# Dourine

*Covering Disease,*
*Morbo Coitale Maligno,*
*Slapsiekte,*
*El Dourin,*
*Mal de Coit,*
*Beschalseuche,*
*Sluchnaya Bolyezn*
*Lappessa*
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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 case fatality rate is high. No vaccine is available, and the long-term efficacy of treatment is uncertain.

## Etiology

Dourine is caused by the protozoan parasite *Trypanosoma equiperdum* (subgenus *Trypanozoon*, Salivarian section). It is very closely related to the causative agents of African trypanosomiasis (*Trypanosoma brucei)* and surra (*T evansi*), and whether it should be considered a distinct species is controversial. Strains of *T. equiperdum* appear to differ in pathogenicity.

## 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.

Naturally occurring infections or clinical cases have not been reported in other species. It is difficult to infect healthy laboratory animals directly with isolates from equids, but mice immunosuppressed with glucocorticoids were more susceptible, and some rabbits were infected by intratesticular inoculation. Sheep, goats, dogs, rabbits, rats and mice can be infected with mouse-adapted strains, and may develop clinical signs. However, ruminants do not seem to be susceptible to isolates from equids, and a recent attempt to inoculate dogs with samples from horses also failed.

### *Zoonotic potential*

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

## Geographic Distribution

Dourine was once widespread, but it has been eradicated from many countries. Diagnosing dourine can be difficult, especially where other trypanosomes are also present, and the current distribution of this organism is unclear. Between 1995 and 2015, published papers and reports to the World Organization for Animal Health (OIE) suggested that this disease is endemic in parts of Africa and Asia. *T. equiperdum* is also reported to exist in South America, although there is little or no recent information from this region. In addition, dourine may occur 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. (NB: While mules are usually sterile, they have functional reproductive organs and can become infected with *T. equiperdum* if they are allowed to mate.). There is currently no evidence that arthropod vectors play any role in transmission.

Rarely, infected mares have been reported to pass the infection to their foals, possibly before birth or through the milk. Trypanosomes have been detected in the mammary secretions of some infected animals. Infections are also thought to occur through mucous membranes such as the conjunctiva. Sexually immature animals that become infected can transmit the organism when they mature.

*T. equiperdum* is reported to be unable to survive for long outside a living organism. The related organism *T. brucei* remained viable for up to 6 days in blood under some carefully controlled laboratory conditions.

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## Disinfection

There is limited need for disinfectants, due to the fragility of trypanosomes in the environment, and no studies have examined the disinfectant susceptibility of *T. equiperdum* directly. The closely related organism *T. brucei* can be inactivated by various agents including 0.05% sodium hypochlorite, 70% ethanol, 2% TriGene™, 0.1% hand soap, 2% formaldehyde and 0.05% glutaraldehyde. The temperature reported to kill 100% of trypomastigotes is 50°C.

## Incubation Period

The incubation period is a few weeks to several years.

## Clinical Signs

The initial lesions of dourine often involve the genitalia. Mares typically develop a mucopurulent vaginal discharge, and the vulva becomes edematous. Vulvitis, vaginitis with polyuria, and signs of discomfort may be seen. There may also be raised and thickened semitransparent patches on the vaginal mucosa. Some mares may abort. Stallions develop edema of the prepuce and glans penis, and can have a mucopurulent discharge from the urethra. Paraphimosis is possible. 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 may also be detected; when they heal, these ulcers can leave permanent white scars called leukodermic patches. In addition, the genital region, perineum and udder may become depigmented. In some horses, edema can spread to involve the ventral abdomen and perineum, including the scrotum in stallions and mammary gland in mares. A serum-like or cloudy, whitish mammary secretion may be noted. Some horses in Italy had severe swelling of the ventral abdominal and legs (especially the hindlegs) without genital involvement, most likely because the genital lesions had resolved.

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 considered pathognomonic for the disease, although they have been reported occasionally with *T. evansi*. They do not occur with all *T. equiperdum* strains. Horses in Italy were reported to have smaller, variable wheals and plaques, which lasted for hours to days, and waxed and waned in different parts of the body. Pustular dermatitis was also described in this outbreak.

Neurological signs can develop soon after the genital edema, or weeks to months later. Restlessness and weight shifting from one leg to another are often followed by progressive weakness, stiffness, lameness (especially in the hindlegs) incoordination and, eventually, paralysis. Facial paralysis, which is generally unilateral, may be seen in some animals, and ptosis of the lower lip is common. During outbreaks in Italy, the neurological signs were not accompanied by sensory dysfunction.

Conjunctivitis and keratitis are common in some reports, and ocular disease may sometimes be the first sign of dourine. Anemia is common, and intermittent fever may be found. In addition, dourine results in progressive loss of condition, predisposing animals to other diseases. Affected animals can become emaciated, although the appetite remains good. Overall, the course of the disease ranges from a chronic, relatively mild condition that persists for years to a more acute illness that often lasts only 1-2 months, and in rare cases, can progress to the end stage in as little as a week. The clinical signs can 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. Whether animals can recover permanently is controversial. Subclinical infections have also been described.

## Post Mortem Lesions

Cachexia and genital edema are often seen at necropsy. 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. In one case, the uterine mucosa was reported to be congested with widespread hemorrhages. There may also be swelling of the ventral abdomen and the legs, and gelatinous exudates can often be found under the skin. One report described pustular dermatitis, with histological lesions consisting of severe inflammation and vacuolar degeneration of the skin, and exudates consisting of cellular detritus (mainly eosinophils) and free protozoa. Chronic lymphadenitis may also 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.

## Diagnostic Tests

Dourine is usually diagnosed by serology combined with clinical signs, supported by evidence from histopathology and epidemiological evidence of non-insect-mediated transmission. The complement fixation (CF) test is the prescribed test for international trade, and has been used successfully in eradication programs. However, no serological test is specific for dourine, as cross-reactions occur with Old World trypanosomes, especially *T. brucei* and *T. evansi*. In addition, uninfected animals, particularly donkeys and mules, often have inconsistent or nonspecific reactions (false positives) in the CF test, due to anticomplementary effects in equid serum. Indirect fluorescent antibody tests may help to resolve these cases. A chemiluminescent immunoblot assay for *T. equiperdum* has been described in the literature, and is also reported to

resolve false positives. Other serologic tests that have been employed include ELISAs, radioimmunoassay, counter immunoelectrophoresis, agar gel immunodiffusion (AGID) and card agglutination. Immunostaining has been used to detect trypanosomes in tissues.

Dourine can also be diagnosed by identification of the parasite; however, the organisms are extremely difficult to find, and *T. equiperdum* cannot be distinguished microscopically from *T. evansi*. A small number of trypanosomes may be present in the lymph, edematous fluids of the external genitalia, vaginal or preputial washings or scrapings (collected soon after infection), mammary gland exudates or fluid content of plaques. The organisms are more likely to be detected soon after the edema or plaques first appear, and they only occur for a few days in plaques. Repeated sampling may be helpful. On rare occasions, *T. equiperdum* can be found in thick blood films; however, it is present very transiently in the blood, and is usually undetectable. The success rate can be improved by concentration techniques such as capillary tube centrifugation or mini anion exchange centrifugation. PCR assays have also been used in diagnosis (with exudates or tissue samples) and are more sensitive than culture; however, they identify the parasite only to the level of the subgenus *Trypanozoon*. *T. evansi* is also a member of this subgenus, and currently there is no genetic technique that can distinguish these two organisms.

## Treatment

Treatment may be possible in endemic areas; however, it is still uncertain whether trypanosomal drugs can completely eliminate this parasite. In some areas, relapses are reported to be common after drug treatment. One recent study found that bis (aminoethylthio) 4-melaminophenylarsine dihydro-chloride (cymelarsan) was effective in a small number of acutely or chronically infected horses, and relapses were not observed up to a year after treatment. Further evaluation of this drug is still required.

## Control

### *Disease reporting*

Veterinarians who encounter or suspect dourine should follow their national and/or local guidelines for disease reporting. In the U.S., state or federal veterinary authorities should be informed immediately.

### *Prevention*

To prevent dourine from being introduced into a herd or dourine-free region, new animals should be quarantined and tested by serology. When this disease 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 typically euthanized. While *T. equiperdum* does not survival for long in the environment, good hygiene and sanitation are nevertheless advisable at assisted matings to avoid any potential for fomite-mediated transmission. No vaccine is available.

Stallions have sometimes been castrated in an attempt to prevent disease transmission; however, geldings can still transmit the disease if they display copulatory behavior.

## Morbidity and Mortality

The severity and duration of dourine may vary with the virulence of the strain and the health of the horse (e.g., nutritional status, concurrent illnesses) and existence of stressors that may precipitate a relapse. While some animals progress to the end stage of the disease within 1-2 months, experimentally infected horses have survived up to 10 years. More severe disease is usually seen in improved breeds of horses, while donkeys, mules and native ponies tend to be more resistant. Subclinical infections have also been described.

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 clinical signs. Some authors feel that nearly all cases are eventually fatal.

## Internet Resources

The Merck Veterinary Manual
http://www.merckvetmanual.com/mvm/index.html

United States Animal Health Association. Foreign Animal Diseases
http://www.aphis.usda.gov/emergency_response/downloads/nahems/fad.pdf

World Organization for Animal Health (OIE)
http://www.oie.int

OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals
http://www.oie.int/international-standard-setting/terrestrial-manual/access-online/

OIE Terrestrial Animal Health Code
http://www.oie.int/international-standard-setting/terrestrial-code/access-online/

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