

# ADDISON'S DISEASE (HYPOADRENOCORTICISM)



*This adrenal gland disorder is often misdiagnosed.*

Playful and involved with everything around her, Sally emanated health and vitality. One week later, the five-year-old Basset Hound was near death. Sally's symptoms came on rapidly. She raided the trash one night and vomited several times the next day. She lost her usual voracious appetite and seemed depressed. It was natural to attribute her symptoms to indigestion, and her vet prescribed Kaopectate.

Sally didn't get better. She isolated herself from the family, refused to eat and developed a continuous shiver that blankets didn't help. She rapidly lost weight. Within a few days, her face was sunken and hollow, and she was so weak that she had trouble jumping into her favorite chair. Her owner, Janet, changed vets.

The new veterinarian was alarmed when he saw Sally, and immediately put her on intravenous fluids. She was severely dehydrated, and her heart was racing. After only two weeks of illness, Sally had lost 14 pounds – 25 percent of her body weight. She was near death. How could this have happened? The vet suspected Addison's disease.

First, he nursed Sally out of the crisis; then he ran some tests, which confirmed his suspicions. Sally had Addison's disease and had gone into Addisonian crisis – the stage at which about 50 percent of dogs are first diagnosed with this rare disorder.

## A RARE DISEASE

Hypoadrenocorticism, or Addison's disease, was first described by Thomas Addison in 1855 as a disorder afflicting humans. A rare disease of the adrenal glands, Addison's occurs in one in 100,000 people. One of the unlucky few afflicted was President John F. Kennedy. Addison's disease was not reported in dogs until 1953. It is less rare in dogs than in people, so we see a few cases every year. The canine symptoms are similar to those experienced by humans.

## WHAT IS ADDISON'S?

The adrenal glands play a vital role in maintaining hormonal balance throughout the body. Located just above the kidneys, these glands are finely-tuned producers of essential hormones that we rarely consider when all is working well.

Addison's disease is caused by an immunologic destruction of the adrenal glands. The body's immune system begins to treat the glands as foreign bodies, attacking and destroying them. This destruction of the adrenal glands may be caused by an auto-immune disorder, a genetic predisposition, infection, certain cancer drugs or problems with the pituitary gland.

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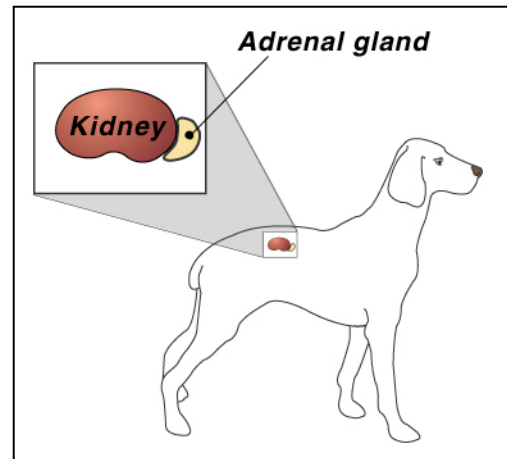
Without fully-functioning adrenal glands, the body goes haywire, throwing everything off balance. Left untreated, Addison's disease becomes life-threatening because the damaged adrenal glands do not produce enough of two vital hormones: cortisol and aldosterone.

In healthy dogs, the pituitary gland, in conjunction with the adrenal gland, keeps the amount of cortisol produced precisely balanced, and increases production of cortisol during times of stress.

Cortisol serves many purposes, but its most important function is to help the body respond to stress. It also helps maintain blood pressure and heart functions; slows the immune system's inflammatory response; balances the effects of insulin in breaking down sugar for energy; and regulates the metabolism of proteins, carbohydrates and fats. Sally's glands were not producing enough cortisol, which caused her gastrointestinal distress.

Aldosterone, the second hormone produced by the adrenal glands, helps maintain blood pressure and water and salt balance in the body, by helping the kidneys retain sodium and excrete potassium. When the aldosterone level falls too low, the kidneys are not able to regulate the body's salt and water balance. Sally was urinating sodium right out of her system, causing her blood pressure to drop and leaving her severely dehydrated and shaking.

As with most immune-related disorders in dogs, Addison's disease occurs more frequently in females. Between 60 and 70 percent of afflicted dogs are female. This differs from human Addison's, which afflicts men and women equally. Data show that the disorder most often strikes young and middle-aged dogs, and most dogs diagnosed with Addison's disease are younger than seven years old.



## TWO FORMS OF DISEASE

There are two different types of Addison's disease: primary and secondary. Primary Addison's is caused by the gradual destruction of the outer layer of the adrenal glands by the body's own immune system. About 90 percent of the dogs with Addison's have the primary type, including Sally.

Usually, by the time Addison's disease is diagnosed, 90 percent of the adrenal cortex, the outer layer of the adrenal glands, has been destroyed. The destruction is usually a gradual process, so at the beginning stages of the disease, symptoms occur only during times of stress, when the extra cortisol needed to cope with the stress but is not produced. As the gland's destruction progresses, hormone production becomes inadequate even under non-stressful conditions, and a crisis can occur without any precipitating factors.

Secondary Addison's disease is caused when the pituitary gland stops producing the hormone that stimulates the adrenal gland to do its job. This form is very rare. It's somewhat academic which form a dog has though, as the treatment is the same for both.

As already mentioned, there are two hormones made by the adrenal glands: cortisol and aldosterone. Most dogs with Addison's disease are low in both of them. It has recently been recognized that some dogs are producing an adequate amount of one hormone and not the other. This is called "atypical Addison's" and it makes the disease more difficult to diagnose.

### **WHAT ARE THE SIGNS?**

Symptoms of Addison's disease include periodic episodes of unexplained vomiting, diarrhea, appetite loss, weight loss, lethargy, shaking and illness around times of stress. Inadequate hormone production causes the gastrointestinal distress, and depleted sodium levels lead to muscle weakness and shaking. Stefan Rachwal, D.V.M., with the Mesa Veterinary Hospital in Golden, Colorado, treats about four cases of Addison's each year. Sally is one of them.

"Because of the vagueness of symptoms, Addison's is often misdiagnosed," Dr. Rachwal says. "An owner brings a dog in with these vague symptoms, and we try symptomatic treatment first. We don't immediately run a full gamut of diagnostic tests on a sick dog if its clinical signs don't seem to warrant it. If a dog is getting sick during stress, owners just assume the dog is not handling the stress well. And the part that makes it hard is that dogs often respond to symptomatic treatment. Then they come back in crisis."

Sally, for instance, had exhibited symptoms twice before going into Addisonian crisis. Both times, because of the vomiting and diarrhea, Sally's first vet thought she had "garbage gut," most likely from getting into something rotten in the backyard. Sally was not accurately diagnosed until she was near death.

If we are lucky, we find Addison's disease on wellness screening, before a crisis develops. If we run a chemistry panel and find the ratio of sodium to potassium is low. Upon further questioning of the pet owner, sometimes we realize that the dog has been having mild symptoms, often intermittent mild bouts of diarrhea, that were not severe enough to prompt a call to the vet.

### **ADDISONIAN CRISIS**

An Addisonian crisis occurs when a dog's hormonal levels are so unbalanced that the animal goes into shock. A low aldosterone level causes a dog's kidneys to fail to conserve sodium or excrete potassium, and dogs often become severely dehydrated. During an Addisonian crisis, low blood pressure, low blood sugar and high levels of potassium are life-threatening. Death can also occur from heart failure and shock.

Dogs in crisis are immediately put on an intravenous saline solution to correct sodium and potassium imbalances. Virtually every dog in crisis shows quick improvement within one to two hours of rapid and progressive fluid therapy. Dogs that were once near death become alert, are interested in food and water, and are able to stand and walk. Dogs are usually kept on IV's for at least 24 hours, followed by 48 hours of observation.

### **DIAGNOSIS AND TREATMENT**

"Diagnosis of Addison's can be quite difficult, because it can look like a lot of other things," explains Deborah Greco, D.V.M., assistant professor in small animal medicine at the Colorado State University Veterinary Hospital and a veterinary

endocrinologist who teaches veterinary students how to diagnose and treat Addison's. "Depending on the astuteness of the veterinarian involved, diagnosis can run anywhere from a couple hundred to a couple thousand dollars."

The first screening test used to make a tentative diagnosis of Addison's disease is an electrolyte or biochemical panel. The test averages about \$120 and gives the veterinarian sodium/potassium ratios. If the ratios are too low, the vet will need to measure the cortisol level, which costs about \$120. Sometimes a more expensive test, the adrenocorticotrophic hormone stimulation test, must be used for a conclusive diagnosis. The ACTH test averages \$450 and measures cortisol before and after an injection is given to stimulate the adrenal glands. If the glands fail to respond to the injection by producing more cortisol, the dog has Addison's. Before Janet switched to her current vet, she had already spend \$950 within the span of a few weeks on EKGs, a barium test, X-rays, blood workups and hospitalization.

An electrolyte panel and ACTH confirmed that Sally had Addison's disease. Once she had stabilized on the IV's, treatment began. Sally's treatment was typical and consisted of two daily medications: fludrocortisone (Florinef™), which is a human drug we would have you pick up from a pharmacy, and prednisone, an inexpensive drug that costs about \$35 per 100 pills. Veterinarians usually prescribe daily administration of one or both drugs.

A third option for treatment is a monthly injection of slow-releasing mineralo-corticoid drug, which replaces the aldosterone hormone that controls electrolyte levels. The injection would be used in place of the fludrocortisone tablets. Prednisone would still be needed along with it, to replace cortisone and help handle stress. Some dogs do better on the injections than the pills. Depending on the size of the dog and the dose of fludrocortisone needed, it may be more or less expensive to give the injection rather than the pills.

Some dogs can be maintained on prednisone alone, especially when Addison's disease is caught early. Prednisone mostly supplies cortisol replacement but it has some weak aldosterone effects as well.

Dr. Greco warns dog owners that, during times of stress, the prednisone dose must be temporarily increased to help the dog's system cope. This stress may be the result of a minor illness or change in routine. Owners of Addisonian dogs should attach identification tags to their dogs' collars stating their condition in case of an emergency.

### **PROGNOSIS**

Sally is doing better these days, although a recent bladder infection nearly threw her into another Addisonian crisis. She has had a more difficult time stabilizing than most dogs, though.

"The prognosis for dogs with Addison's is excellent. For some reason, Sally has been a little harder to get stabilized than most," says Dr. Rachwal. "It's really a fairly easy thing to treat, once you've made your diagnosis. That's the hard part."

Dr. Greco agrees: "As long as the owner continues treatment, there is no reason these dogs shouldn't lead full lives. I tell my clients to count on spending an average of \$3 per day for treatment for the rest of the dog's life."

Dr. Rachwal has managed two cases in which the owners simply could not afford the treatment. One case involved his youngest Addison's patient yet – a seven-month-old Chow mix named Maxwell. The Chow's owners decided to euthanize Maxwell, but Dr. Rachwal's receptionist stepped in and adopted him.

Although it can strike any size or breed, Dr. Greco sees more Addison's in Bearded Collies and Standard Poodles. Rachwal's patients have included a Fox Terrier, a 15-year-old Poodle and a black and white Husky named Oreo. Because of Oreo's size, it takes more medication to stabilize him, and he requires six fludrocortisone tablets daily, which gets expensive.

The cost of treating the disease worries owners who are struggling to make ends meet. Most veterinarians recommend monthly electrolyte panels until the disease stabilizes, with blood work every three to six months thereafter. At \$45 for each test, plus office visit charges and a minimum several dollars a day for medication, treatment is expensive.

Sally has been back to the hospital several times since her diagnosis around Christmastime, often being kept for a few nights on IV's. A recent bladder infection cost \$350 to treat because of the complications created by Addison's. Vet bills for the past several months have now hit the \$2,500 mark. However, Janet has found a unique way to look at the cost. "Sally's like a monthly car payment," she comments.

Sally's appearance has changed since Addison's disease took its toll. Her face is much grayer than it used to be. Although she weighs the same as she did prior to the diagnosis, she no longer has her slender Basset figure. Daily doses of prednisone have caused Sally to lose muscle tone and have given her a puffy look.

Another complication from the prednisone is the fact that it makes dogs ravenous. Sally has become something of a thief, always on the prowl for unguarded food. Sally steals any food left on the kitchen counter. Her more recent acquisitions have included a plate of turkey paprika and a package of canine bagels – she consumed all nine bagels in one sitting.

Whatever food she can reach is fair game. The antics may seem cute, but overeating and indigestion could create a strain on Sally's digestive system that might throw her system off balance again.

Janet hopes that Sally won't always have to be on fludrocortisone and prednisone, but every time the vet tries to reduce the prednisone dosage, Sally begins shaking again.

Her owner has adjusted to the change in Sally. Now, the moment Sally starts acting withdrawn, Janet keeps an eye on her. At the first sign of shaking, she whisks her off to see the vet.

In spite of the vet's prognosis for longevity, Janet is not sure how long she'll have Sally. She postponed buying the Basset puppy she had planned on adding to her household this year because of the stress the adjustment could cause Sally.

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*Note: This article has been adapted from an article published in DOG FANCY MAGAZINE. Article written by Nancy J. Odom.*