

Common Fungal Diseases of Animals

Fungal Diseases in Dogs

Cryptococcosis

This disease, caused by the yeastlike fungus *Cryptococcus neoformans*, is acquired by inhaling spores found in soil contaminated by bird droppings, especially those of pigeons. In dogs, cryptococcosis involves the brain, eyes, lymph nodes, and skin. About 50 percent of the dogs with this fungus will also show respiratory signs. Signs of brain involvement are an unsteady gait, pressing the head against a hard surface or standing with the head up against a wall, circling, [seizures](#), [blindness](#), and dementia. Involvement of the inner structures of the eyes leads to blindness.

In the less common form that infects the skin, cryptococcosis produces firm nodules, primarily in the head area, that ulcerate and drain pus.

The diagnosis is made by fungal culture and/or tissue biopsy. A cryptococcus latex agglutination test is available.

Treatment: Oral antifungal drugs of the imidazole group (as described for Histoplasmosis) are partially effective when started early in the course of the disease. The response is uncertain and treatment is prolonged. Overall, the prognosis for dogs is guarded to poor.

Blastomycosis

This systemic fungal disease occurs along the eastern seaboard, in the Great Lakes region, and the Mississippi, Ohio, and Missouri River valleys. The fungus is associated with moist, rotting organic debris protected from sunlight and enriched with bird droppings, particularly those of pigeons. The disease is acquired by inhaling infected spores. Dogs are considerably more susceptible to blastomycosis than are humans.

Most cases of acute canine blastomycosis involve the respiratory system and cause bronchopneumonia. About 40 percent of cases involve the eyes and skin, producing signs similar to those of cryptococcosis (see above). Weight loss and lameness may also be noted.

Histoplasmosis

This disease is found in the central United States near the Great Lakes, the Appalachian Mountains, Texas, and the valleys of the Mississippi, Ohio, and Missouri rivers. These areas have nitrogen-rich soil that facilitates growth of the causative fungus (*Histoplasma capsulatum*). Spores are found in soil contaminated by the dung of bats, and chickens and other birds. Spores are breathed in by dogs, people, or other animals.

In most cases, histoplasmosis is subclinical or inapparent, occasionally producing a mild respiratory infection. There is an acute intestinal form, however, that attacks the small bowel and colon. The principal signs are weight loss and intractable [diarrhea](#). A systemic form is characterized by fever, weight loss, [vomiting](#), muscle wasting, [coughing](#), enlargement of the tonsils and other lymph nodes, as well as involvement of the liver, spleen, bone marrow, eyes, skin, and, rarely, the brain.

The diagnosis is made by chest X-ray, blood studies, and identification of the histoplasma organism in cytology, biopsy, or culture specimens.

Treatment: Oral anti-fungal drugs of the imidazole group, including ketoconazole, itraconazole, and fluconazole, are particularly effective in treating histoplasmosis that is not life-threatening. In dogs with severe infections, amphotericin B is often combined with one of the imidazoles. Amphotericin B is potentially damaging to the kidneys.

Coccidioidomycosis (Valley Fever)

This is the most severe and life-threatening of the systemic fungal diseases. Coccidioidomycosis is found in dry, dusty parts of the southwestern United States, and in California and neighboring Mexico. (Note that coccidioidomycosis is not the same disease as coccidiosis, a disease caused by intestinal protozoa.)

Infection occurs by inhaling spores. Most cases are subclinical or inapparent. A severe form affects the lungs and produces acute [pneumonia](#). If the disease becomes systemic, it may involve the long bones (most common), liver, spleen, lymph nodes, brain, and skin. Affected dogs will often have a [chronic cough](#), weight loss, lameness, and fever.

The diagnosis is made by identifying the organism (*Coccidioides immitis*) in cytology, biopsy, or culture specimens.

Treatment: Coccidioidomycosis can be treated effectively using one of the imidazole group of antifungal agents (as described for Histoplasmosis). Prolonged treatment for up to a year is required to try to prevent recurrence. However, relapses are common.

Fungal Infections (Mycoses) in Horses

Aspergillosis (Guttural Pouch Mycosis)

Aspergillosis is a fungal infection caused by several *Aspergillus* species. It is primarily a respiratory infection that may become generalized. Aspergillosis is found worldwide and in almost all domestic animals as well as in many wild animals; however, the susceptibility to fungal infections varies among species.

The most common form in horses is fungal disease affecting the guttural pouch. The 2 guttural pouches are sacs formed by the auditory tube, which connects the middle ear with the back of the throat. Infection usually occurs only in 1 guttural pouch. The infected guttural pouch becomes thickened, and bleeding into the tissue may occur. Nosebleed and difficulty in breathing or swallowing are common signs. Other signs include holding the head extended or low, head-shaking, swelling of the head, neurologic signs, and nasal discharge.

Aspergillosis in horses can be rapidly fatal when the infection invades the lungs. In these cases, inflammation of the intestine is often a predisposing factor thought to weaken the immune system of the horse. This is followed by the invasion of *Aspergillus* from a disrupted lining of the intestines. Physical coordination is impaired and visual disturbances, including blindness, may occur when the infection spreads to the brain and optic nerve.

In horses, surgery to expose and remove fungal material has been used to treat guttural pouch mycosis. Topical and oral antifungal agents have been reported to be effective in cases of *Aspergillus* infection. The outlook is guarded; horses may survive but not recover completely, particularly if the nerves are damaged.

Candidiasis

Candidiasis is a localized fungal disease affecting the mucous membranes and the skin. It is distributed worldwide in a variety of animals and is most commonly caused by species of the yeast-like fungus, *Candida albicans*. Superficial infections limited to the mucous membranes of the intestinal tract have been described in foals. Widespread candidiasis has also been described in foals undergoing prolonged antibiotic or corticosteroid treatment. Infections are rare in horses. However, *Candida* species have been considered a cause of arthritis in horses.

Signs are variable and nonspecific and may be associated more with the primary or predisposing conditions than with the candidiasis itself. An ointment or topical application may be useful in the treatment of oral or skin candidiasis. Your veterinarian may also recommend different drugs given by mouth or through the vein to successfully resolve arthritis induced by *Candida fumata* infection in a horse or to treat generalized candidiasis in foals.

Coccidioidomycosis (Valley Fever)

Coccidioidomycosis is a dustborne, noncontagious infection caused by the fungus *Coccidioides immitis*. Infections are limited to dry, desertlike regions of the southwestern United States and to similar areas of Mexico and Central and South America. Inhalation of fungal spores (often carried on dust particles) is the only established mode of infection. Epidemics may occur when rainy periods are followed by drought, resulting in dust storms.

The disease varies from infections with few or no signs to progressive, disseminated, and fatal forms. In horses, the most common signs include loss of weight, coughing, fever, musculoskeletal pain, and abscesses of the skin. Placental infections leading to abortion and inflammation of bone have been described in horses. A diagnosis is confirmed by identifying the fungus in body tissues.

Coccidioidomycosis may resolve without treatment, but if chronic respiratory signs or multisystemic disease are present, longterm antifungal treatment is needed. At the present time there is no known prevention other than decreasing your horse's exposure to the desert soil and dust as much as possible in areas where the fungus is known to exist.

Cryptococcosis

Cryptococcosis is a systemic fungal disease. The causal fungus, *Cryptococcus neoformans*, exists in the environment and in tissues in a yeast form. The fungus is found worldwide in soil and bird manure, especially in pigeon droppings. Transmission is by inhalation of spores or contamination of wounds. Cryptococcosis is uncommon in horses.

The disease in horses is, almost invariably, a respiratory ailment with obstructive growths in the nasal cavities. Treatment for cryptococcosis may include surgery to remove lesions in the nasal cavity. Various antifungal drugs can be used for the treatment of cryptococcosis.

Epizootic Lymphangitis

Epizootic lymphangitis is a disease that affects the skin, lymph vessels, and lymph nodes of the limbs and neck of horses. It is caused by the fungus *Histoplasma farciminosum*. Infection seems to be limited to horses, donkeys, and occasionally mules. Epizootic lymphangitis occurs in Asian and Mediterranean areas but is unknown in the United States. Infection probably is acquired by wound infection or transmission by bloodsucking insects such as mosquitoes.

The disease most typically involves the skin and associated lymph vessels and nodes. Occasionally there is involvement of the respiratory tract. Some horses develop small, inconspicuous lesions that heal spontaneously. More typically, nodules develop under the skin. These increase in size and undergo cycles of granulation and partial healing followed by renewed eruption. The surrounding tissues become hard, painful, and swollen. Lesions may be seen on the skin of the face, around and in the eyes and nose, and on the forelegs, thorax, neck, and occasionally the inside of the rear legs. Other internal organs may be involved.

No completely satisfactory treatment is known. Surgical removal of lesions combined with antifungal drugs may be tried. In most areas of the world, however, this is a reportable disease; treatment of animals is not permitted, and destruction of affected horses is usually mandatory.

Strict hygienic precautions are essential to prevent spread of epizootic lymphangitis. Great care should be taken to prevent spread on grooming or harness equipment. Contaminated bedding should be burned. The organism may persist in the environment for many months.

Pythiosis

Pythiosis is a disease caused by *Pythium insidiosum*, which is not a true fungus but a water mold. It occurs in some tropical and subtropical areas of the world and is seen in warmer sections of the US. In the US, the disease most often is seen in fall and winter months. Horses are the most commonly affected animals, followed by dogs and, rarely, cats and people.

Infections in horses are most commonly restricted to the skin and the tissues just inside the skin. There may be large, circular nodules or areas of swelling that can become open, draining sores. These lesions are usually on the lower legs, abdomen, and chest but may occur anywhere on the body. The lesions are usually intensely itchy, and horses may mutilate the wounds if not closely monitored. Skin lesions often contain firm, yellowish masses of dead tissue known as “kunkers.”

Following the initial infection, the organism may spread to distant areas through the lymph system. The lymph nodes, bones, or lungs may be involved.

Horses rarely develop gastrointestinal disease similar to that occurring in dogs . Horses with gastrointestinal pythiosis may have signs of gastrointestinal obstruction, weight loss, poor appetite, diarrhea, and acute abdominal pain. In other horses, gastrointestinal disease may be unaccompanied by signs of generalized illness.

A diagnosis may be based on the appearance of the distinctive lesions and confirmed by identification of the organism in infected tissues. Surgical removal of lesions, antifungal treatment, treatment directed at the immune system, or a combination of these may be recommended to treat affected horses. The outlook is guarded, but timely recognition and treatment may lead to a more successful outcome. Other factors that influence the outlook include the size and location of lesions and the length of infection.

Phaeohyphomycosis

Phaeohyphomycosis is a general term for an infection by any of a number of funguses of the family Dematiaceae. This type of fungal infection is uncommon in horses. The funguses known to cause phaeohyphomycosis have been recovered from decaying vegetative matter and soil all over the world. Infection may result when the fungus enters the body at the site of an injury.

In most cases, the infection is confined to the skin and tissues beneath the skin. The most common signs include nodules in the skin, upper respiratory signs, and masses that form in the lining of the nasal passages and on the legs and chest. The nodules may ulcerate and have draining tracts.

Surgical removal of the lesion can be a cure. Treatment with antifungal drugs may be considered in cases when surgery is not possible.

Rhinosporidiosis

Rhinosporidiosis is a chronic infection, primarily of the lining of the nasal passages and occasionally of the skin. It is caused by the fungus *Rhinosporidium seeberi*. Uncommon in North America, it is seen most often in India, Africa, and South America. This disease is not considered transmissible.

Infection of the nasal mucosa is characterized by polyp-like growths that may be soft, pink, crumbly, and lobular with roughened surfaces. The growths may become large enough to obstruct or close off the nasal passages. The skin lesions may be single or multiple, attached at a base or have a stem-like connection. Signs of infection include nasal discharge and sneezing.

Surgical removal of the lesions is considered to be the standard treatment, but recurrence is common.

Sporotrichosis

Sporotrichosis is a sporadic chronic disease caused by *Sporothrix schenckii*. The organism is found around the world in soil, vegetation, and timber. In the United States, *Sporothrix schenckii* is most commonly found in coastal regions and river valleys. Infection usually results when the organism enters the body through skin wounds via contact with plants or soil or penetrating foreign objects such as a sharp branch. Transmission of the disease from animals to humans can occur.

The infection may remain localized to the site of entry (involving only the skin) or it may spread to nearby lymph nodes. Both of these forms occur in horses. Small, firm nodules develop at the

site where infection enters the body. Although generalized illness is not seen initially, chronic illness may result in fever, listlessness, and depression. Rarely, infection will spread through the bloodstream or tissue from the initial site of inoculation to the bone, lungs, liver, spleen, testes, gastrointestinal tract, or central nervous system.

In order to diagnose sporotrichosis in horses, it may be necessary to take samples of infected tissues, culture them, and then examine them for evidence of the fungus.

Longterm treatment with antifungal drugs (continued 3 to 4 weeks beyond apparent cure) is usually recommended. Alternatively, a solution of potassium iodide, administered by mouth, has been used with some success; treatment is continued 30 days beyond apparent cure. During treatment, the horse should be monitored for signs of iodide toxicity.

Because sporotrichosis can be passed from your horse to you, strict hygiene must be observed when handling animals with suspected or diagnosed sporotrichosis.

Zygomycosis (Basidiobolomycosis, Conidiobolomycosis)

Zygomycosis is the term used to describe infection with fungi in the class Zygomycetes and 2 genera in the order Entomophthorales (*Basidiobolus* and *Conidiobolus*). These fungi are found throughout the natural environment and are present in soil and decaying vegetation. True zygomycete infections are rare, but conidiobolomycosis and basidiobolomycosis are more common and cause lesions that are similar to those caused by

This is primarily an infection of the lining of the mouth, nasal passages, and tissue beneath the skin of horses (*Conidiobolus* and *Basidiobolus* species) or the sides of the head, neck, and body (*Basidiobolus* species).

When infection causes ulcers or nodular growths in the mucous membrane of the nostril or mouth, the lesions may grow so large that they block the passages. Such mechanical blockages cause difficulty in breathing and nasal discharge. When *Basidiobolus* affects the skin of the upper body, nodules that are large, usually single, circular, ulcerative, and itchy may form. Infection may extend to nearby lymph nodes, causing swelling of the nodes and development of focused yellow areas of dead cells.