs are noted.

Patients that get highly stressed at the practice can benefit from at-home BG monitoring. Clients can be trained to use veterinary-specific glucometers, and should be given clear guidelines on when to obtain readings to prevent excessive sampling. Implantable, continuous monitors that measure glucose levels in the interstitial fluid offer another option and have recently gained popularity in veterinary medicine for outpatient diabetic monitoring.⁷

STEP 2
Team Education Primer ►

Team Diabetes Management *at a Glance*

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DM occurs when there is a deficiency of insulin secretion from the pancreatic beta cells or when a systemic resistance to insulin action occurs at the level of target tissues (eg, skeletal muscle). Most dogs are considered insulin-dependent at diagnosis,¹ meaning their pancreatic beta cells have permanently lost the ability to secrete sufficient insulin.

Although canine DM shares some similarities with type 1 DM in humans, the exact pathophysiology is not definitively known. In most cases, progressive pancreatic beta cell destruction contributes to an eventual loss of insulin-secreting ability. The underlying cause of beta cell loss is likely multifactorial and involves

genetics, environment, and/or autoimmune inflammation that specifically targets the endocrine pancreas.

Impaired insulin action reduces glucose uptake into cells for use as energy. The absolute or relative lack of insulin ultimately contributes to chronic elevations in BG concentration and impaired handling of other nutrients.

Most dogs do not show signs that suggest a problem before fulminant DM develops. A smaller percentage may develop DM secondary to a disease process (eg, chronic pancreatitis, excess circulating cortisol, exogenous steroid administration, high circulating progesterone concentrations [typically associated with diestrus]) or medication that causes resistance to insulin action. Prompt correction or discontinuation of any predisposing condition or

medication may allow remaining functional beta cells to recover and resume insulin production.

Although achieving remission (ie, the ability to maintain euglycemia without insulin injections) may be possible in a few dogs with insulin resistance, it is exceedingly uncommon. Therefore, lifelong q12h insulin injections are needed to maintain control of the disease.

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STEP 3
Communication Keys ►



Acknowledging & Educating Clients

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Successful management of DM requires commitment, partnership, and open and honest communication between the veterinary team and the client. The client's decision to care for a diabetic pet is an emotional and financial commitment; providing and managing the costs of proper follow-up and at-home care may be taxing. Team members should provide a realistic overview of the commitment and care required, and respect the client's feelings and decisions, including the decision for or against treatment.

Team members can support and communicate with a client whose dog has diabetes in the following manner:

- Acknowledge the client's feelings or concerns (eg, financial or time constraints, lack of understanding of the disease, fear of administering at-home treatment). This will allow the client to confirm his or her feelings, correct any misperceptions, and move from

an emotional reaction toward a logical response.

- Assure the client that the team will be available to assist with ongoing care and answer any questions. Also, be sure he or she knows what to do if an urgent or emergent situation arises after-hours.
- Be careful not to take anger or negative attitudes or conversations personally. The client may feel

overwhelmed when hearing the diagnosis, which can make communication difficult.

- Be prepared to provide accurate information about the cost of ongoing diabetic care.
- Educate the client about the condition and required commitment, including changes in nutritional requirements and ongoing veterinary care. This information may need to be presented in multiple ways (eg, verbal, written, hands-on practice).
- Express appreciation to the client for seeking the best possible care for his or her pet.
- Follow the client's lead during conversations. If he or she wants to talk about the patient, listen actively and respond compassionately. Offer words of encouragement without pressuring the client.
- Use the "chunk and check" method by offering small chunks of information and then checking for the client's understanding before proceeding.



READ ALL ABOUT IT

- **2010 AAHA Diabetes Management Guidelines for Dogs and Cats.** Rucinsky R, Cook A, Haley S, et al; 2010.
- **AAHA's Complete Guide for the Veterinary Client Service Representative.** Renfrew J—Lakewood, Colorado: AHAA Press, 2013.
- **The Art of Veterinary Practice Management.** Opperman M—Lenexa, Kansas: Advanstar Communications, 1999.

STEP 4 Team Workflow ►

Team Action

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RECEPTIONIST

- ✓ Follow your practice's protocol when instructing clients to prepare their pet for an appointment
- ✓ Recognize an urgent or emergent situation and quickly and efficiently direct phone calls or obtain help upon patient presentation
- ✓ Greet and provide support to the client
- ✓ Provide or create a medical record, which should include the client's name, address, and contact information, as well as patient, vaccination, and insurance information
- ✓ Communicate important information from the client to the team

TECHNICIAN/ASSISTANT

- ✓ Receive the patient and obtain the history from the client, including clinical signs, signs of hypoglycemia, and a list of all medications, treats, and food the patient is given at home
- ✓ Record the information in the patient's medical record
- ✓ Facilitate the performance of BG curves
- ✓ Minimize patient stress and handling to maximize result accuracy

VETERINARIAN

- ✓ Perform a physical examination and order any necessary diagnostic tests
- ✓ Assess the patient's clinical presentation and all diagnostics
- ✓ Discuss the assessment, treatment options, prognosis, and finances with the client
- ✓ Administer any necessary treatments
- ✓ Prescribe medications and diet therapies

TECHNICIAN/ASSISTANT

- ✓ Collect blood or urine specimens from the patient as ordered by the veterinarian
- ✓ Educate the client about hypoglycemia signs
- ✓ Provide the client with supporting educational information about the condition and treatment

RECEPTIONIST

- ✓ Collect all deposits and payments for services
- ✓ Schedule follow-up appointments
- ✓ Provide documentation and forms for referral, if necessary
- ✓ Provide educational materials as directed by the veterinarian

STEP 5
Team Roles ►

Team Roles

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TEAM MEMBER	ROLE	RESPONSIBILITIES
RECEPTIONIST	Patient & client bonding expert, client educator	<ul style="list-style-type: none"> ✓ Be aware that diabetic patients require special care before arriving at the practice for procedures that require fasting (eg, blood tests, surgery); follow your practice's guidelines or script when providing information to clients; and refer any questions to the veterinarian ✓ Be familiar with diabetes and its related complications ✓ Learn to recognize signs of distress and what constitutes a diabetic emergency to ensure rapid and proper fielding of phone calls ✓ Facilitate communication between clients and team members ✓ Ensure the completion of appropriate paperwork, release forms, and deposits or payment for services
TECHNICIAN/ ASSISTANT	Patient caregiver, client educator	<ul style="list-style-type: none"> ✓ Train and educate clients as instructed by the veterinarian, and provide educational information and handouts ✓ Demonstrate administration techniques for insulin and other medications ✓ Educate clients about what constitutes an urgent or emergent situation for a diabetic dog
VETERINARIAN	Medical expert, client & team educator	<ul style="list-style-type: none"> ✓ Educate clients about treatment options and their advantages and limitations ✓ Facilitate the role of the veterinary technician in patient care and client education ✓ Educate the team about diabetes, its signs, and any potential urgent or emergent conditions ✓ Emphasize the value of careful diabetic monitoring and consistent follow-up
PRACTICE MANAGER	Workflow facilitator, team & education coordinator	<ul style="list-style-type: none"> ✓ Ensure the team is trained to support and communicate with clients ✓ Encourage the veterinarian to train other team members to recognize diabetes signs and potential urgent or emergent conditions and respond appropriately ✓ Ensure the condition and treatment are properly documented in patients' medical records to support any necessary legal defense and insurance claims ✓ Assess client satisfaction and address client concerns ✓ Ensure diabetes information (eg, handouts, brochures) is available ✓ Promote workplace morale by praising the team for things done well and sharing success stories and comments of appreciation ✓ Set competitive but fair fee schedules to allow and encourage clients to follow through with appropriate long-term care

STEP 6
Team Training Plan ►

Team Training Topics

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Developing skills and knowledge about diabetes *before* they are needed is the key to your team's effectiveness and, ultimately, success in treating diabetic dogs. Training should be reviewed with the entire team periodically. Effectively supporting clients' informational and emotional needs from the moment they arrive at the practice will help establish a trusting and lasting relationship during care.

TRAINING A KNOWLEDGEABLE TEAM

The practice manager and the veterinarian should provide training and clarify each team member's role and responsibilities. All team members should review educational materials such as handouts and websites to ensure they are current and accurate.

Effective training includes tips for communicating with clients regarding their concerns about diabetes and the treatment plan. Training should also include a presentation from a veterinarian about the condition, including typical treatment options and required follow-up care, as well as information about urgent and emergent conditions and how to respond. Suggested content for the practice manager's, veterinary technician's, and veterinarian's presentations includes:

Practice manager

- The challenges of communicating with clients during difficult situations

- Communicating with clients about treatment cost concerns
- Each team member's role during an urgent or emergent presentation
- Educating clients about at-home diabetes management.

Veterinary technician

- Topics for client education (eg, diet management, medication administration).

Veterinarian


- Clinical and behavioral signs of canine diabetes
- Home care and prognosis
- Diagnosing the disease
- Recognizing and responding to diabetic emergencies
- Typical treatments and costs.

To summarize and put team training into action, role-play specific scenarios.

Scenario 1: A client calls the practice to discuss changes in her dog's behavior. You recognize nonemergent signs of diabetes.

- Know and follow the protocol for scheduling appointments for diabetic cases.
- Take the lead from the client during the conversation and ask open-ended follow-up questions about the patient's signs.

Scenario 2: A diabetic patient presents with an urgent condition. The client did not call the practice before arriving.

- Recognize a diabetic patient in distress.
- Review each team member's role.
- Follow the protocol for providing urgent care.
- Use communication skills to effectively speak with and support the client. 

See Aids & Resources, back page, for references & suggested reading.

STEP 7
Client Handout ►

Frequently Asked Questions: Canine Diabetes Mellitus

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1 **What is diabetes mellitus?**

Diabetes mellitus (DM) is caused by a lack of insulin action, which makes your pet unable to utilize glucose for energy.

2 **Why did my dog get this disease?**

Similar to type 1 DM in humans, canine diabetes is often associated with genetics and autoimmune inflammation of the pancreas. Most dogs do not show signs of illness until their pancreas has completely lost the ability to make insulin.

3 **How is DM treated?**

Most dogs are treated with 2 daily insulin injections under their skin, using a tiny needle to minimize discomfort. Some dogs also require a change to a low-carbohydrate, low-fat, high-fiber diet to control their glucose levels.

4 **How long will my dog need treatment for diabetes?**

Almost all diabetic dogs require lifelong insulin therapy.

5 **How do I monitor my diabetic dog's health?**

Diabetic patients need regular veterinary monitoring. Your own observations of your dog's health are combined with blood testing (eg, blood glucose curves, fructosamine levels) to ensure the therapies' effectiveness. While veterinary visits may be more frequent soon after diagnosis, most diabetic dogs only require visits every 4–6 months once the disease is stable.

6 **Does DM predispose my dog to other health problems?**

Diabetic patients have reduced immune defenses, which can predispose them to secondary infections (commonly, urinary tract infections).^{1,2} They also have a high occurrence of pancreatic inflammation, which can cause gastrointestinal upset and temporarily disrupt their glucose control. Routine veterinary monitoring helps catch problems early and minimize their impact on diabetic control. Additionally, most diabetic dogs will eventually develop cataracts in both eyes. This is a result of the disease and often cannot be prevented even with good regulation of diabetes.

7 **Do I need to change how I care for my dog at home?**

Diabetic patients are predisposed to dehydration and should have access to fresh, clean water at all times. Also, the timing of meals and insulin injections should be consistent.

Discuss with your veterinarian or veterinary technician how to monitor your pet for signs of low blood sugar (ie, weakness, tremors or twitching, collapse, seizures). Although high blood sugar is seldom life-threatening, low blood sugar is a medical emergency, so you should seek veterinary assistance immediately if you observe any of these signs.

See Aids & Resources, back page, for references & suggested reading.