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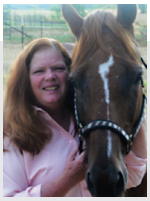
STANDING STILL
Pythiosis insidiosum feeds on plant material and was originally believed to live in ponds that were not spring fed. More recently, it has been discovered that the organism can be found in standing and stagnant water and in the moist soil left after the water dries up. *Photo courtesy of shutterstock.com/ Karen Givens*

EQUINE MEDICINE

Equine Pythiosis

An Overview



MEET THE AUTHOR

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Sharon Klingler RVT, VTS (Anesthesia, EVN) has been a veterinary technician for almost 40 years. She worked in private practice for almost 20 years where she worked in both an emergency and a general practice as the office manager, the anesthesia technician, and emergency technician. In 1997, Sharon joined the anesthesia department at the University of Georgia Veterinary Teaching Hospital to pursue a career as an anesthesia technician specialist. She is a credentialed member of the Academy of Veterinary Technicians in Anesthesia and Analgesia. and the Academy of Equine Nursing Technicians. At Georgia she was the emergency on-call anesthesia technician. Sharon joined the staff of Premier Equine Veterinary Services with Dr. William Rhoads in 2006. She currently provides

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Pythiosis is a noncontagious disease caused by *Pythiosis insidiosum*, a fungus-like, protozoan organism. Until recently, it was considered to be a threat only to horses living in tropical or subtropical environments; however, it has been seen in many other areas of the United States, such as Illinois, New York, and even Wisconsin.[1] Although dogs, cats, and even humans can be affected by pythiosis, horses are most commonly infected.

EXPOSURE AND INFECTION

P insidiosum feeds on plant material and was originally believed to live in ponds that were not spring fed. More recently, it has been discovered that the organism can be found in standing and stagnant water and in the moist soil left after the water dries up.[2] Animals become infected when it finds its way into small scratches or wounds or when they inhale or ingest spores. To date, there are no documented cases of animal-to-animal or animal-to-human infection. There has been no correlation to breed, age, or sex, so all horses are equally at risk if living in an infectious environment.

Infection with *P insidiosum* can cause two types of disease: lesional and respiratory. The lesional form manifests as tumor-like masses and ulcerated lesions that can affect any part of the body. They can be cutaneous, subcutaneous, and/or intestinal. Rarely, with chronic pythiosis, lesions develop in the bones and lungs. Although relatively uncommon, lesional equine pythiosis can be fatal (>95% of cases) if it is not treated when it first develops.[3]

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FUNDAMENTALS

Animals become infected with *Pythiosis insidiosum* when it finds its way into small scratches or wounds or when they inhale or ingest spores.

In horses, the most common lesion locations are the lower legs. This is logical because the legs are more exposed to organisms present in stagnant water and grasses. The next most common site of lesions is the abdomen. Generally, horses only develop one lesion. If multiple granulomas appear, they tend to be in the same general area. If not diagnosed and treated, the masses grow very large and ulcerate.

The lesions seem to be very pruritic. They have a strong odor, draining tracts, and a core lesion that is a hard mass called a "kunker." They also produce a serosanguinous discharge that, along with loss of tissue, can lead to anemia. Lesions that erupt on parts of the body other than the limbs (eg, abdomen, chest, face) are usually circular and less lobulated.[4]

DIAGNOSIS AND TREATMENT

Lesional Disease

Histopathology of samples taken from the characteristic lesions can be helpful in diagnosing pythiosis by identifying microabscesses with eosinophils.[3] However, the organism itself is very hard to identify in biopsy samples. A definitive diagnosis can be made using enzyme-linked immunosorbent assay (ELISA) testing

Case 1: Abdominal Lesion

This horse presented with a lesion on its abdomen (**FIGURE 1**). According to the owners, the lesion had progressed from a small sore over a relatively short time despite treatment with antifungal and antibiotic salves, Based on the appearance and history of the lesion, we obtained a blood sample for ELISA testing and started immunotherapy while waiting for the results. Within 48 hours, the diagnosis was confirmed; therefore, we continued treatment with injections given on days 7 and 21.

FIGURE 2 is of the lesion on day 7. It has become smaller and has less black, necrotic-appearing tissue and less purulent discharge. **FIGURE 3** is of the lesion on day 21. Again, the lesion is smaller and the tissue is healthier looking. There is normal tissue with hair growth around the outside of the remaining lesion where the original lesion once extended. At the 28-day recheck, a second course of immunotherapy was determined to be unnecessary. By day 56, the lesion was almost undetectable.

FIGURE 1.

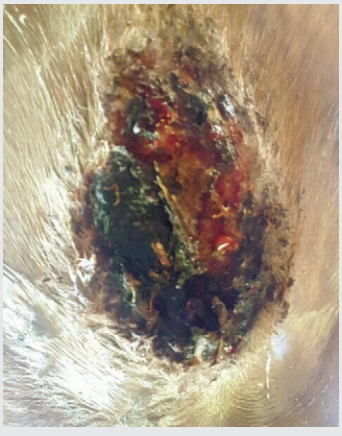

FIGURE 2.

FIGURE 3.

of serum for pythiosis antibodies (Pan American Veterinary Laboratories; pavlab.com).[5] The results are characterized as positive, borderline, or negative. Patients with borderline results should be retested in 30 days to confirm the diagnosis before treatment; treatment may also be started without retesting.

Because *P insidiosum* is not a true fungus, antifungal drugs have proven ineffective as therapy.[6] Treatment of diagnosed pythiosis involves immunotherapy with a product that is described as a vaccine, although it cannot be used as preventive therapy. The full treatment protocol is a series of three 1-cc subcutaneous injections given on days 1, 7, and 21. The patient is rechecked on day 28, and if the lesion is smaller but not totally cured, a second 3-injection course can be administered.[7] This immunotherapy protocol was developed in the 1980s, and the early form of the vaccine cured 100% of acute cases (horses infected for <60 days). It was less successful in chronically infected horses because of immunosuppression in those patients caused by loss of proteins and electrolytes through the open wounds.

A newer form of the therapeutic vaccine cured 50% of the chronic cases that had previously not been cured. The overall cure rate for acute and chronic cases combined is 75% with this product.[6] Occasionally, surgical excision is needed to remove a larger lesion after it is shrunken by the 3-injection course of immunotherapy.

Respiratory Disease

The respiratory condition caused by *P insidiosum, Pythium*-induced allergic syndrome, produces very mild clinical signs that include a sporadic, dry cough and clear nasal discharge. It is caused by ingestion of *Pythium* spores that have been trapped in hay that was grown on land where water sat stagnant, perhaps after a torrential rainfall or flood. The organisms still in the grass are picked up when the hay is baled. Horses may also inhale spores that are aerosolized when the wind blows up dirt that was once covered with stagnant water.

Case 2: Leg Lesions

The patient in **FIGURES 4 through 6** had been treated for an extended period of time for summer sores. It was referred to us for a second opinion because of its worsening condition. Owing to the severity of the lesions on presentation (**FIGURE 4**), this horse was treated with 2 series of immunotherapy. **FIGURE 5** is of the lesions on day 22, and **FIGURE 6** was taken on day 45.

Eventually this patient healed completely with minimal scarring, and it has returned to the show ring.

FIGURE 4.

FIGURE 5.

FIGURE 6.

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Bronchoscopic examination of horses with these clinical signs shows inflamed mucous membranes in the nose and throat. Definitive diagnosis is also done with ELISA testing, and treatment is the same as for the lesional disease. It is common to have multiple cases in the same training or boarding facility at the same time. In the practice where I work, most of the positive pythiosis cases we see are *Pythium*-induced allergic syndrome.

PRESENTATION: CASE EXAMPLES

Although pythiosis was once considered rare in the United States, in 2015, the practice that I work in, located 60 miles north of Dallas, saw more than 100 positive cases in a 6-month period. Approximately 40% of these cases involved cutaneous lesions, some that were originally diagnosed as summer sores. When these did not respond to steroid injections, we tested

Case 3: Body Lesions

This patient presented with sores on its face (**FIGURE 7**) and lateral to its withers (Figure 8) that owners described as being the size of a quarter one day and the size shown in 1 week. They had been treating the sores with antifungal salve. Results of an ELISA test were positive for pythiosis, and we initiated treatment with the immunotherapy protocol. **FIGURES 9 and 10** were taken on day 21. On day 28 after the initial 3-injection series, the patient was 75% improved and received 1 more immunotherapy injection. At recheck on day 60, the wounds were dry and 90% healed.

FIGURE 7.

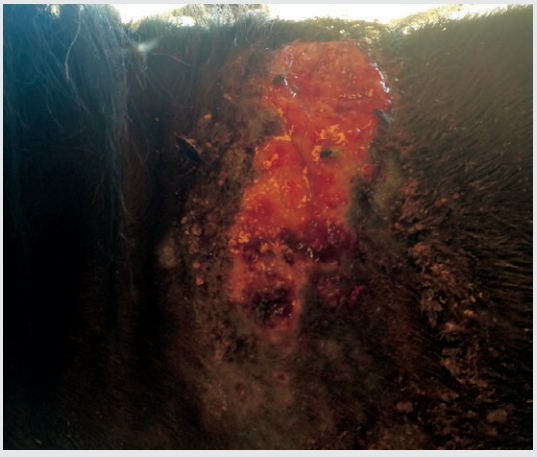

FIGURE 8.

FIGURE 9.

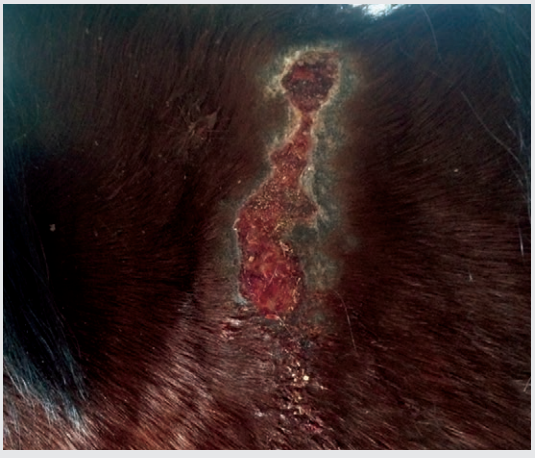

FIGURE 10.

them for pythiosis, and the results were positive.

Included with this article are a few examples of how pythiosis cases present and respond to therapy. All cases described were treated with the newer form of the immunotherapeutic vaccine. TVN

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anesthesia to Dr. Rhoads' surgical patients as well as serving as the office manager. She also assists Dr. Wendy Rhoads at All About Pets Animal Hospital.

Over the years, Sharon has been involved with the American Association of Equine Veterinary Technicians and was a member of the organizing committee for the Equine Veterinary Nursing Academy and is now a charter member and Past President of the Academy. She is often asked to speak to technicians at both local and national conferences.

Sharon resides in Whitesboro, Texas, with her daughter Megan and grandson Bradley. Sharon enjoys horseback riding, gardening, watching Bradley play sports, and taking care of her menagerie of animals.

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