Diabetes Mellitus - Insulin Treatment in Dogs

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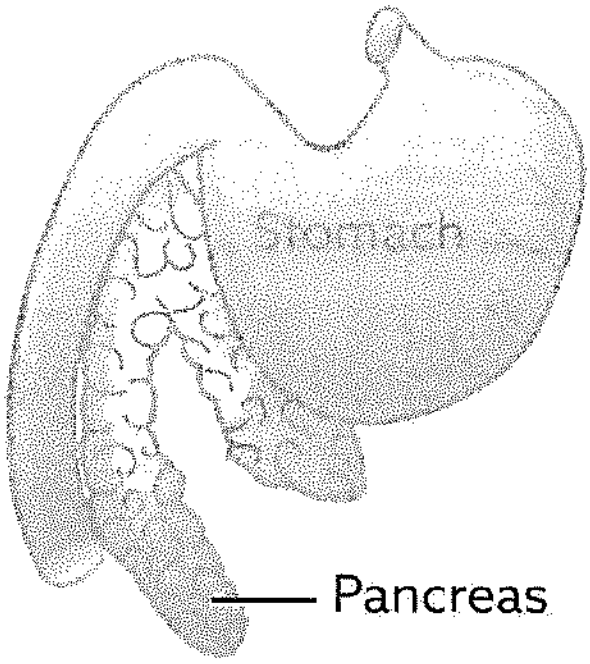
Emergency Situations, Medical Conditions, Pet Services

This handout provides detailed information on insulin administration. For more information about diabetes mellitus, see the handouts "Diabetes Mellitus - Overview", and "Diabetes Mellitus - Principles of Treatment in Dogs".

What is diabetes mellitus?

In dogs, diabetes mellitus is caused by the failure of the pancreas to produce enough insulin to regulate blood sugar. This is Insulin Dependent Diabetes Mellitus (also called Type 1 Diabetes). This type of diabetes usually results from destruction of most or all of the beta-cells that produce insulin in the pancreas. As the name implies, dogs with this type of diabetes require insulin injections to stabilize blood sugar levels.



What do I need to know about insulin treatment for diabetes mellitus?

In diabetic dogs, the main treatment for regulating blood glucose is giving insulin by injection. Dogs with diabetes mellitus typically require two daily insulin injections as well as a dietary change. Although the dog can go a day or so without insulin and not have a crisis, this should not be a regular occurrence; treatment should be looked upon as part of the dog's daily routine. This means that you, as the dog's owner, must make both a financial commitment and a personal commitment to treat your dog. If are out of town or go on vacation, your dog must receive proper treatment in your absence.

Initially, your dog may be hospitalized for a few days to deal with any immediate crisis and to begin the insulin regulation process. For instance, if your dog is so sick that he has quit eating and drinking for several days, he may be experiencing "diabetic ketoacidosis," which may require a several days of intensive care. Once your dog is home, you will continue to administer insulin as prescribed. With the availability of a reliable home monitoring unit, blood sugar (glucose) levels can be tracked easily. The veterinary healthcare team will teach you how to take the tiny blood sample needed to check your dog's glucose levels. Because the glucose readings are taken at home in the dog's natural environment, stress levels are low and the readings are more generally more accurate. At first, regular glucose readings will be required in order to monitor progress. It may take a month or more to achieve good insulin regulation. Your veterinarian will work with you to try to achieve consistent regulation, but some dogs are difficult to keep regulated.

Consistent treatment is a vital component of the proper management of the diabetic dog. Your dog needs consistent administration of insulin, consistent feeding, and a stable, stress-free lifestyle. Your dog should live indoors to minimize uncontrollable variables that can disrupt regulation.

Many people are fearful of inflicting pain or harm by giving insulin injections. This fear is unfounded since the disposable injection needles are extremely sharp and cause minimal pain, the insulin does not sting on injection, and the injections are given under the skin in areas where it is impossible to damage internal structures. Once you are coached on how to give them, you may be pleasantly surprised at how easy it is and how well your dog tolerates the injections.

How is insulin stored?

Insulin is a hormone that will lose its effectiveness if exposed to direct sunlight or high temperatures. It should be kept in the refrigerator, but it should not be frozen. If you have any doubt about the storage of your dog's insulin, it is safer to replace it rather than risk using ineffective insulin. Insulin is safe as long as it is used as directed, but it should be kept out of the reach of children.

Insulin comes in an airtight bottle that is labeled with the insulin type and the concentration. It is important to make sure you match the insulin concentration with the proper insulin needles. Insulin needles show their measurement in "units per ml", which must correspond to the concentration of the insulin you are using. There are two common forms of insulin and corresponding syringes: U-100 and U-40. Your veterinarian will instruct you on which type of insulin you are using and which type of syringe you should use.

How should I draw up the insulin?

Insulin is a suspension not a solution, so before administering it you must mix it. Roll it vigorously between your hands. Do not shake it because it will foam, which will make accurate measuring difficult. Some insulin has more of a tendency to settle out of suspension, so mixing is very important for accurate dosing.

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The trick is to mix it vigorously enough to blend it without creating foam. When you have finished mixing the insulin, turn the bottle upside down to see if any of the white insulin molecules still adhere to the bottom of the bottle. If so, more mixing is needed.

Have the needle and syringe, insulin bottle, and dog ready. Then, follow these steps:

1. Remove the cap from the needle, and draw back the plunger to the appropriate dose.

2. After mixing the insulin, carefully insert the needle into the insulin bottle.

3. Inject the air from the syringe into the bottle. This air replaces the liquid you will draw out.

4. Draw out more insulin than you need, then inject the excess back into the bottle. This helps to remove any air bubbles from the syringe. Measure the dose at the edge of the plunger that is closest to the needle.

How do I inject the insulin?

Generally, you will want to inject insulin as the dog is eating her meal because it is critical that insulin be given with a meal. Here's how:

1) Hold the syringe like you would hold a pen or pencil in your right hand (if you are right-handed).

2) Have someone hold your dog while you pick up a fold of skin from somewhere along your dog's back in the "scruff" region of the neck with your free hand. Try to pick up a slightly different spot each day.

3) Quickly push the very sharp, very thin needle through your dog's skin at about a forty-five degree angle and insert the full length of the needle. This should be fast, easy and painless.

4) To inject the insulin, place your thumb on the plunger and push it all the way into the syringe barrel. If you are unsure if you administered it correctly, or if you "missed," do not administer additional insulin. Simply resume your normal schedule and give the next insulin injection at the regular time.

5) Withdraw the needle from your dog's skin. Immediately place the needle guard over the needle and place the used needle and syringe into a puncture-resistant container such as a sharps container. Some communities have strict rules about disposal of medical waste material so don't throw the needle and syringe into the garbage until you know if this is permissible. It is usually preferable to take the used needles and syringes to your veterinary clinic or local pharmacy for disposal.

6) Stroke and praise your dog to reward it for sitting quietly.

Should I sterilize the skin with alcohol before giving the injection?

Do not swab the skin with alcohol to "sterilize" it. There are four reasons:

1) The smell of the alcohol can make your dog dislike the injections.

2) Due to the nature of the thick hair coat and the type of bacteria that live near the skin of dogs, brief swabbing with alcohol or any other antiseptic is not effective.

3) Because a small amount of alcohol can be carried through the skin by the needle, it may actually carry bacteria with it into the skin.

4) If you have accidentally injected the insulin onto the surface of the skin, you will not know it. If you do not use alcohol and the skin or hair is wet following an injection, you will want to know that the injection was not done properly.

Although the above procedures may at first seem complicated and somewhat overwhelming, they will very quickly become second nature. Your dog will soon learn that once or twice each day it has to sit still for a few moments. In most cases, a reward of stroking results in a fully cooperative dog that eventually may not even need to be held.

Does hypoglycemia occur in dogs?

Hypoglycemia means low blood sugar. If the blood sugar falls below 40 mg/dl, it can be life threatening. Hypoglycemia generally occurs under two conditions:

1) The insulin dose is too high. Although most dogs will require the same dose of insulin for long periods of time, it is possible for the dog's insulin requirements to suddenly change. However, the most common causes for change are a reduction in food intake and an increase in exercise or activity. The dog should eat before you give the insulin injection, because once the insulin is administered it can't be removed from the body. If your dog does not eat, skip that dose of insulin. If

only half of the food is eaten, give only a half dose of insulin. Always remember that it is better in the short term for the blood sugar to be too high than too low.

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2) Too much insulin is given. This can occur because the insulin was not properly measured in the syringe or because two doses were given. A chart placed in a central location to record insulin administration will help to prevent the dog being treated twice.

The most likely time that a dog will become hypoglycemic is the time of peak insulin effect, 5-8 hours after an insulin injection. When the blood glucose is only mildly low, the dog will act very tired and unresponsive. You may call your dog and get little or no response. Within a few hours, the blood glucose will rise, and your dog will return to normal. Since many dogs sleep a lot during the day, this important sign is easily missed. Watch for any subtle signs of hypoglycemia because it is the first sign of impending problems. If you see this, take a glucose reading and call your veterinarian (or local emergency room if it is after hours).

Your veterinarian may have you offer an extra meal and recheck the glucose level within a short time after the dog eats.

If severe hypoglycemia occurs, this is a true emergency as a dog may have seizures or lose consciousness. Ultimately, untreated hypoglycemia will lead to coma and death. This is an emergency that can only be reversed with intravenous administration of glucose. If it occurs during office hours, take your dog to the veterinarian's office immediately. If it occurs at night or on the weekend, call your veterinarian's emergency phone number for instructions.

SUMMARY OF INSTRUCTIONS FOR INSULIN TREATMENT OF YOUR DOG:

Read and reread this material so that you understand the specifics of proper regulation and how to recognize and treat hypoglycemia.

Purchase the supplies for treatment. Your prescription will specify the type of insulin and syringes as well as the appropriate home glucose monitoring device and test strips.

You will be coached how to get a tiny blood sample for measuring blood glucose levels at home. You will need to purchase the test strips from your veterinary hospital. You cannot use another brand of test strips in the animal-approved glucose meter.

Type of insulin:

Type of insulin syringes: U-100 U-40

Give the first injection of insulin of units at about AM / PM.

If your dog shows symptoms of low blood sugar, give tbsp (mL) of corn syrup, based on your dog's body weight of .

Your veterinarian will guide you about how often to perform a glucose curve at home. Generally, the first glucose curve is performed 10 – 14 days after beginning insulin therapy, but you may need to take a few readings each day. When performing a curve, you will take blood glucose readings every 2 – 3 hours for 12 hours (the time between insulin injections. You will then call the veterinary practice with the curve values so that they may fine-tune the insulin dose.

Return to the practice for a glucose curve as prescribed, no later than a.m., on . Feed your dog that morning and immediately bring it to the hospital. Do not give insulin, but bring it with you. If it will take more than 30minutes to drive to the hospital, call for instructions on feeding. (In-hospital glucose curves may not be needed at all, depending upon the ease with which your dog's glucose levels are stabilized.)

Return to the hospital for a fructosamine test as prescribed by your veterinarian. For this test, the time of day is not important and fasting is not necessary.

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