

Dourine

Covering Disease, Morbo Coitale
Maligno, Slapsiekte, el Dourin,
Mal de Coit, Beschalseuche,
Sluchnaya Bolyezn

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Importance

Dourine is a serious, often chronic, venereal disease of horses and other equids. This protozoal infection can result in neurological signs and emaciation, and the mortality rates are high. No vaccine is available, and treatment with drugs may result in inapparent carriers.

Etiology

Dourine is caused by the protozoan parasite *Trypanosoma equiperdum*. This organism belongs to the subgenus *Trypanozoon* and Salivarian section of the genus *Trypanosoma*. Strains of *T. equiperdum* vary in their pathogenicity.

Whether *T. equiperdum* can be considered a distinct species is controversial. It is very closely related to *Trypanosoma brucei* subsp. *brucei*, *T. brucei* subsp. *gambiense* and *T. brucei* subsp. *rhodesiense*, which cause African trypanosomiasis in a variety of species, and to *T. evansi*, which causes surra. Based on genetic evidence, some authors argue that some strains of *T. equiperdum* were misidentified strains of *T. evansi*, and the others should be placed in *T. brucei* subsp. *brucei* or in a new subspecies *Trypanosoma brucei* subsp. *equiperdum*.

Species Affected

Dourine mainly affects horses, donkeys and mules. These species appear to be the only natural reservoirs for *T. equiperdum*. Zebras have tested positive by serology, but there is no conclusive evidence of infection. Dogs, rabbits, rats and mice can be infected experimentally. Dourine signs have been reported in sheep and goats that were inoculated with a murine-adapted strain, but ruminants do not seem to be susceptible to the isolates from equids.

Geographic Distribution

Dourine was once widespread, but it has been eradicated from many countries. Currently, the disease is endemic in parts of Africa and parts of Asia including Russia. Outbreaks or cases are occasionally reported from other areas including the Middle East and Europe. Dourine may exist in some areas where testing is not done.

Transmission

Unlike other trypanosomal infections, dourine is transmitted almost exclusively during breeding. Transmission from stallions to mares is more common, but mares can also transmit the disease to stallions. *T. equiperdum* can be found in the vaginal secretions of infected mares and the seminal fluid, mucous exudate of the penis, and sheath of stallions. Periodically, the parasites disappear from the genital tract and the animal becomes noninfectious for weeks to months. Noninfectious periods are more common late in the disease. Male donkeys can be asymptomatic carriers.

Rarely, infected mares pass the infection to their foals, possibly before birth or through the milk. Infections are also thought to occur through mucous membranes such as the conjunctiva. Other means of transmission may also be possible; however, there is currently no evidence that arthropod vectors play any role in transmission. Sexually immature animals that become infected can transmit the organism when they mature.

Incubation Period

The incubation period is a few weeks to several years.

Clinical Signs

Dourine is characterized mainly by swelling of the genitalia, cutaneous plaques and neurological signs. The symptoms vary with the virulence of the strain, the nutritional status of the horse, and stress factors. The clinical signs often develop over weeks or months. They frequently wax and wane; relapses may be precipitated by stress. This can occur several times before the animal either dies or experiences an apparent recovery.

Genital edema and a mucopurulent discharge are often the first signs. Mares develop a mucopurulent vaginal discharge, and the vulva becomes edematous; this

swelling may extend along the perineum to the ventral abdomen and mammary gland. Vulvitis, vaginitis with polyuria, and signs of discomfort may be seen. Raised and thickened semitransparent patches may be seen on the vaginal mucosa of some mares, and swollen membranes can protrude through the vulva. The genital region, perineum and udder may become depigmented. Abortion can occur with more virulent strains. Stallions develop edema of the prepuce and glans penis, and can have a mucopurulent discharge from the urethra. Paraphimosis may occur. In stallions, the swelling may spread to the scrotum, perineum, ventral abdomen and thorax. Genital edema can disappear and reappear in both stallions and mares; each time it resolves, the extent of the permanently thickened, indurated tissue becomes greater. Vesicles or ulcers can also occur on the genitalia; when they heal, these ulcers can leave permanent white scars called leukodermic patches.

Edematous patches called “silver dollar plaques” (up to 10 cm diameter and 1 cm thick) may appear on the skin, particularly over the ribs. These cutaneous plaques usually last for 3 to 7 days and are pathognomonic for the disease. They do not occur with all strains.

Neurological signs can develop soon after the genital edema, or weeks to months later. Restlessness and weight shifting from one leg to another is often followed by progressive weakness, incoordination and, eventually, paralysis. Facial paralysis, which is generally unilateral, may be seen in some animals. Conjunctivitis and keratitis are common, and in some infected herds, ocular disease may be the first sign of dourine. Anemia and intermittent fever may also be found. In addition, dourine results in a progressive loss of condition, predisposing animals to other diseases. Affected animals may become emaciated, although the appetite remains good. The course of the disease varies with the strain. Some strains cause chronic, relatively mild disease that persists for years. Other strains cause a fairly acute form that often lasts only 1-2 months, and in rare cases, can progress to the end stage in as little as a week. Whether animals can recover permanently is controversial.

Post Mortem Lesions

Cachexia and genital edema are often seen at necropsy. The swelling can extend to the ventral abdomen. Gelatinous exudates can often be found under the skin. In stallions, the scrotum, sheath and testicular tunica may be thickened and infiltrated. The testes may be embedded in sclerotic tissue and may not be recognizable. In mares, a gelatinous infiltrate may thicken the vulva, vaginal mucosa, uterus, bladder and mammary glands. Chronic lymphadenitis may be apparent. The perineural connective tissue can be infiltrated with edematous fluid, and the spinal cord may be surrounded by a serous infiltrate. A soft, pulpy or discolored spinal cord may be noted, particularly in the lumbar or sacral regions.

Morbidity and Mortality

The severity and duration of this disease vary with the virulence of the strain, the nutritional status of the host, and the existence of stressors that may precipitate a relapse. The prevalent strains in southern Africa tend to cause a chronic, mild disease that may last for several years. Experimentally infected horses have survived up to 10 years. In South America and northern Africa, cases have been more acute, often lasting only one to two months. More severe disease is usually seen in improved breeds of horses, while donkeys, mules and native ponies tend to be more resistant.

The mortality rate in untreated cases is estimated to be 50-70%. However, apparent recoveries have been questioned by some, in view of the long course of the disease and the waxing and waning symptoms. Some authors feel that nearly all cases are eventually fatal. In endemic areas, drug treatment may be possible; however, treatment may result in inapparent disease carriers.

Diagnosis

Clinical

Symptoms suggestive of dourine include genital edema and neurological signs. “Silver dollar plaques,” if present, are pathognomonic. Diagnosis can be difficult in some cases, particularly in the early stages or during latent infections.

Differential diagnosis

The differential diagnosis includes coital exanthema, surra, anthrax, equine infectious anemia, equine viral arteritis and causes of purulent endometritis such as contagious equine metritis.

Laboratory tests

Dourine is usually diagnosed by serology combined with clinical signs. The complement fixation test is the prescribed test for international trade, and has been used successfully in eradication programs. However, uninfected animals, particularly donkeys and mules, often have inconsistent or nonspecific reactions (false positives) due to anticomplementary effects in equid serum. Indirect fluorescent antibody tests may help to resolve these cases. Other serologic tests include enzyme linked immunosorbent assays (ELISAs), radioimmunoassay, counter immunoelectrophoresis, agar gel immunodiffusion (AGID) and card agglutination. Cross-reactions can occur with Old World trypanosomes, especially *T. brucei* and *T. evansi*, and no serological test is specific for dourine. A test that can concurrently distinguish equine piroplasmosis, dourine and glanders by immunoblotting has been developed.

Definitive diagnosis is by identification of the parasite; however, the organisms are extremely difficult to find. A small number of trypanosomes may be found in the lymph, edematous fluids of the external genitalia,

vaginal mucus, and fluid content of plaques. Detection is more likely shortly after the edema or plaques first appear. Organisms may sometimes be found in the urethral or vaginal mucus, 4 to 5 days after infection. On rare occasions, the trypanosomes can be found in thick blood films; however, the parasites are present very transiently in the blood, and are usually undetectable. The success rate can be improved by centrifuging a blood sample and examining the re-centrifuged plasma. *T. equiperdum* cannot be distinguished microscopically from *T. evansi*.

Samples to collect

Before collecting or sending any samples from animals with a suspected foreign animal disease, the proper authorities should be contacted. Samples should only be sent under secure conditions and to authorized laboratories to prevent the spread of the disease.

Serum, whole blood in EDTA and blood smears should be submitted. If silver dollar plaques are present, the skin over a plaque can be washed, shaved and dried, and the fluid aspirated with a syringe to look for trypanosomes. Because trypanosomes only occur for a few days in plaques, the lesions should be reexamined periodically. Organisms may sometimes be found in vaginal or preputial washings or scrapings taken 4-5 days after infection.

Recommended actions if dourine is suspected

Notification of authorities

Dourine must be reported to state or federal authorities immediately upon diagnosis or suspicion of the disease.

Federal: Area Veterinarians in Charge (AVIC):

http://www.aphis.usda.gov/vs/area_offices.htm

State Veterinarians:

<http://www.aphis.usda.gov/vs/sregs/official.html>

Control

To prevent dourine from being introduced into a herd or region, new animals should be quarantined and tested by serology. When dourine is found in an area, quarantines and the cessation of breeding can prevent transmission while infected animals are identified. Dourine can be eradicated from a herd, using serology to identify infected equids. Infected animals are euthanized. In some cases, stallions have been castrated to prevent disease transmission; however, geldings can still transmit the disease if they display copulatory behavior. *T. equiperdum* cannot survive outside a living organism, and dies quickly with its host. If necessary, this organism can be destroyed by various disinfectants including 1%

sodium hypochlorite, 2% glutaraldehyde and formaldehyde, as well as heat of 50-60° C.

Successful treatment with trypanocidal drugs has been reported in some endemic areas. However, therapeutic regimes have not been thoroughly investigated, and treatment is usually discouraged due to fears that the organism will persist inapparently. Good hygiene should be used at assisted matings. No vaccine is available.

Public Health

There is no evidence that *T. equiperdum* can infect humans.

Internet Resources

The Merck Veterinary Manual

<http://www.merckvetmanual.com/mvm/index.jsp>

United States Animal Health Association. Foreign Animal Diseases

http://www.vet.uga.edu/vpp/gray_book02/fad/index.php

World Organization for Animal Health (OIE)

<http://www.oie.int>

OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals

http://www.oie.int/eng/normes/mmanual/a_summry.htm

OIE Terrestrial Animal Health Code

http://www.oie.int/eng/normes/mcode/en_sommaire.htm

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