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## VALLEY FEVER ( COCCIDIOIDOMYCOSIS )

Valley fever is a disease that is endemic (only found) in Arizona and certain parts of California. It is very common and can be very serious but fortunately most animals who contract it will eventually do fine.

The disease is caused by a yeast/fungus that lives in the soil. It exists in 2 forms .. a vegetative form which is active in the right environment ( i.e. in the body of an animal or a human) and a spore form which remains viable and potentially infective

Valley Fever is not contagious (with very rare exceptions) but it is infectious which means that you get infected with the disease but cannot pass it on to somebody else.

Humans and dogs are the most common victims. Cats occasionally pick it up but years could by without a veterinarian seeing it in a feline.  
This may be due that here in Arizona most cats have limited access to the outdoors.

The fact that unlike dogs ...cats do not sniff the ground with the same frequency and enthusiasm as a dog does could also be a major reason.

Valley fever organisms are potentially anywhere in the desert..though it does seem that there are more cases in some areas or neighborhoods than others.

Though it is seen all year round there seems to peaks twice a year after the winter and summer rains. Perhaps the rain and winds spread increased amount of dust that carry the organisms or encourage growth of the infectious stage. It is also may be seen in areas of construction perhaps for the same reason.

Bottom line there is really no way to predictably avoid your dog from contracting the disorder other than limiting access to the outdoors and paving over large areas of desert.

Not every exposure will lead to disease..in fact it is said that animals and people native to the area have a higher resistance. There may be cases in humans and animals in which the patients own immune system fights off the disease. It may be mistaken for a few weeks of malaise or chest cold that eventually resolves before the person seeks medical help..or a dog who just isn't feeling well but seems to suddenly get better. Obviously it is impossible to document how often this happens.

The incubation period is variable..and in any individual case it may be impossible to know the time between the pet actually got infected and when they started to show clinical symptoms.

I had one case of a puppy flown in from another state and came down with a full blown case of the disease 14 days later. So he must of caught it the day after he got off the plane.

## HOW IT WORKS

A classic simple scenario would be :

Pet sniffs ground and inhales organism...organism goes to the lungs and gets caught in the lymph nodes in the chest ...there it sits and causes the lymph nodes to get large and may colonize the local lung tissue ..at this point the pet may start to cough and may develop a fever now or soon after...it can also travel to other parts of the body ..often landing in bone causing lameness..pain ..deformity depending on where it settles....it can also travel to other parts of the body including the brain and eyes..skin etc..

## SYMPTOMS

Valley Fever can do anything and can look like other diseases. Fortunately veterinarians down here are so aware of the disorder that most cases are diagnosed fairly quickly. We also tend to test for it in cases in which the pet is showing vague or atypical signs not common to a specific disease. So few cases are missed.

Having said that...there are a small percentage of cases which are atypical or confusing or hard to prove and they can be quite a challenge.

## TYPICAL SYMPTOMS

The common trio of symptoms are

- 1- fever
- 2- coughing
- 3- lameness

These can exist alone or in different combinations..it can come on suddenly or gradually. Plus the disease can provoke a very profound malaise and the pet often will not eat though they still tend to drink.

A very common presentation would be a dog that may develop a mild cough and has slowed down in their activity and appetite and has a fever.

However early cases of Valley Fever the pet may still be bright alert and eating well and the cough can sound like a more benign disorder such as kennel cough ...in fact some early cases are misdiagnosed as kennel cough but they will be caught eventually as kennel cough tends to get better within 2 weeks while Valley Fever tends to get worse over the same time period.

Lameness is another common symptom with or without swelling of the affected area. These cases may actually have no other signs of Valley Fever...while others may have the other typical symptoms.

so...fever...coughing...lameness...malaise and anorexia are the common stuff in different combinations in different patients.

There are other more uncommon signs that can be seen:

- 1- lethargy ..without any other signs of fever or lung problems
- 2- eye problems consisting in deep inflammation of 1 or both eyes
- 3- central nervous system problems such as seizures or back pain and nerve dysfunction.
- 4- joint swelling or inflammation
- 5- skin lesions generally oozy open wound types
- 6- heart disease from inflammation of the lining of the heart ( pericarditis)

## DIAGNOSIS

Diseases often have their own personalities. Patients often have their own 'flavor' of a disease...so there will always be cases that are not as obvious but the diagnosis will be made using the following scheme;

- 1- classical group of symptoms
- 2- blood test ( cocci titers)
- 3- X-rays of the chest in the case of lung involvement
- 4- X-rays of the affected bone in the case of lameness or deformity...
- 5- Experience
- 6- in some atypical cases more invasive expansive testing may need to be done.

## BLOOD TITERS

In conjunction with clinical signs the blood titer is the most common diagnostic tool. A blood test is sent to the lab that test for antibodies to the disease.

This is a very important concept! The test does not test for the direct presence of the organism but only the body's reaction in mounting an immune challenge to combat the disease.

Though in conjunction with clinical signs and x-rays the titer is very good in diagnosing the disease and also knowing when to stop treatment.. But as with everything in medicine there can be some confusion with the titer in diagnosing the disease and also knowing when the pet cured.

When the blood report comes back there are 2 things we look at ...

The first is whether it is positive or not and then how positive.

There are different degrees of positivity ..the positive numbers vary from :

weak positive to less than 2 or 4 ..and then increasing numbers 8..16..32..64..128...they stop measuring after that.

Another important concept is that the level of positive does not necessarily dictate how sick the pet is in real time. Some dogs with very low titers are very sick and some dogs with high titers are only mildly affected.

Since the titer represents the reaction of the body and not the direct presence of the organism it is possible that the titer can be misleading in a couple of scenarios.:

- 1- The test can be negative ..this could happen because it is too early in the case for the dog to produce antibodies though she is showing clinical signs. In most cases repeat titers a month or so later may turn positive.
- 2- there are some dogs that never turn positive
- 3- the patient does not have the disease.

In a pet with a negative test but significant clinical symptoms of the disease other tests such as x-rays of the chest or limb can help give the doctor more confidence in the diagnosis in the face of a negative titer.

## RADIOGRAPHS

Radiographs are always suggested ..for the sake of economics it is not unusual for a titer to be taken as the sole method of confirming the diagnosis. However if affordable it is always wise to take chest x-rays in a dog with valley fever. It helps stage the disease..it helps evaluate progress ..it also can rule-out other complicating factors such as a secondary bronchopneumonia provoked by the disease which might be missed and not treated leading to under treating the patient

X-rays of the chest are always important in a coughing animal suspected of having valley fever with a negative titer.. Valley fever has some very common expected changes in chest x-rays which can suggest that a trial therapy is warranted in a dog that is negative but has significant clinical signs associated with the disorder.

Of course in lameness especially persistent lameness with deformity x-rays will be taken routinely. Valley Fever shows certain types of destruction in the bone.

However it can be confused in some patients with cancer of the bone ( and vice versa and can be a dilemma in a dog with a negative test especially in certain breeds and age groups.

Other tests may need to be done in a few cases that have atypical lesions or locations and the titers are negative....

Since it is everywhere in the Phoenix Metro area it is possible that many dogs are exposed to or get over the disease...it is also possible that they may have a low titer to the disease from this but do not actually have the disease. It is hard to know how many cases may be erroneously diagnosed with Valley Fever that may have some symptoms resembling Valley Fever and have a positive test.

In my experience I am sure this happens but probably is not too common as in the overwhelming cases I have handled the Valley Fever test is not taken routinely but only in animals with symptoms suggestive of the disease. I have not seen any good studies that show the rate of positive tests in healthy animals that were picked at random ...but it is always something to consider.

## TREATMENT

The treatment of choice is fluconazole ...it is a drug which is pretty safe but has gotten a little more expensive over the last few years due to shortages of the drug. The medication can be bought from any pharmacy by prescription but it pays to shop around as prices can vary. Often veterinary specialty pharmacies will be asked to reformulate the medications into strengths based on the patients weight as the human formulations may have too much or too little sizes for any individual pet. They also can be cheaper in many cases than the local pharmacy.

Fluconazole in general is well tolerated and safe for long term treatment. There will always be dogs that may not tolerate it and may get vomiting or diarrhea or lack of appetite but fortunately they are not too common.

The major concern is that it can cause liver problems. Fortunately after treating hundreds of patients only a handful seem to suffer from this severe side effect.

To catch those patient before any liver damage becomes severe or irreversible I have my patients have a baseline blood test at the beginning of therapy to rule out any preexisting liver disease and establish a baseline and then 1 month later after starting therapy to see if there is any changes that would suggest the drug is doing harm.

The medicine can cause birth defects and there are some reports of hair coat changes and darks coats becoming lighter in dark haired breeds ..

Therapy lasts for at least a year and sometimes longer ...during that time titers are repeated as is baseline blood work at varying schedules.

So to summarize my approach :

- 1- pet has baseline blood work done and medication is started
- 2- 1 month later pet has a recheck small blood test to catch any problems with the medications
- 3- if that blood test is ok then the pet is placed on medication for 3-4 months and the titer and perhaps additional blood work is repeated. Some veterinarians may repeat the titer more frequently but it is my feeling that the titer does not change dramatically from month to month so for the sake of economics I only retest every few months...
- 4- tests are taken at few month intervals until the pet is negative and medication can be stopped.

There may be some variations in how any individual veterinarian will handle the treatment of Valley Fever..

## REAL WORLD OUTCOMES

It is impossible to give every variation of presentation ..the journey thru the disease..complications and resolution ...most dogs do well ...a few may develop problems that are life or life quality threatening or may not turn around in a predictable time period..

It can take anywhere between 1 to 6 weeks for most dogs to get clinically better with most patients responding in 3 weeks ..that means that many pets will not eat or will feel

miserable for awhile ..this can drive us all crazy with worry as days go by and the pet seems not to be responding is losing weight and condition..but thankfully there comes a day when there is sudden improvement.

However every case needs to be treated up to their needs and in a few cases aggressive supportive therapy and even intravenous forms of the drug ( very very expensive) may be needed.

Once the patient is been on the medication and has at least responded clinically than a choice has to made when to stop therapy.

The easiest time to make that decision is when the patient after the average course of a year finally turns negative on the titer test.

If at a year the test is still positive (but hopefully the titer has decreased) therapy may be continued at 3-6 month interval with a retest till the titer is negative. A few pets may need 2 years of therapy to get to that point.

There are a small percentage of patients whose titers never turn negative..in this case the choices are somewhat an art as well as a science.

Remember that the titer only measures the body's reaction to the organism and not the direct presence of the organism..it is possible then that a dog could be cured and never become negative so the following are some guidelines:

1- the test after years of therapy remains persistently high like a solid 4 or 8 ...keep treating

2- the titer after 2 years of therapy remains persistently weak positive ..in this case it is impossible to differentiate between persistent infection and an innocent persistent memory titer left over from when the disease was active. In these cases a decision can be made to stop the medication and see what happens ..this can be nerve racking but a significant proportion of cases handled this way remain symptom free. there are those people and veterinarians that may never stop the medication as they are worried about the disease coming back ..but until we can detect the organism directly in the body we will have to make choices based on our best judgment at the time.

3- another confusing scenario is a pet who was diagnosed with VF but never had a positive test and therefore the test cannot be used as a guideline for therapy..in these cases a minimum of 1 year of therapy is done and other tests such as x-rays are used to demonstrate the resolution of objective signs such as the lesions in the lungs or bone completely disappearing

As stated in the beginning there can be cases with odd presentations or having complications involving the eyes ..central nervous system skin ..kidneys etc ..some patients can develop severe complications that affect their quality of life such as blindness..siezures...renal failure ..pericardial disease....in my experience the vast number of pets will do well.

