Your Pet's Guide to Managing & Living With Diabetes

Table of Contents

Diabetes mellitus in Cats

What is Diabetes Mellitus?

Diabetes mellitus is also called “sugar diabetes,” and occurs when there are high glucose (sugar) levels in the blood and urine. This can happen either as a result of the failure of the pancreas to make insulin (type I diabetes) or the failure of the cells in the body to respond to insulin (type II diabetes). The more common form, type I, or insulin dependent diabetes mellitus (IDDM), usually requires insulin injections for treatment. Type II diabetics may need insulin for treatment temporarily, either for one period of time, or repeatedly over time. Type II diabetes is also called non-insulin dependent diabetes mellitus (NIDDM). There are no reliable tests to tell type I from type II diabetes – response to insulin over time tells which type a cat has. Diabetes mellitus is one of the most common endocrine (hormonal) diseases in cats.

Transient diabetes mellitus can occur in cats. Unlike permanently diabetic cats, transient diabetics may require treatment with insulin only for a brief period of time. Transient diabetes can be seen in overweight cats, cats with pancreatitis or other diseases, or cats on medications that interfere with insulin activity. Some transient diabetics require insulin for a short period of time, then never again. Others need insulin from time to time at various periods during their life. Still others eventually become permanent diabetics, and ultimately need lifelong daily insulin therapy.

What Insulin does for the Body

The role of insulin is much like that of a gatekeeper. It stands at the surface of body cells and opens the door, allowing glucose to leave the blood stream pass inside the cells. Glucose is a vital substance that provides much of the energy needed for life, and it must work inside the cells. Without an adequate amount of insulin, glucose is unable to get into the cells. It accumulates in the blood, setting in motion a series of events that can ultimately prove fatal.

When insulin is deficient, the cells become starved for a source of energy. In response to this, the body starts breaking down stores of fat and protein to use as alternative energy sources. As a consequence, the cat eats more; thus, we have weight loss in a cat with a ravenous appetite. The body tries to eliminate the excess glucose by eliminating it in the urine. However, glucose (blood sugar) attracts water; thus, urine glucose takes with it large quantities of the body's fluids, resulting in the production of a large amount of urine. To avoid dehydration, the cat drinks more and more water.

For the diabetic cat, one reality exists. Blood glucose cannot be normalized without treatment.

What are the Symptoms of Diabetes?

Diabetes mellitus often is suspected because of the presence of the classic signs of increased thirst, more frequent urination, and weight loss often despite a greater appetite. Most cats are older than 10 years of age at the time of diagnosis. However, diabetes mellitus can be diagnosed at any age. Male cats are diagnosed more frequently than females, and all breeds can be affected. Owners may notice that they have to change the litter box more frequently because it is wet all the time. Some cats will begin to void large

amounts of urine in places other than the litter box. This may mistakenly be perceived as a behavioral problem in some cats.

Over time, diabetes can lead to:

- delayed healing and chronic skin conditions – this is why we want to do bloodwork an animals that come in "just for skin problems." Diabetic skin problems can look just like allergic skin problems.
- walking on the hocks, or hyperextended wrists.
- Infection – especially in the urinary tract.

If left untreated, diabetes can progress further to weakness, dehydration, depression, diabetic coma, and even possibly death.

What Causes Diabetes?

Development of diabetes mellitus may be influenced by the presence of complicating factors such as obesity, concurrent disease, or medications that interfere with insulin's activity. Pancreatitis (inflammation of the pancreas), whether acute or chronic, is known to lead to diabetes, as the pancreas makes the insulin needed to control blood sugar. Medications that can cause cats with borderline insulin production to become dependent on insulin include anti-inflammatory steroids (prednisone, dexamethasone, DepoMedrol, etc.), and progesterones such as MegAce.

How is Diabetes Diagnosed?

Diabetes is sometimes diagnosed as the result of routine blood test – there is excessive glucose in the blood and in the urine. Because stress can cause significant elevations of blood glucose levels in cats, and in some circumstances, glucose can be seen in the urine of stressed cats, the measurement of fructosamine may help distinguish stress-induced changes in blood and urine sugar levels from true diabetes mellitus. In stressed cats, serum fructosamine concentrations are usually normal, but they are elevated in diabetic cats. Fructosamine indicates an average of blood glucose levels over the previous 1-3 weeks. Ketones are another substance that can appear in the blood and urine of diabetic cats with severe and advanced disease, but they are generally not seen due to stress. Ketones can appear in the urine of any cat that has not eaten for several days.

Ideally, the following tests should be done on every new diabetic cat, prior to pursuing long term management, to assess the condition of the diabetic cat, and to discover at the outset concurrent medical conditions that might change long term prognosis, or hamper insulin regulation.

- CBC (complete blood count) – high white count might indicate infection that needs to be isolated and treated. Anemia, if present, should also be treated.
- Biochemistry profile – to look for liver or pancreas problems that commonly occur in unregulated new diabetic cats, and may need special treatment, as well as to look for problems such as kidney disease which are common in older cats. The profile must include phosphorus in sick diabetic cats, as phosphorus can become dangerously low in new diabetics.
- Electrolytes – low potassium is common in new diabetics, and can be life threatening in diabetics with ketoacidosis (one type of diabetic coma).
- fPLI or TLI – many diabetic cats have chronic and/or acute pancreatitis which can be detected by these tests, and must be treated if the cat is to do well. A few with long standing chronic pancreatitis can develop enzyme deficiencies which must be treated

by adding enzymes to each meal, so that their body can put to use the nutrients in food. fPLI was a very popular test when it came out several years ago, but has since fallen out of favor with feline experts.
Thyroid test - should be checked in cats older than 5 years old to rule out concurrent hyperthyroidism (overactive thyroid), which can hamper efforts to get diabetic cats regulated.
Urinalysis and urine culture - necessary to rule out ketoacidosis and urinary tract infection. A significant proportion of new diabetics have a urinary tract infection.
Chest x-rays and abdominal ultrasound - may also be recommended, depending on the cat's overall condition, to assess for concurrent problems which could change prognosis and deter an owner from pursuing long term management of a diabetic.
FeLV antigen and FIV antibody tests- owners should know the feline leukemia and FIV (cat AIDs) status of their cat prior to pursuing lifelong treatment.

How Do You Treat Diabetes?

Key to successful treatment is consistency in diet, medication administration and doing your best to keep your cat's life as stress free as possible. Insulin injections are usually the first choice because this approach is to replace the hormone that is missing or made in inadequate amounts. Although many people are initially uncomfortable with the thought of giving injections, for most cats, insulin injections are easier than giving medications by mouth. The injections are made with very tiny needles that your cat hardly feels.

A very small number of cats with type II diabetes can do well for a short time on oral medications. There is no reliable, practical test to know if your cat is one of these. Many cats respond to diabetic pills only temporarily, and eventually have to take insulin.

Which Insulin should I use?

The commonly used insulins are listed below, listed from shortest to longest acting:

"R" for regular – the shortest acting – usually used only for cats that are ill in the hospital.

"N" for NPH – trade names Humulin-N® and Novolin® - rarely used for cats, because it is usually too short acting. Most cats eliminate it in just a few hours.
"L" for Lente – trade name Vetsulin®; available only from veterinarians and veterinary pharmacies.
"PZI" for Protamine Zinc Insulin – trade name ProZinc® - available only from veterinarians and veterinary pharmacies. A good insulin for cats, but can be more expensive than some of the others.
Lantus® or glargine insulin – the longest acting, and usually the best insulin for cats, as cats tend to metabolize insulin quickly. It is significantly more expensive per bottle than other insulins, but when the cats do better, they have fewer vet visits, and often this insulin pays for itself.
Levemir® or Detemir insulin – the very longest acting insulin in cats. It is rarely used for cats, because it is very concentrated and the tiny doses needed for most cats can be difficult to measure accurately.

The manufacturer of Lantus® recommends that the bottle be discarded 28 days after opening. However, independent studies show that Lantus® is effective for at least 6 months after opening, assuming that the expiration date has not passed. If the insulin becomes discolored or cloudy or changes appearance in any way, it should be discarded.

IMPORTANT!!!! There are two different concentrations of insulin, called U-100 and U-40. Each type of insulin has its corresponding calibrated syringes, also called U-100 and U-40. You MUST know which your cats take, so you use the right syringes. U-100 insulin contains 100 units per cc and (Lantus®, Levemir® and NPH), and U-40 insulin contains only 40 units insulin per cc (Vetsulin® and ProZinc®). Giving Lantus® or NPH (U-
100) insulin using the wrong (U-40) syringes will result in a 250% overdose. Giving Vetsulin®, ProZinc® (U-40) insulin using U-100 syringes will result in giving only 40% of the insulin needed.

U-40 syringes usually have red caps – for Vetsulin® and ProZinc®.
U-100 syringes usually have orange caps – for NPH, Levemir® and Lantus®.

Cats are usually on small dosages of insulin, so the small-capacity (3/10 or 1/2 cc) syringes work well. 3/10cc syringes are preferred, as the graduations are easiest to see and there are markings for 1/2-unit increments.

Insulin is usually given to cats every twelve hours. Ideally, insulin should be given no closer together than 10 hours, and never farther apart than 14 hours. Cats can almost never be well regulated by giving insulin only once daily.

What Diet should Diabetic Cats Eat?

The proper diet is EXTREMELY IMPORTANT to getting your diabetic cats regulated. As a general rule, semi-moist foods are avoided, because they are high in sugars and carbohydrates. High protein (>40% of calories) and low carbohydrates (<10% of calories) are indicated, as some cats will have lower insulin requirement, or even go off insulin altogether if fed high protein/low carbohydrate diets. There are many canned diets on the market which fit the bill, but only three dry diets, to my knowledge – Innova EVO, Wellness Core and Nature's Variety Raw Instinct. Purina DM and Hill's Prescription Diet MD have sufficient protein, but are 15% carbohydrates, which is a big improvement over the 25-35% carbs in most commercial dry feline diets, but not ideal for some diabetic cats.

Especially for overweight cats, adding high fiber to the diet may be helpful in encouraging weight loss and in controlling fluctuations in the serum glucose concentrations. In the past, commercially prepared high fiber diets such as Hills Prescription Diet R/D and W/D were recommended for diabetic cats. However, these diets are too high in carbohydrates and too low in protein for diabetic cats. If fiber is to be increased in the diet, psyllium (1/4 to 1/2 tsp per 3 ounces of canned food) or a small spoon of pumpkin can be added to a high protein diet. Most diabetic cats do well on high protein/low carb diet, and don't need increased fiber to do well.

If a cat refuses to eat the proper diet, then other diets should be used, and insulin should be given accordingly. Frequency of feeding is usually dictated by the cat's normal dietary behavior. Cats that eat all day long are probably best fed small amounts many times per day, while cats that eat voraciously but infrequently may do better with meal feedings. No matter what diet you and your vet settle on, it is important that your cat be fed the same amount of the same food and on the same time schedule each day. Our pet should be weighed at home once to twice monthly. It is best to use the same **scales each time. Significant weight loss or gain should prompt a vet visit.**

Phases of Treatment

Now that we have covered diet and insulin, there are three phases in treatment of diabetics: regulation, maintenance, and remission.

Regulation. It can take anywhere from 1-4 months to find the proper dose of insulin for your cat – this process is called “regulation.” We usually keep a new diabetic for 1-2 days to monitor response to the first few doses of insulin, then send your pet home on a relatively low dose of insulin, and recheck them in 1-2 weeks. Unless you can do an entire glucose curve at home (check blood sugar every 1-2 hours throughout the day), your cat will need to stay at the clinic for 8-24 hours for these “regulation rechecks” in order to complete the glucose curve. Insulin dose is changed every 1-2 weeks, according to each glucose curve, until the ideal insulin dose is reached. If your cat is ill enough to be hospitalized at the time of diagnosis, we may hospitalize more often during the regulation period so that we can arrive at the proper dose more quickly.

The goal of regulation is to keep the lowest blood glucose number in the curve above 80 mg/dl, and the highest number below 250 mg/dl. Sometimes we have to settle for a higher peak, but we NEVER want blood glucose to go below 80 if we can help it, and we’d like to have the lowest blood glucose level below 120 for the best control.

Once your cat is regulated, keep in mind that the proper insulin dose for your cat is subject to change. Coming in for scheduled rechecks and monitoring for signs of low blood sugar (see below) as well as high blood sugar can detect need to change insulin dose. Increase water drinking and urination accompanied by weight loss despite eating well are the most common symptoms of high blood sugar.

Instructions for the glucose curve:

- Feed your cat and give insulin as usual in the morning.
  - Arrive at the clinic within 2 hours of giving insulin. Bring with you whatever food your cat normally eats during the day, if any, so the normal feeding schedule is maintained.

    If your cat gets stressed by the car ride but does well at the clinic, you might consider bringing your cat to the clinic the afternoon before the curve is to be done, and going over the usual daily routine with clinic staff.
- Blood sugar will be tested every 1-2 hours during the day.
  - The curve is complete when there are 2 consecutive values that are trending significantly upward. This can happen as quickly as 6 hours or as long as 24.

Maintenance. When the cat is regulated to our satisfaction, you get a big chunk of your life back. Urine output can be measured by determining the amount of litter that is scooped out of the litter box. This is a little less accurate if you have more than one cat that uses the litter box, but it can still be meaningful. The best way to measure litter is to use a clumping litter. After a few weeks you will be able to know the normal amount of urine that you scoop from the box each day. Too rapid filling will indicate that your cat's urine production has increased.

Any significant change in your cat's food intake, weight, water intake, or urine output is an indicator that the diabetes is not well controlled. We should see the cat at that time for blood testing. Sometimes, it is no longer necessary to do glucose curve for very long periods of time (months to years).

These are the regular checks we recommend for diabetic cats, even when doing well:

3-6 times a year (every 2-4 months) - Short visit for weight and fructosamine (blood test). Healthier diabetics come less often, and fragile diabetics come more often. Start with every 2 months, and go from there.
Twice a year (every 6 months) - Full exam including blood pressure, Complete Blood Count (CBC – to look for anemia or infection), general health profile (to check kidney, liver, etc), urinalysis, and urine culture (to check for bladder infection).
Once a year - Thyroid testing yearly if your cat is older than 10 years old, or sooner if weight loss becomes a problem. Feline leukemia and FIV test if your cat goes outside.

Regular dental cleaning as needed to prevent gum and tooth infections, which can dysregulate diabetic cats

Any other tests or treatments indicated for your individual cat

Remission. Some very lucky cats actually have periods where they are not on medications (including insulin) and you can't tell they have diabetes. Remissions can be temporary or permanent. They can be short or long.

How Can I Monitor My Diabetic Cat?

PU-PD (polyuria-polydipsia). Polyuria means increased urination and polydipsia means increase water drinking. The simplest way to monitor your cat is to pay attention to how much water he/she is drinking, and how much urine he/she is producing (watch the litter box). Increase in either should trigger you to check your cat's blood sugar, and visit with your vet about what to do next. PU-PD can be cause be either too much or not enough insulin.

Fructosamine. The vets can do blood tests (fructosamine) that show how well the diabetes has been controlled over the past 1-3 weeks. If your cat who was previously well regulated is showing signs of poor regulation (weight loss, PU-PD, increased appetite, illness, etc), it's usually time to see the vet to check fructosamine. If fructosamine is normal, you assume the diabetes has been well controlled for the past 2 weeks, and the insulin dose is appropriate for your pet at that time. If fructosamine is elevated, then we know that insulin dose needs to be adjusted -- its' time for a glucose curve, so that we know how to adjust. Fructosamine can be elevated if the insulin dose is too low, or if the insulin dose is too high.

Home blood sugar testing. Checking blood sugar at home can make caring for your diabetic cat much easier and more effective. It might sound intimidating at first, but almost all owners can learn to check blood sugars at home. If you can check blood sugars at home, you and your vet can manage insulin treatments while keeping visits to the clinic to a minimum. As well, any time a cat is stressed, blood sugar levels can go up, so blood sugar testing at the clinic likely is sometimes not as accurate as testing at home.

Home Blood Testing involves pricking the skin somewhere to obtain a drop of blood. It can range from the occasional check to confirm your suspicion of hypoglycemia (low blood sugar) or hyperglycemia (high blood sugar); to taking full control of regulating the cat's diabetes and doing glucose curves at home.

Glucometers made for human diabetics are used, and provide sufficient accuracy for optimal blood glucose control. These meters are very accurate in the normal ranges, less so as the glucose levels approach extremes. This doesn't matter, since all you need to know is that an extreme has been reached -- the extent of the extreme is less important than the fact that the glucose is far from where you want it. There are glucose meters made especially for dogs and cats. One is called Alpha Track by Zoetis.

In cats, the ear is generally the most popular site for blood testing. Although sensitive to touch, it is a relatively insensitive area to prick (lancets cause less pain than a mosquito bite). A paw pad can be used, but since the paws are on the floor and in the litter box, more care has to be taken about keeping the little puncture wound clean to avoid infection. Some are able to learn to us a needle to draw a few drops of blood from a leg vein, but this isn't for everyone.

There are several detailed handouts on how to do ear sticks so I won't repeat any of that here. Each person has to develop their own way of getting the sample from their own cat. If you are having trouble, let us know – we've got lots of helpful hints to share.

Helpful hints for home blood glucose testing:

Try to get a glucometer which uses a tiny volume of blood (One Touch Ultra) – it is MUCH easier to use.

Test strips are extremely sensitive to humidity and substances that might be in the air, so keep the vial on the test strip lid on tight.

Never make insulin changes based on a single blood test reading. If single test readings are too high or too low, we need to do an entire curve to tell how to adjust the dose.

Test strips are easily contaminated -- wash your hands in case you wind up accidentally touching it, and don't use it if it dropped on a dirty surface.

Make sure the number on your test strips matched the number set on your glucometer (see your glucometer owner's manual for more details on this, or ask us to show you).

Urine Dipsticks. Some use urine glucose testing for monitoring, but we don't, because it does not tend to be very accurate. We get better results with blood testing.

Hypoglycemia (low blood sugar)

Low blood sugar (hypoglycemia), if mild, causes little more than discomfort and hunger. But if BG level falls too far, you might see strange behavior, distress, or twitching. If BG falls dangerously low, problems can advance to severe distress and possibly seizures, coma, and even death in very severe cases. Some animals are very sensitive to even mild hypoglycemia; others give no obvious clues even when the levels are getting into what is generally thought to be dangerous territory. With time, you will learn how your cat responds to low blood sugar.

Mild Hypoglycemia. Signs of mild hypoglycemia (glucose 60-80 mg/dl):

more quiet than usual

excessive hunger

sometimes a little bit of weakness or incoordination.

Mild hypoglycemia can usually be easily managed with an extra feeding of the regular diet, or a high protein canned food, meat or cheese. Check the food dish to make sure your cat

has been eating normally. Check the litter box for signs of diarrhea, and check around the house for vomit, in case he ate and brought it back up.

If you find no evidence that a temporary shortage of food was the cause of low blood sugar, the next insulin dose should be skipped, and then the dose should be reduce by about 10-15% when insulin is given again. Two weeks after decreasing the dose, you should take your cat in to have fructosamine checked, or do a glucose curve at home or at the clinic, to see if the new dose is appropriate. If the cat is doing exceptionally well, it may be sufficient to just check a fructosamine. If there are any doubts that the dose is correct, a curve is better.

Moderate Hypoglycemia. Signs of moderate hypoglycemia (glucose 45-60 mg/dl)

- Twitching
- Weakness or incoordination
  - Staggering, circling, huddling, trembling
  - Disoriented, howling
- unable to see or correctly look in the direction of a noise

For moderate hypoglycemia, immediately offer your cat 1-3 cc of corn syrup (make sure you keep a syringe on hand – we can give you one). As soon as you see that his coordination is improving, give him a small snack of high protein cat food, cheese, meat or cat treats. In 30-60 minutes after initial improvement, offer a small serving of his regular food. If your cat is not back to normal within 1-2 hours, you need to make a visit to your vet. Skip the next dose of insulin, and then decrease insulin dose by 20-25% when insulin injections are resumed. Do a fructosamine or glucose curve 1-2 weeks after adjusting the dose

Other high sugar liquids that can be used in place of corn syrup include dextrose solution (from your vet), honey, pancake syrup, even table sugar dissolved in water. HINT: keep the top of the corn syrup bottle clean so the cap doesn't get glued on -- if it's stuck shut while your cat is having an emergency your own anxiety levels may go through the roof.

Should he go to the vet, or be left to recover? That depends on whether you can be there to watch for a few hours, and your own confidence levels.

Severe Hypoglycemia. Signs of severe hypoglycemia (glucose less than 45 mg/dl):

- collapse
- blindness
- seizures
- howling
- comatose

In the case of severe hypoglycemia, put corn syrup on the cat’s gums (be careful not to get bitten if your cat is disoriented or having seizures), and THEN call the vet on call. If you are having trouble with the corn syrup, just hold your cat firmly by the scruff (you won’t hurt him by doing this), and squirt it on his tongue and gums. Don't try to restrain the seizures, but make sure that your cat is in an open space if having seizures, so he does not injure himself. As soon as you can, get your cat to a veterinarian – this type of hypoglycemia can be potentially life threatening. Your vet will make recommendations for insulin administration.

What Health Challenges Might I Expect in my Diabetic Cat (Prognosis)?

The outlook for diabetic cats depends on a number of factors. The owner's commitment to treatment is a key point, as treatment is seldom easy and is usually life-long. Cats diagnosed with diabetes mellitus at a younger age that are able to be controlled with relative ease can live for many years with a good quality of life. Cats that develop diabetes mellitus along with other diseases may also have a worse prognosis. One study that looked at the length of survival following the diagnosis of diabetes mellitus in cats found that the cats in the group examined live an average of two years after diagnosis. Many of our patients live much longer than that, once diagnosed with diabetes. Proper home care, regular veterinary evaluation, and most importantly excellent client-veterinary communication are vital to the successful treatment of diabetes mellitus in cats.

Cats are pretty tough creatures, and seem to resist the ravages of diabetes better than, say, dogs, who can go blind from cataracts in a matter of months if their blood glucose isn't controlled. Their insulin needs might be pretty constant, or they might change. If your cat is well regulated, he should remain in relatively good health. If you see any of the problems listed at the top of this handout as signs of diabetes, consider bringing him in for a check-up to see if he really is well regulated. If you monitor blood sugar at home, any loss of regulation that lasts more than a few days, or inability to achieve regulation, warrants a thorough checkup to see if something else is going on.

Keep a close eye on diabetics with early kidney failure -- if it worsens, the symptoms are increased water drinking and urination, the same as for diabetes out of control. You will need to have your vet check kidney functions periodically (by blood test).

Helpful Hints for Diabetics

If you cat wears a collar, make sure the tag announces that he is diabetic and includes your phone number and/or the vet's.

Corticosteroids such as prednisone and dexamethasone and hydrocortisone can potentially dysregulate diabetics, and large doses have actually induced diabetes in many animals. Unless your cat has a condition such as inflammatory bowel disease which necessitates use of prednisone, corticosteroids should be avoided in diabetics.

Any illness that lasts more than a couple of days will often necessitate an insulin change, at least temporarily. Sick cats eat less, move around less, and use less glucose.

If your cat ever needs anesthesia for surgery, dental cleaning, etc., DO NOT WITHOLD WATER OVERNIGHT, as many vets instruct owners to do with healthy cats. Take food up several hours after the evening insulin dose. No food in the morning, and take the water up then. Administer half of the regular insulin dose that morning. Give half the regular insulin dose the night after anesthesia, and then go back to the regular routine the next day.

References:

1. **http://felinediabetes.com**
2. **Wellness Handouts**
3. **Wendy Blount, DVM – PracticalVetMed**
4. **Celeste Clement, DVM - VetCentric**

INSTRUCTIONS FOR YOUR DIABETIC PET

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 your pet's insulin and how it was stored, it is safer to replacing it instead of risking 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. If you leave the insulin out by accident overnight, just put it back in the fridge and it should be fine, as long as it has remained at room temperature and has not gotten hot to the touch, sitting in the sun.

How should I draw up the Insulin?

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

1. Before using the insulin, mix the contents. Be sure to roll it gently between your hands, not shake it. The reason for this is to prevent foam formation, which will make accurate measuring difficult. Some types of insulin used in dogs have a strong tendency to settle out of suspension. If it is not shaken properly, it will not mix well and dosing will be inaccurate. Therefore, the trick is to shake it vigorously enough to mix it without creating foam. When you have finished mixing the insulin, turn the bottle upside down to see if any white powder adheres to the bottom of the bottle. If so, more mixing is needed.

2. Remove the cap from the needle, and draw back the plunger to the appropriate dose level. Carefully insert the needle into the insulin bottle.

3. Inject air into the bottle. This prevents a vacuum from forming within the bottle.

4. Withdraw the correct amount of insulin into the syringe.

5. Before injecting your dog with the insulin, check that there are no air bubbles in the syringe. If you get an air bubble, draw twice as much insulin into the syringe as you need. Then withdraw the needle from the insulin bottle and tap the barrel of the syringe with your fingernail to make the air bubble rise to the tip of the syringe. Gently and slowly expel the air bubble by moving the plunger upward.

6. When this has been done, check that you have the correct amount of insulin in the syringe. The correct dose of insulin can be assured if you measure from the needle end, or "0" on the syringe barrel, to the end of the plunger nearest the needle.

How do I inject the Insulin?

The steps to follow for injecting insulin are:

1. Hold the syringe in your right hand (switch hands if you are left-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 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, all the way to the hub. It should be easy and painless to do this. Take care not to push the needle all the way out through the other side of the skin, so that injecting pushes the insulin onto your dog's haircoat or onto the floor. The needle should be directed slightly downward toward the dog.

4. To inject the insulin, place your thumb on the plunger and push it all the way into the syringe barrel. Do not have your thumb on the plunger as you place the needle into the skin, as you can easily inject prematurely by mistake, and then you may not know if the insulin went into your pet.

5. Withdraw the needle from your dog's skin. Immediately place the needle guard over the needle and discard the needle and syringe.

6. Stroke and praise your dog to reward it for sitting quietly. Some owners like to give the insulin injection while the pet is eating – they often hardly notice it.

It is neither necessary nor desirable to swab the skin with alcohol to "sterilize" it. 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. 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. The sting caused by the alcohol can make your dog dislike the injections. If you have accidentally injected the insulin on the surface of the skin, you will not know it.

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 minutes. In most cases, a reward of stroking results in a fully cooperative dog that eventually may not even need to be held. Many diabetic pets learn to ask for their insulin, because they learn that it makes them feel better, and it is given when they eat a meal.

Disposal of Needles

Be aware that some communities have strict rules about disposal of medical waste material so don't throw the needle and syringe into the trash 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. The UltiMed syringes have a built in sharps disposal receptacle.

What if I give too much insulin by mistake?

This can occur because the insulin was not properly measured in the syringe or because two doses were given. You may forget that you gave it and repeat it, or two people in the family may

each give a dose. A chart 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 weak. If this happens, encourage your dog to eat a snack. Most of the time, 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. It is the first sign of impending problems. If you see it, please bring your dog in for blood glucose testing.

If your dog is slow to recover from this period of lethargy, you should give it corn syrup (one tablespoon by mouth). If there is no response within fifteen minutes, repeat administration of the corn syrup. If there is still no response, contact your veterinarian immediately for further instructions.

If severe hypoglycemia occurs, 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

Read and reread your handouts 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.

Insulin should be given twice daily, when the dog is fed. Ideally, it should be given no more often than every 10 hours and no longer than every 14 hours. If more than 14 hours passes since the last dose, it is sometimes easier to just skip that dose and get back on track when the next dose is due. Skipping 1 dose of insulin once or twice a month will almost never cause any serious problems other than increased water drinking. However, you should never skip two doses in a row – that could result in serious illness.

Feeding Plan:

Recommended Diet: _____ Amount to Feed: _____

Permitted Snacks: _____

Your insulin dose to be given twice daily: _____ units. Your insulin: _____

Your Syringes are: _____ U40 red capped _____U100 orange capped

_____ Return for a glucose curve, no later than 9:00 a.m., on _____. Feed your dog that morning, give insulin and then immediately bring it to the hospital. Bring the insulin with you. Your pet will likely need to stay for the day.

_____ Return for regular recheck on _____(date). A routine appointment should be fine for this recheck.

_____

References:

1. Ward, Ernest. Lifelearn Handouts.