

Cushing's Disease (part 1 of 3)

Hi, this is Dr. Karen Becker, and today we're going to discuss Cushing's disease. This is the first of a three-part series.

Cushing's disease was originally diagnosed by Dr. Harvey Cushing in 1932, hence the name. I prefer the correct title of what's happening to this syndrome: hyperadrenocorticism, which is a bigger much more descriptive word. It means "hyper" or too much, "adreno" referring to the adrenal gland, and "cortisol" or what exactly the syndrome dictates. It's too much adrenal release of the hormone cortisol.

What Cortisol Does to Your Pet's Body

Cortisol is your pet's "fight or flight" hormone. It is designed to be released by your pet's adrenal glands in very small amounts. When there's an upregulation of cortisol demand, your pet can begin producing cortisol in high amounts. This can be toxic to the body.

As stated earlier, cortisol is designed to be released in very small amounts from the adrenal gland when the body perceives stress. Ultimately speaking, the end result of cortisol release is glucose release from the liver. Glucose, being sugar, is what provides energy to the muscle cells so that your pet is able to escape a bear, or for a kitten to run up a tree when chased by a dog. It helps your pets ready their bodies either to address confrontation or be able to get away from a life-threatening situation. That's the big reason why pets release cortisol.

However, cortisol influences a whole host of other biochemical parameters. It influences the body in a whole host of negative ways. Cortisol is also linked to regulation of blood pressure. It can negatively influence electrolyte balance. It is immunosuppressive, so it can negatively impact your pet's immune system in the long term. It has a negative interaction between bone and fat metabolism.

Needless to say, we're thankful that cortisol is in our pets' bodies in small amounts. The goal is to help your pets not oversecrete cortisol, which becomes a toxic situation.

Chronic cortisol release translates to chronic signs of stress in your pet. Keep in mind there's no such thing as good or bad stress for your pet. It's all stress, so your pet is having the same physiologic response whether you're dropping them off at the groomer, they've been hit by a truck, they're all excited that your serving them steak for your birthday dinner, there's divorce or a new dog in the family, they have a large wound, or they're dealing with the inflammation of cancer or allergic response. Those are all the same stress. If you're thinking, "My pet doesn't really have stress. I'm moving from place to place, and he travels with me all the time in a brand-new environment," then that's still considered a type of stress on your pet's body.

The Effects of Chronic Stress

Chronic stress – and therefore chronic cortisol release – ultimately results in elevated blood sugar in the long term, which can lead to diabetes. It results in elevated blood pressure, which can be negative for your pet's cardiovascular system. There's also extreme hunger; when your pet's burning that much blood glucose, then he or she ends up being much hungrier than the average pet. Increased thirst and urination also come about when there's extra cortisol in your pet's system.

There's an accumulation of fat in the abdominal area, as well as thinning skin, poor, thin hair coat, a change in the pigment in the color of your pet's skin, decreased muscle and bone mass, and increased risk of infection. That infection can come from anywhere, so pets that have chronic cortisol release tend to be more exposed to oral, eye, gum, ear, and urinary tract infections. Infection can come about wherever your pet's body's weak link is, so it isn't just in one area. For animals that have recurring infections – or those that just lag on and on and pets have a hard time getting rid of – you need to think about cortisol influencing your pet's ability to fight infection.

Types of Cushing's Disease

There are several forms of Cushing's disease, and they can become confusing for clients. So I'm going to try spell it out in an easy-to-understand format today. If you have a pet that's dealing with Cushing's disease, it's important for you to know exactly what's going on to help you prevent Cushing's disease from occurring in your pet.

There are different types of Cushing's disease because there are several layers of your pet's adrenal glands. Depending on what layer of your pet's adrenal gland is overproducing hormone is the type of Cushing's disease your pet has.

Traditionally speaking, the middle layer of your pet's adrenal gland for typical Cushing's disease begins overproducing glucocorticoids. The zona fasciculata is the middle layer of your pet's adrenal gland. When that particular layer of your pet's adrenal gland overproduces glucocorticoids (which can also be called steroids, cortisol, cortisone, or the synthetic version that veterinarians can give orally, prednisone), it's called typical Cushing's disease.

Sometimes veterinarians unknowingly induce Cushing's disease by giving too-high doses or too long administration courses of oral prednisone therapy. If your pet is on prednisone, that predisposes your pet to acquire Cushing's disease.

Typical Cushing's disease is too much cortisol. Atypical Cushing's disease comes about when the outer layer of the adrenal gland overproduces electrolyte-balancing hormones called aldosterone, or when the inner layer of the adrenal gland begins overproducing sex hormones.

Atypical Cushing's disease comes about from the outer or inner layer overproducing mineralocorticoids called aldosterone, or sex hormones like estrogen, progesterone and testosterone precursors.

So let's not make it confusing. Traditional or typical Cushing's disease (too much cortisol in the system) also has two types. There's adrenal dependent, and there's pituitary dependent. Hands down, the most common form of Cushing's disease in pets is the pituitary dependent form. About 85% of dogs that acquire Cushing's disease acquire the pituitary dependent form. This means that the pituitary gland – the master gland in the brain – is sending too much stimulating hormones to the adrenal gland, and the adrenal gland is simply responding to the stimulus to produce more cortisol.

In rare or about 15% of cases, the adrenal glands acquire a tumor, and that causes the upregulation of cortisol production in the body.

Breed Predisposition among Dogs

It's very rare for cats to acquire Cushing's disease, which is much more common in dog breeds.

There's also breed predisposition. The terriers, unfortunately, are predisposed. These include silky terriers, Yorkies, bull terriers, and Boston terriers, as well as poodles, daxies, and the American Eskimo dog, also known as spitz. All these have genetic predisposition to acquire Cushing's.

Cushing's Disease (part 2 of 3)

Hi, this is Dr. Karen Becker, and we're on part two of Cushing's disease. In our first video, we discussed the fact that there is typical and atypical Cushing's. With typical Cushing's, you could be adrenal-dependent or pituitary-dependent. For atypical Cushing's, it can be sex hormone or aldosterone electrolyte-dependent.

In this video, we're going to talk about a lot of different symptoms, as well as the unfortunate lack of effective treatments that can manage this particularly devastating disease.

Symptoms of Cushing's Disease

Because cortisol is such a diverse hormone, there's a whole host of diverse symptoms. Not all dogs that acquire Cushing's disease have all symptoms. Honestly, unless you or vet has waited for the bitter end to make the diagnosis, most dogs only two or three in the long list of symptoms.

The symptoms we see commonly with dogs that are beginning the Cushing's process is that they tend to drink more, urinate more (can include incontinence in the house), pant more, and gain weight. Even if you reduce calories in their food, they tend to have a potbellied appearance, a big, swollen abdomen. You can see thinning skin, hair loss and, in many cases, change in the pigment of the skin. If your dog used to have a pink belly, she now has a gray one or even black skin.

Oftentimes, your dog can become irritable or restless. We've seen some animals develop bruising. There are some rare symptoms like [1:30] weakness, as well as blood clots that can be associated with Cushing's disease.

But because the symptoms are so diverse (and every part of your pet's body literally has a cortisol receptor), sometimes the immunosuppressive aspects of Cushing's disease is what ultimately bring you to the veterinarian. So if your pet has a recurrent urinary tract infection that he or she can't get rid of – along with one or two of the other symptoms like thin skin and failing to gain weight – you have to think about asking your veterinarian about Cushing's disease.

In my practice, the number one reason I see Cushing's patients being referred in for is misdiagnosis of liver disease. Because the liver has to process these tremendous extra cortisol circulating in your pet's body, your pet's liver enzymes tend to increase – not only the liver's specific enzyme ALT, but a secondary induced liver enzyme called alkaline phosphatase (ALP) tends to elevate when animals begin developing Cushing's disease.

The Importance of Blood Testing

I think it's important for you to ask for a copy when you have annual blood work done on your dog. I would show the blood work to the pet owners and say, "Look, your dog has had ALP elevation for two or three years," and their answer would be, "Why didn't my veterinarian tell me?" Unfortunately, many reactive veterinarians simply won't address Cushing's disease until all of the symptoms are there, or until you begin telling him or her about the symptoms: "My dog's peeing in the house," "My dog's hair is falling out," or "My dog's incontinent at night in bed."

Oftentimes once you start complaining, your veterinarian starts digging. But if you want to be proactive in preventing this disease from occurring, you need to be asking for copies of blood work and why every single blood work value is not balanced or correct.

Your veterinarian needs to partner with you to be able to identify if your dog is at risk of having pre-Cushing's symptoms, or indeed already cushingoid. So if the ALP value is already elevated in your dog's blood work, you need to ask your veterinarian if this could be the start of Cushing's disease.

The diagnosis of Cushing's disease is difficult. Typically it's with the blood test. There are two blood tests that many veterinarians will do. An ACTH stem test is a two-part blood work that veterinarians will do to diagnose Cushing's disease, along with a low-dose dexamethasone suppression test. Both of those are two-part – sometimes three-part – blood draws that compare the cortisol levels in your pets' bodies to be able to make a consistent diagnosis of Cushing's disease.

After Cushing's disease has been diagnosed, your veterinarian would want to determine if it's indeed adrenal or pituitary dependent. In my opinion, the best way to rule out an adrenal tumor is non-invasive ultrasound. Some veterinarians prefer to do a secondary blood test called a high-dose dexamethasone suppression test. It is important to have a good diagnosis of if it's indeed Cushing's and what type, whether adrenal or pituitary dependent. This way, your vet is able to offer you treatments to the best of his or her ability.

Urine Test: An Alternative to Expensive Diagnostics

If your pet has symptoms of Cushing's but you don't want to spend your money in expensive, definitive diagnostic testing, you can ask your veterinarian for a urine test. It needs to be done with the first urine of the morning, and it's called the urine cortisol: creatinine ratio test. We call it the UCC because it's easier to remember.

By running a simple urine test on the first urine that your dog produces in the morning, your veterinarian will be able to determine if your dog is passing too much cortisol. Circulating levels of cortisol in healthy dogs should be quite low, and therefore the measurable amount of

cortisol being passed out in your dog's urine should be low – if indeed Cushing's disease isn't an issue.

If your dog is passing way too much cortisol, chances are he's trying to detoxify some of that cortisol by passing it out in the urine. That could be your first clue that your dog is indeed dealing with Cushing's disease. It's a cheaper way of determining that than doing a full-blown Cushing's test.

Another way to determine how much of the ALP value on blood work is Cushing's or adrenal-derived is to ask your veterinarian to run a CIALP, which stands for Cortisol Induced Alkaline Phosphatase Test. It's a simple blood test that can determine what portion of the ALP is adrenally derived. It's a really good screening test if you're interested in making sure that your dog isn't walking down the path of developing Cushing's disease.

Unfortunately, most of the time, Cushing's disease is diagnosed when full-blown Cushing's is already present. This means there's no way of getting back from pre-Cushing's syndrome to a non-cushingoid patient. Once a dog has full-blown Cushing's, he or she tends to live with the disease for the rest of their life. It can be managed in some situations, but Cushing's disease is NOT curable.

Potential Side Effects of Cushing's Disease Drugs

Most of the drugs now available to treat Cushing's disease also carry with them potential side effects. So it's really important that you discuss with your veterinarian your concern with side effects. In my opinion, it's very important that you do research to make sure that you're well aware of what medications your dog is being prescribed with. Do you feel comfortable giving those medications?

In my hospital, we don't use most of the Cushing's disease medications available because the side effects are usually worse than dealing with the underlying condition. Cushing's medications are very expensive, and they require a lot of monitoring of blood work throughout the rest of your pets' life to make sure they're being managed correctly.

Early Detection of Symptoms

Needless to say, identifying pre-Cushing's syndrome early – or at least ensuring that your pet has a reduced likelihood of acquiring Cushing's disease – is, hands down, the best approach. My recommendation is for you to be proactive and check your pet's ALP on an annual basis. Address it if you notice that the ALP is climbing. Do a screening test, a UCC, or CIALP to determine if your pet's indeed overproducing cortisol. Through this, you're better able to manage the condition before your pet has permanently developed Cushing's disease, which is pretty difficult to manage.

Always remember that you shouldn't ignore symptoms. If your dogs have consistent (even minor) symptoms, then it's absolutely worth investigating endocrine or adrenal disease as a contributing factor to why your pet has symptoms that are concerning for you.

Cushing's Disease (part 3 of 3)

Hi, this is Dr. Karen Becker on part 3 of Cushing's disease. In parts 1 and 2, we discussed that there are two types of Cushing's disease – typical and atypical.

Typical Cushing's disease is when the middle layer of the adrenal gland overproduces cortisol. Atypical Cushing's disease is when the outside and inside layers overproduce other types of hormone. The outside layer of the adrenal gland can overproduce aldosterone, which regulates electrolytes. That translates to electrolyte abnormalities in your pet's blood work. More commonly, the inside layer of the adrenal gland overproduces sex hormones: estrogen, progesterone, and testosterone precursors. Although we don't know why animals develop atypical Cushing's disease, we do have some ideas that could predispose pets to developing this particular syndrome.

The Ill Effects of Early Spaying, Neutering, and Desexing

In my opinion, early spay neutering, early dog and cat desexing absolutely has to participate in part of the upregulation of sex hormone production by the adrenal gland. This is because when we spay/neuter dogs early – before puberty, 6 months or earlier – their endocrine systems, glandular and hormonal systems never have the chance to fully develop. So when we desex them, we pull out all the ovaries and the testicles, and all of their sex hormones are taken out of the body. They literally become asexual. That's not a problem. However, it becomes a big problem later on in their lives because their bodies still require some natural hormone for normal biologic function.

What's one remaining source of tissue in a pet's body that can secrete some sex hormones? You got it – the adrenal glands. The adrenal glands are asked slowly to produce more and more sex hormones for the body that needs them. At some point, they simply can't keep up, and overproduction of sex hormones from the adrenal glands occurs.

Not all veterinarians will tell you that this is what's happening, and not all of them believe that atypical Cushing's disease is something they should be treating. I do treat a lot of atypical Cushing's in my practice because we see a lot of symptoms pertaining to dysregulation. By balancing out your pet's hormones, you see not just physiologic improvement, but mental and emotional improvement as well.

Atypical Cushing's disease certainly can be influenced by when and if you desex your pet and how early desexing occurs.

The second factor that can change hormone regulation in your pet's body are substances called xenoestrogens. Xenoestrogens are chemical substances that mimic the effects of estrogen in

your pet's body. Because hormone disruption is a central focus in Cushing's disease, substances that facilitate hormone disruption need to be evaluated, including xenoestrogens.

Xenoestrogens and External Estrogen Sources

Xenoestrogens are found in fertilizers, pesticides, soils, a lot of non-organic meat, as well as plastics. They potentially include your pet's plastic drinking bowl.

Pets are exposed to just as many external sources of estrogens as we are. Of course, that can influence their own adrenal glands production of estrogens. That can negatively influence your pet's endocrine balance. So you need to be thinking about potential external sources of estrogen, like compounds that can be causing adrenal stress for your pets if they have been diagnosed with atypical Cushing's disease.

Natural Treatments to Manage Atypical Cushing's Disease

Dr. Jack Oliver, an endocrinologist at the University of Tennessee Endocrinology Lab, suggests some natural treatments to help reduce the amount of circulating hormones in atypical Cushing's patients. He recommends considering using melatonin, the first on his list of arsenal of treatments. First, it's non-toxic. Second, it's cheap. Third, it's pretty effective in the early stages of atypical Cushing's disease.

Dr. Oliver recommends that pets be provided with melatonin because it helps reduce both estrogen and cortisol levels in your pet's bloodstream. It's an easy way to provide some management for atypical Cushing's with no side effects.

Dr. Oliver also recommends – for pets that are dealing with elevated estrogen levels – using high lignin flax holes, not flax seed oil that doesn't have enough of the lignins present. High lignin flax holes are phytoestrogenic, and it seems kind of contraindicative feeding estrogen to a pet that already has estrogen dominance problems. But believe it or not, there's a negative feedback. Providing phytoestrogens orally sends a feedback mechanism to the adrenals, telling them to pipe down on the estrogen production. Overall it can be quite therapeutic in helping to manage – not cure – atypical Cushing's in dog patients.

Integrative veterinarians choose a whole host of glandulars, homeopathics, nutraceuticals, and Chinese herbs, as well as adrenal-balancing nutraceuticals, to help manage atypical Cushing's. So if you have a pet that's been diagnosed with atypical Cushing's disease or could be acquiring this particular syndrome, working with an integrative vet is a pretty good idea.

Identifying Cushing's Disease Early

Most importantly, I want you to remember that disease is never black and white. Your pets are never vibrantly healthy, and then acquire typical or atypical Cushing's disease a week from Tuesday at 1 in the afternoon. It never happens that way. The only time your pets are vibrantly

healthy and then in a state of disease is when your pets are hit by a [5:32] and that's the truth. Other than acute trauma, disease is on a spectrum, and your pets are either headed toward immunologic and endocrinologic balance or away from balance.

My biggest frustration with traditional veterinary medicine is that we tend to categorize diseases as black and white. This means that when you're working with a reactive, not a proactive, veterinarian, he or she will probably tell you, "Oh your pet's fine. I'm just seeing some symptoms. They're losing their muscle tone and they're drinking a lot. Their skin color and attitudes are changing. The hair texture's changing. I just don't like what I'm seeing. Oh but it's fine; these are normal signs of aging." As veterinarians, we tend to not address these issues until they're so clear-cut, that disease has become black or white, because we've waited for so long.

My pep talk to you today is, if you believe that your pet is having changes that you suspect are with endocrine involvement, ask your vet to check. The only way to treat these symptoms early is to identify early. And the only way to identify early is to work with a proactive veterinarian and determine if indeed your pet has this syndrome going on.

Probably my biggest frustration is that veterinarians... Oftentimes – through clinical pathology or charting changes in blood work over a period of several years – we tend to see that as thyroid levels drop in dogs, the ALP levels tend to solely increase. That's a pretty clear marker that your pet's endocrine system could be becoming off-balanced. You need to begin working with your veterinarian to identify some of these trends in your pet's blood work, so you can identify potential shifts in their endocrine system earlier rather than later.

Most diseases are actually in the gray zone. So if you believe that your pet is headed to the gray zone – not vibrantly healthy, but not yet wracked with disease – then that's the perfect time to act and identify potential barriers in your pet's system that could be contributing to moving down the gray spectrum and into the black disease areas.

We recommend that you work with your veterinarian and identify every biochemical change in blood work that could be abnormal, including ALP. Do further diagnostics that we discussed in video two if you have concerns about potential secondary changes in your pet's adrenal glands.

Preventing Cushing's Disease

Most importantly, I'm going to tell you that you need to do the common-sense things in reducing cortisol overproduction in your pets. This means that prevention is what I'm going to recommend to you.

We recommend that you eliminate carbohydrates – corn, wheat, and rice – because carbs prompt insulin release. Insulin release will prompt a cortisol release. We recommend that you

consider adrenal-supportive substances. If your pets are undergoing known stress, you can provide great herbs: magnolia, ash Uganda, and phosphatidyl serine. These can help them through periods of stress to decrease cortisol release.

We also recommend that you also think about low-stress diets. In addition to low carb, feed a low stress type of diet – a moisture-rich diet – to your pet. A species-appropriate way to nourish your pet can overall reduce biologic stress immensely over the course of your pet's lifetime. Moving your pet's body to give her adequate exercise also results in a lifestyle that can decrease the amount of stress that your pets have on their adrenal glands.