

Nocardia Infections in Bird Dogs

By Dr. Pat McInteer and Dr. Jim Mills & others

Nocardia, Actinomycosis and speargrass infections are a complex set of diseases in sporting dogs that present varied and confusing symptoms. This article is designed to bring a better understanding of this disease complex to dog owners so that they might understand and recognize it at an earlier stage. Also, it is hoped that veterinarians unfamiliar with this condition might develop an understanding that will enable them to recognize and treat it successfully. The authors wish to emphasize that in this article, the complex disease syndrome has been somewhat simplified and categorized for the sake of clarity, and that actual cases may be more complicated than the examples presented.

The year old setter spent the summer in training on the prairies of North Dakota. During the fall, this promising pup ate well and seemed to feel well but his performance and stamina were not up to his usual standards. A routine check-up at the vet's office revealed no recognizable causes. Two months showed no improvement. Suddenly he stopped eating, became severely depressed, and died within two days. A severe chest infection with fluid in his chest cavity was found after his death.

The pointer derby placed in the quail futurity in November after training on the prairies of Oklahoma. In early spring, he had lost some zip and three weeks later developed severe pain in the lower back region and a large lump appeared on his side in front of the hip and behind the ribs. This abscess ruptured and drained, then healed, and the process was repeated.

The two and a half-year-old foxhound developed a lump on his side beneath the skin. Over the next month, this swelling spread, ruptured, and drained in several places.

These three cases represent three forms of a disease complex commonly referred to as nocardia infections. "Nocardia," a term that brings dread to dog owners and handlers, is actually caused by two related bacteria – Actinomyces species and Nocardia species. Nocardia is commonly found in soil and may enter the dog's system through inhalation or ingestion, but often enters through an injury site. Actinomyces commonly resides in the oral cavity of animals and requires an injury or foreign body to produce disease. These foreign bodies carry the bacteria found in the mouth into the body of the host. Foreign bodies, including dust, pollen, plant particles and seeds, definitely play a role in the development of the disease. Most notable among these foreign bodies are grass awns which migrate through the body, such as speargrass (needlegrass), foxtail, and cheatgrass. When these migrating grass awns are involved, the disease is usually more complicated because the seed migration carries the infection from the mouth to various locations in the body. Lesions are similar in both infections and dogs show abscesses, draining tracts, granulomas (masses of inflamed tissue) with fibrosis and respiratory involvement.

There are three common forms or locations that the disease presents:

The **subcutaneous** (under the skin) **form** occurs most commonly on the dog's side. These subcutaneous nocardia infections yield the best treatment results and least death loss because this form is easily diagnosed and does not affect critical organs. Because death from this form only occurs when the infection is advanced to a very late stage, treatment is usually successful. This is because the dog's vital organ systems are not affected, thus allowing time for treatment results to occur. The subcutaneous form usually results

from entry of the bacteria through a cut or foreign body wound. A mass or lump develops which then migrates in fistulous tracts in several directions. Drainage may occur from several sites, heal, and then develop again. Surgery and/or medication have been used to treat these lesions with success. Advanced cases may require months of therapy to completely resolve. The prognosis is usually good.

The **abdominal form** of the disease results in a tender abdomen and back. Extreme and intense pain often occurs. This results from a deep abscess located high on the dog's side behind the rib cage and in front of the hipbone. This abscess will eventually break open and drain, then seal over, and the process will be repeated. This syndrome is usually caused by a migrating foreign body which resides below the spinal column under the lumbar vertebra in the abdominal cavity. These foreign bodies (usually migrating grass awns) probably are swallowed and penetrate the intestinal wall and carry the bacteria to establish in this location. Because these infections tend to develop a tract and drain to the outside of the body and not affect the organ systems, the prognosis is fairly good. Flushing the draining tract and long term medication have yielded excellent results for the authors.

The **thoracic** (chest cavity) **form** of the disease is more difficult to diagnose and treat. This form carries a high death rate unless detected early, and early detection is often difficult because early symptoms are vague and not severe. The most common early symptom for this form of "nocardia" is poor performance and stamina below what is usual for the canine athlete for an extended period over weeks and months.

To best understand how the authors believe this disease develops, dog owners should look at the very back of the dog's throat when the dog has been worked in late summer or early fall. This is best done with the dog facing you and the sun behind your back before the dog has had any water.

The panting dog will readily open its mouth for a quick examination of its throat. What you will observe is a throat coated with dust, pollen, and plant material. Behind this is the opening to the windpipe which goes directly to the lungs. This will be wide open as the panting, hot dog breathes heavily. It will be obvious that some of the dust, pollen, and plant material quite likely entered this opening, thus gaining access to the lower respiratory tract. Every dog is exposed to this. For most dogs, the natural protective mechanisms of the respiratory tract bring these minute particles back to the throat in a mucous coating where the mucous is either gagged out or swallowed (to be passed harmlessly in the bowel). Other particles may be lodged in the lower lungs, where they are walled off and consumed by the body's protective system. Larger particles may be walled off and surrounded by scar tissue to remain in the lung tissue. Bacteria and fungi are consumed by the body's defenses.

In cases where disease develops, pneumonia may develop acutely from the infusion of particles into the lung, or these particles may be walled off but not destroyed by the body. In this case, the bacterium (*Nocardia* or *Actinomyces*) develops into a small pocket of infection. The bacteria will spread, creating an area of lung infection. Because this infection is isolated in the lungs, symptoms of systemic disease will not develop. At this stage, the dog's temperature, white blood count, attitude, and appetite will be normal. Only its stamina and performance will decline. This is the point in the disease when diagnosis will be difficult. The owner may think the dog's performance is due to hard training. If the veterinarian is not familiar with strong, canine athletes and this disease complex, these subtle symptoms may be dismissed in the clinic. The dog will be bright, alert, try to breed the poodle in the waiting room and pee on every chair.

One look and the practitioner will assume the owner is mistaken about a problem with this dog. A physical exam may only reveal mild bronchial harshness in

the lungs and lab work may be normal, or near normal, because the infection is still isolated in the lungs and has not become systemic. Chest radiographs will only show some bronchial congestion with perhaps a few small spots in the lung tissue.

It is at this point that the authors would suspect an early nocardia infection based on the history of poor performance, training in the late summer and early fall, the vague symptoms seen on exam and radiographs, and lack of other causes (obviously there are other clinical causes of poor performance). At this point, the diagnosis is impossible to confirm. However, if the veterinarian's suspicion is correct, aggressive therapy will save much heartache and likely save the dog's life. If the diagnosis is wrong, only the owner's wallet will be affected unless some other ailment is missed.

If undetected, this early stage (which may show up several months after exposure) will progress slowly. Eventually the lung lesions will spread, and when a small lung abscess bursts on the surface of the lung, the infection will spread into the chest cavity. At this stage, the disease becomes systemic and the infection progresses rapidly. Thick, tomato juice-like fluid often will fill the thoracic cavity. This will put pressure on the lungs and the dog will become extremely ill. Breathing will be very labored and the dog will become weak. This severe worsening of symptoms can occur in a very short period (one to five days). At this point, draining the fluid from the chest cavity becomes an immediate necessity. It is during this stage of the disease that the death loss is high. This final stage of the disease may develop as long as three to six months after the initial exposure.

Historically, treatment of "nocardia" infections has included radical surgery. Recently Dr. Jim Mills developed long term massive antibiotic therapy that has proven successful in many cases. Using his

regimen and refining it, the authors have had improved success with both early and final stage cases utilizing limited or no surgery. Draining chests filled with fluid has remained an absolute necessity in severe cases. Based on cases of the subcutaneous form where treatment progress can be readily seen and palpated, the authors have determined that two to three months' therapy is an absolute minimum and treatment schedules of four to six months may be required.

The authors are currently using clindamycin in massive doses along with Trimethaprin Sulfa in normal doses. Follow up chest radiographs and blood work monitoring are essential to good results. This is a complex disease; diagnosis and treatment should not be attempted by dog owners without thorough radiographic exams, work ups, and lab work by a veterinarian.

These infections have often been associated with training on the prairies from Canada to Texas. Other regions have also produced problems. Interestingly, the majority of cases have occurred in young dogs one to three years of age. Occasionally, dogs past this age group are affected. The fact that older dogs seem more resistant to this infection raises the possibility of an effective vaccine development.

For many years, trainers have referred to the fact that breaking dogs often causes a reduction in range and independence during the first year of adult competition. Could this actually relate to a low-grade lung infection that was eventually conquered by the body's defense mechanisms? The radiologist at Kansas State University Vet School related that almost all adult hunting dogs in the Midwest have rather extensive scarring in their lungs and bronchial systems. This is no doubt caused by inhalation of material while afield.

Nocardia Treatment

- Nocardia is very difficult to detect in its early stages.
- By the time the blood work shows an infection, it may be too late to successfully treat the dog.
- Check for tonsil infection, throat infection, and upper respiratory infection.
- Check stool for parasites, protozoa, etc.
- Check liver and kidney function, and thyroid.
- Listen to chest and consider chest x-rays.
- Start treatment when other illnesses or causes have been eliminated.
- It is common for a dog to have two or more illnesses at the same time.

Two options:

1. Wait and see, often will be too late.
2. Assume the dog has nocardia and treat for it.

The authors have never seen any negative result from treatment.