

Contagious Equine Metritis

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Importance

Contagious equine metritis (CEM) is a highly communicable venereal disease of horses. This disease can spread rapidly from a single asymptomatic carrier, particularly a stallion. It was first documented in the 1970s, when epidemics among thoroughbred horses spread rapidly in Europe, North and South America, Australia and other countries. Although the causative organism has been eradicated from some countries including the U.S., it is still present in others and continues to affect international trade. Infected horses do not become ill or die, but reproductive success is severely reduced. Mares develop acute metritis and fail to conceive, resulting in substantial economic losses. Additional economic costs include the cost of pre-breeding tests in endemic areas, as well as surveillance screening before importation into CEM-free countries. Immunity is weak, and animals may become infected repeatedly. Imported animals or semen can cause outbreaks in CEM-free regions; in the U.S., an outbreak occurred in 2008, after an absence of more than 25 years.

Etiology

Contagious equine metritis is caused by *Taylorella equigenitalis*, a fastidious microaerophilic gram-negative coccobacillus. Only one serotype is known, but genetic differences between isolates have been described. Two types of strains exist, one sensitive and the other resistant to streptomycin. A small-colony variant, which appears to be less virulent, may be particularly difficult to identify: its only distinguishing characteristic in culture is that the colonies are small and transparent.

A closely related organism called *Taylorella asinigenitalis* has been isolated from donkeys in the U.S. and a stallion in Europe. Although *T. asinigenitalis* does not appear to cause significant disease, its pathogenicity has not been fully determined. Given the severe impact of contagious equine metritis on international trade, infections with *T. asinigenitalis* must be distinguished from *T. equigenitalis*.

Species Affected

Horses appear to be the only natural hosts for *T. equigenitalis*. Thoroughbreds seem to be particularly susceptible. Donkeys have been infected under experimental conditions. Attempts to infect cattle, pigs, sheep and cats have been unsuccessful, but some laboratory rodents can be infected by intrauterine inoculation.

Geographic Distribution

Taylorella equigenitalis has been reported mainly in Europe; however, this organism is difficult to grow in culture, and its geographic distribution is difficult to estimate accurately. Many countries have introduced strict import regulations to prevent its introduction. Contagious equine metritis has been eradicated from the U.S., Canada and Australia, as well as some European countries and other nations.

Transmission

T. equigenitalis is transmitted mainly during mating. It can also be spread by infected semen during artificial insemination or introduced to the genital tract on fomites. The transmission rate is extremely high. Stallions are the most common source of the infection. In untreated stallions, *T. equigenitalis* can persist for months or years on the reproductive tract, particularly in the urethral fossa and its associated sinus. This organism also occurs in the distal urethra as well as on the exterior of the penis and prepuce, and occasionally in the pre-ejaculatory fluid. Mares can carry *T. equigenitalis* asymptomatically after they recover from acute disease. The vast majority of carrier mares maintain this organism on the clitoris, particularly in the clitoral sinuses and fossa, but a few carry it in the uterus. Foals (especially colts) born to infected mares can carry bacteria on the external genitalia and may become long-term asymptomatic carriers. There is no evidence that *T. equigenitalis* survives long-term in a free-living form in the environment.

Incubation Period

The incubation period is 2 to 14 days; most infections become apparent 10 to 14 days after breeding.

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Clinical Signs

Infected stallions display no clinical signs. Mares develop metritis and temporary infertility, although they have no systemic signs. Some infections are subclinical; the only sign may be a return to estrus after a shortened estrus cycle. Other mares also develop a mucopurulent vaginal discharge a week or two after breeding; in severe cases, the discharge is copious. The discharge is usually grayish-white in uncomplicated cases; mixed bacterial infections may result in a gray to yellow exudate. Variable degrees of endometritis, cervicitis and vaginitis can sometimes be found if the reproductive tract is examined, using a speculum. The discharge often disappears after a few days to two weeks. Most infected mares do not conceive. Those that do may give birth to a normal full-term foal that can carry the organism asymptotically. Abortions also occur, but appear to be uncommon. The infertility usually lasts a few weeks, and long-term effects on reproduction have not been reported; however, mares can remain asymptomatic carriers for months. Subsequent infections are usually less severe than the initial exposure.

T. asinigenitalis has not been reported to cause disease in donkeys or stallions, but some experimentally infected mares developed cervicitis and metritis with vaginal and cervical discharges. These mares had a shortened estrus cycle and failed to conceive. The clinical signs were milder than in mares infected with *T. equigenitalis*.

Post Mortem Lesions [Click to view images](#)

The most severe lesions are usually found in the uterus. The endometrial folds may be swollen and edematous, and a mucopurulent exudate may be apparent. Edema, hyperemia and a mucopurulent exudate may be seen on the cervix. Salpingitis and vaginitis also occur. The lesions are most apparent approximately 14 days after infection, then gradually decrease in severity over the next few weeks. They are not pathognomonic for contagious equine metritis.

Morbidity and Mortality

Fatal infections have not been seen. Morbidity is high; nearly every mare mated to an infected stallion will become infected. Most mares recover without incident, but some become asymptomatic carriers. Immunity after an infection is not complete, and mares can be infected repeatedly during a short period of time. The first infection is usually the most severe; infertility and clinical signs are less likely to occur during later bouts of the disease, and some mares conceive.

Diagnosis

Clinical

Contagious equine metritis should be a consideration in mares that develop an abundant mucopurulent vaginal

discharge two to 14 days after breeding. The disease may also be suspected in mares that return prematurely to estrus, particularly when several mares have the same symptoms after being mated to the same stallion.

Differential diagnosis

Pseudomonas aeruginosa, *Streptococcus zooepidemicus* and some capsule types of *Klebsiella pneumoniae* can also cause outbreaks of endometritis. In general, most bacterial infections are not as contagious as contagious equine metritis and produce a scantier discharge. *T. asinigenitalis* infection is theoretically a possibility, but this organism has not been reported from naturally infected mares, and clinical signs have been reported only in experimentally infected mares.

Laboratory tests

Contagious equine metritis may be suspected when microscopic examination of the uterine discharge reveals numerous gram-negative coccobacilli or bacilli (present individually or arranged end-to-end) and large numbers of inflammatory cells. *T. equigenitalis* is sometimes pleomorphic and may exhibit bipolar staining.

Definitive diagnosis is by isolation of the causative organism from swabs of the genital tract, or by polymerase chain reaction (PCR) assays. Culture should be performed by a laboratory experienced in isolating *T. equigenitalis*; this organism is fastidious and difficult to grow. It can be isolated on chocolate (heated blood) agar. Antibiotics, fungicides and other additives (e.g., Timoney's medium) are often incorporated to suppress the growth of commensal organisms, which may otherwise prevent the recovery of *T. equigenitalis*. Some media take advantage of the resistance of some strains to streptomycin; however, streptomycin-sensitive biotypes are now common, and isolation should not rely solely on such media. *T. equigenitalis* is cultured at 35–37°C in 5–10% (v/v) CO₂ in air or by use of a candle jar. Colonies usually become visible after 72 hours, but in some cases, they may take up to a week to appear. The initial colonies are typically small (up to 2–3 mm in diameter), smooth with an entire edge, and watery to opaque and yellowish gray. Antibiotic treatment can prevent recovery of the organism. *T. equigenitalis* is strongly oxidase positive, and produces both catalase and phosphatase, but it does not react in other biochemical tests. Definitive identification can be done with specific antibodies. A variety of methods including slide agglutination, latex agglutination, and direct or indirect immunofluorescence may be used. Cross-reactions with *T. asinigenitalis* can occur in some tests, and rare cross-reactions with *Mannheimia haemolytica* have been reported. The use of monoclonal antibodies can prevent this problem.

Because carrier stallions can have few organisms, cultures from these animals may be unsuccessful. For this reason, stallions may be bred to test mares and the

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Recommended actions if contagious equine metritis is suspected

Notification of authorities

Contagious equine metritis 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/animal_health/area_offices/

State Veterinarians:

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

Control

In countries free from contagious equine metritis, horses are screened for *T. equigenitalis* during importation. Where this disease is present, it is controlled by breeding only from stallions and mares that have been tested for the organism and are known not to be carriers. High risk stallions include those animals being bred for the first time. Stallions that have been carriers (until they are proven negative), or were exposed to infected premises or mated to a mare not known to be negative are also considered high risk. Mares that have visited an infected facility, come from an area that is not CEM-free, or have been mated with a stallion from a country that is not CEM-free are also likely to be infected. Mares with clinical signs, including those that return to estrus prematurely, should be investigated. Good hygiene, decontamination of potential fomites, and sanitation during breeding are also important. *T. equigenitalis* is susceptible to most common disinfectants, including chlorhexidine, ionic and nonionic detergents, and sodium hypochlorite (400 parts per million). There is no vaccine.

In carriers, *T. equigenitalis* may be cleared by washing the external genitalia with disinfectants (e.g. chlorhexidine), combined with local antibiotic treatment such as nitrofurazone ointment. Particular care should be taken in the washing of the clitoral fossa and sinuses. Systemic antibiotics are also recommended in some animals. *T. equigenitalis* may be more readily eliminated from stallions, but treatment can take up to several weeks in mares. Surgical excision of the clitoral sinuses can eliminate the organism in mares that do not respond to treatment. Acutely infected mares may or may not be treated with antibiotics; some authors suggest that treatment increases the risk that this organism will persist.

T. equigenitalis has been eradicated from some countries by surveillance/ testing, quarantine of infected animals, treatment and a moratorium on breeding from infected animals. Samples are generally taken from all stallions at the beginning of the breeding season, and from mares according to the risk that they carry this organism. The fastidious nature of the organism complicates its detection. PCR has been useful in eradication programs in Japan.

test mares cultured for *T. equigenitalis*. PCR assays can also be used to identify acutely infected mares or carrier mares and stallions. PCR can distinguish *T. equigenitalis* from *T. asinigenitalis*.

Serology is unreliable as a diagnostic tool, but it may be helpful as an adjunct screening test. Serologic tests include complement fixation, rapid plate agglutination, enzyme-linked immunosorbent assay (ELISA), passive hemagglutination and agar-gel immunodiffusion. Antibodies can be found in acutely infected mares beginning seven days after infection; however, in some animals, they may be undetectable for up to 2 to 3 weeks. Antibodies persist for up to 6 to 10 weeks after the primary infection, then disappear. Complement fixation can detect infected mares 21-45 days after they have been bred to a suspected carrier stallion, but this test becomes unreliable thereafter. Carrier mares may or may not be seropositive. Serologic tests are not useful in stallions, since stallions do not produce detectable antibodies to *T. equigenitalis*.

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.

In infected mares, *T. equigenitalis* can be isolated from vaginal discharges. Bacteria can also be found in the placenta of some mares that conceived, and on the genital tract of some normal foals born to these mares. This organism has been detected at multiple sites in aborted fetuses. In mares suspected to be carriers, swabs should be taken from the clitoral fossa and its sinuses, and the cervix and endometrium. Only the clitoral sinuses and fossa are swabbed in pregnant mares. If possible, carrier mares should be cultured during estrus, particularly during the first part of the cycle. In stallions, swabs should be taken from the urethral fossa and sinus, distal urethra, and external surface of the penis and the prepuce. The pre-ejaculatory fluid may also be sampled. For optimal success in carrier mares and stallions, swabs should be collected on more than one occasion, at intervals of 7 days or more. No antibiotics should be used for at least seven days before a sample is taken. Swabs should be placed in a transport medium with activated charcoal (for example, Amies medium) to absorb bacterial products that may inhibit the growth of *T. equigenitalis*. Samples must be kept cool and transported to the laboratory within 24-48 hours.

Serum samples can be collected from acutely infected mares. Serology is not generally helpful in carrier mares, and it is useless in stallions.

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Public Health

There is no evidence that *T. equigenitalis* infects humans.

Internet Resources

- Canadian Food Inspection Agency.
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<http://www.inspection.gc.ca/english/anima/disemala/equinmet/equinmete.shtml>
- Manual for the Recognition of Exotic Diseases of Livestock
<http://www.spc.int/rahs/>
- 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
- United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS).
<http://www.aphis.usda.gov/>
- USDA APHIS. Horse Disease Information
http://www.aphis.usda.gov/animal_health/animal_dis_spec/horses/
- 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/A_summry.htm

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