

CONTAGIOUS EQUINE METRITIS

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Definition [top](#)

Contagious equine metritis (CEM) is a highly contagious venereal disease of horses that causes an acute purulent metritis and a copious mucopurulent vaginal discharge 10 to 14 days postbreeding to an infected stallion. The first exposure to the disease usually results in temporary infertility in the mare. Mares may become chronically infected and remain carriers of the causal organism for several months or longer. Stallions carry the contagious equine metritis organism (CEMO) on their external genitalia, and the primary site of localization is the urethral fossa. The stallions may carry the CEMO on their external genitalia for years. Newborn foals may become infected at birth and remain infected until they are mature.

Etiology [top](#)

The CEMO is a microaerophilic gram-negative coccobacillus (17). There are two important strains of the CEMO, one being streptomycin sensitive and the other streptomycin resistant (14). A suggested name, *Taylorella equigenitalis*, has recently been accepted by the International Committee on Systemic Bacteriology.

The organism is susceptible to most commonly used disinfectants such as sodium hypochlorite (30 ml of household bleach in 1 gal of water), chlorhexidine, and ionic and nonionic detergents.

Host Range [top](#)

Only the equine species appear to be natural hosts for the disease. Thoroughbred horses appear to be more severely affected by the disease than other breeds (14).

Geographic Distribution [top](#)

Although the disease was first described as an entity in England in 1978 (4), the causal organism was likely present in horse populations in different countries for several years before that time.

The CEMO has since been detected in several countries, including Australia, Czechoslovakia, Ireland, France, Germany, Japan, Belgium, Denmark, Italy, Netherlands, Norway, Sweden, Switzerland, and Luxembourg. The disease has been eradicated from the United States.

Transmission [top](#)

The disease is naturally transmitted by coitus. Also, the CEMO can be transmitted indirectly to mares and stallions with contaminated instruments and equipment (3). Undetected carrier mares and stallions are the source of infection for acute outbreaks of the disease. During the breeding season, an infected stallion may infect several mares before the disease is suspected and diagnosed. Also, the CEMO may be transmitted through the use of artificial insemination.

Incubation Period [top](#)

In field cases, the disease does not become evident until 10 to 14 days postbreeding when the mare short-cycles and shows signs of estrus. The inflammatory reaction starts 24 hours after exposure to CEMO and reaches

maximum intensity 10 days to 2 weeks postbreeding.

Clinical Signs [top](#)

In the mare, a copious mucopurulent vaginal discharge occurs 10 to 14 days postbreeding to an infected stallion (Fig. 44). The first indication of infection is short-cycling of infected mares and a return to estrus. At this time, a mucopurulent vaginal discharge or a dried vaginal discharge can be found on the tail and inside the thighs (Fig. 45). The discharge subsides after a few days, but the mare may remain chronically infected for several months. In experimental infections in ponies (9,18,19) and horses (1), there was evidence of a mucopurulent vaginal discharge 24 to 48 hours postinfection, which lasted for 2 to 3 weeks. Most mares will not conceive when infected at the time of breeding. If infected mares do conceive, they may abort the fetus or carry an infected foal to term. The newborn foal may then become a carrier of the causal organism.

Gross Lesions [top](#)

The lesions of contagious equine metritis are not pathognomonic for the disease. The most severe lesions are present in the uterus, but salpingitis, cervicitis, and vaginitis also occur (1,9). The most severe lesions occur at about day 14 postinfection. The changes gradually decrease in severity over the next several weeks as the disease becomes chronic. On the uterine mucosal surface, the endometrial folds may be edematous and swollen with a mucopurulent exudate evident between the folds at the height of the infection (Fig. 46). The cervix is edematous and hyperemic, and the surface is covered with a mucopurulent exudate (Fig. 47) (1).

Morbidity and Mortality [top](#)

Morbidity is high in animals exposed venereally to the organism. Death to CEM has not been observed.

Diagnosis [top](#)

Field Diagnosis [top](#)

Mares that have a copious mucopurulent vaginal discharge 10 to 14 days postbreeding are suspect cases of CEM. Chronically infected mares and stallions do not have any clinical evidence of the disease.

Specimens for the Laboratory [top](#)

In both the acute and chronic stages of the disease, isolation of the bacterium is necessary for a diagnosis of CEM (14). Mares suspected of being carriers of the CEMO should be cultured during estrus, preferably during the first part of the heat cycle. Culture sites in the mare are the uterus, clitoral fossa, and clitoral sinuses (11). In the stallion, the culture sites are the urethra, urethral fossa and diverticulum, and the sheath (14). Culture swabs should be placed immediately in Amies transport media and maintained at 4° C or lower to prevent the organism from dying and to prevent overgrowth by contaminating bacteria. If the culture swabs are not cultured within a few hours, the specimens in the transport media should be frozen. The organism appears to remain viable when frozen, for it has remained viable in Amies transport media for 18 Years at -20° C (16).

Laboratory Diagnosis [top](#)

Smears of the uterine exudate during the acute stages of the disease are helpful in making a presumptive diagnosis of CEM (12). Examination of Gram- and Giemsa-stained smears of the uterine exudate may reveal large numbers of inflammatory cells, mainly neutrophils. Numerous gram-negative coccobacillary bacteria can be demonstrated in the mucus and in the cytoplasm of the neutrophils. The organisms are usually seen individually or in pairs arranged end to end.

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Various serologic tests may be used to detect antibodies to the CEMO (2,3,5,10). Evaluation of the rapid plate agglutination (RPA), antiglobulin, enzyme-linked immunosorbent assay (ELISA), passive hemagglutination (PHA), complement fixation (CF), and agar-gel diffuse tests in ponies and Thoroughbreds provided varied results (10). Antibodies to CEMO were detected in the sera of Thoroughbred mares by the ELISA, RPA, CF, and PHA tests. The CF test was unreliable during the chronic stages of the disease owing to anticomplementary activity and low or undetectable CF titers. Most acute and chronic CEM infections are detected with the RPA, ELISA, and PHA tests. The rapid plate agglutination test (RPT) is very simple and rapid. The RPT detected 100 percent of the culture positive mares in the 1978 outbreak of the disease in Kentucky (14). The test also detected mares in the chronic stages of the disease — in many cases over a year after exposure to the CEMO. The CF test is only reliable between 15 and 45 days postinfection. A seropositive mare may or may not be infected with the CEMO (14). Stallions do not develop detectable antibodies to the CEMO.

Differential Diagnosis [top](#)

Contagious equine metritis is the most contagious bacterial venereal infection of horses and should be suspected when several mares develop characteristic clinical signs after being covered by the same stallion. Typically, an uncomplicated CEM-infected mare produces a mucoid, gray purulent exudate from the uterus. However, mixed bacterial infections may occur, and the discharge may vary from gray to yellow. Other bacterial venereal diseases in the mare may produce a similar purulent, gray to yellow vaginal discharge, but they tend to be less contagious. As with other bacterial infections, CEM infections may be very mild to inapparent, or they may be severe. Although a tentative diagnosis of CEM may be suspected, laboratory tests are necessary to confirm a case or outbreak of CEM.

Treatment [top](#)

The uterine infection can be treated with antibiotics, but it is questionable whether treatment effectively eliminates or facilitates elimination of the CEMO. The mare cannot be successfully treated until the CEMO clears from the uterus, which may take several months. The external genitalia of the mare and stallion can be treated with disinfectants and antibiotics. A standard treatment currently used is thorough washing of the external genitalia with soap and water and then with chlorhexidine surgical scrub once a day for 5 days. After cleaning with chlorhexidine, the external genitalia are rinsed with warm water to remove the chlorhexidine because it may irritate the sensitive mucous membranes. Then, the external genitalia are coated with nitrofurazone-containing ointment. A disadvantage of this treatment is the destruction of the normal flora and the potential overgrowth by opportunistic pathogens such as pseudomonas and klebsiella (13). The clitoral sinuses are common sites of persistence in carrier mares, and these sinuses are difficult to expose for cleaning and treatment. Surgical excision of the clitoral sinuses will aid in the treatment of the disease, and will usually rid the mare of infection (15).

Vaccination [top](#)

Natural infection does confer some immunity in the mare, for the first exposure to the CEMO causes a very severe metritis, which usually results in temporary infertility. Subsequent exposure to the CEMO is less severe, and the infection may not prevent conception. However, the carrier state may result. Because of the nature of the disease and the carrier state, artificial immunization is a not practical or recommended procedure for preventing transmission of infection.

Control and Eradication [top](#)

Preventative Measures [top](#)

Inapparent infections in carrier mares (19) and carrier stallions make the disease difficult to control. To prevent the spread of the disease, it is necessary to detect and treat the infection in mares and the stallion. Suspect carrier mares should be tested bacteriologically to ensure they are not carrying the CEMO when bred to stallions because one stallion may infect several mares. Stallions suspected of being carriers should be cultured and bred to susceptible test mares free of the disease and the test mares cultured for CEMO.

The small-colony types are less virulent and may be responsible for the gradual decrease in the number of naturally infected horses showing typical clinical signs of CEM in the field (7). These variants present unique problems, both clinically and in laboratory testing, for the small variants have no distinguishing cultural characteristics except that colonies are transparent and small. In addition, the slow growth of these variants, possible contaminating bacteria, and occurrence of streptomycin-sensitive strains of the organism make bacteriologic testing for the disease rather difficult.

Because of the difficulty of bacterial isolation of the streptomycin-sensitive strains, serologic testing is a valuable aid in detecting mares that have previously been exposed to the CEMO. Currently, the CF test is the only serologic test used to detect the disease in the field, but it will only detect the infection during the acute phase when the organism is easy to culture. Other serologic tests are available, and they will detect mares that have previously been exposed to the CEMO. If other serologic tests were utilized, the disease could easily be detected in carrier mares and steps taken for quarantine and treatment. Such testing would also aid in the prevention of reintroducing the disease into the United States from CEM-infected countries. Serologic testing is of no value in stallions because the latter do not produce detectable antibodies to the CEMO.

Public Health [top](#)

There is no evidence that man is affected by the CEMO.

Contagious Equine Metritis Regulations [top](#)

All horses must have been in the country of export for 60 days immediately preceding exportation. If not, the horse is to be accompanied by a health certificate issued by a full-time salaried veterinary officer of the national

government of each country in which the horse has been during the 60 days immediately preceding shipment to the United States.

Preembarkation Requirements in Country of Origin [top](#)

Stallions

Collect one set of specimens from the surface of the prepuce, urethral sinus, fossa glandis (including the diverticulum of the fossa glandis) within 30 days of export but not less than 21 days following treatment if treated.

Mares

The importer has the options to have the clitoral sinusectomy performed on the mare in the country of origin prior to export or performed in the United States after arrival.

Mares (Option for Clitoral Sinusectomy in the United States)

Collect one set of specimens from the clitoral sinuses within 30 days prior to export, but not less than 21 days following treatment if treated.

Mares (Option for Clitoral Sinusectomy in the Country of Origin)

Surgically remove clitoral sinuses no less than 30 days prior to export. Two hours prior to surgery collect a specimen from the clitoral sinuses and submit with removed clitoral sinuses to approved laboratory.

After surgery, collect a specimen from the clitoral fossa within 30 days prior to export but not less than 21 days following treatment if treated.

U.S. Entry Requirements [top](#)

Horses imported into the United States are required to be detained at the port of entry while tests for dourine, glanders, equine piroplasmiasis, and equine infectious anemia (EIA) are conducted. Horses that are positive to tests for any of these diseases will be refused entry.

Upon completion of USDA import quarantine and testing requirements, the mare

or stallion must be consigned to a State approved to receive mares and stallions from CEM-affected countries to undergo the prescribed CEM treatment and testing requirements.

Mares

Mares with an Incomplete Sinusectomy or Option for Surgery in the United States

Surgery must be performed at The College of Veterinary Medicine, University of California, Davis, California, or The School of Veterinary Medicine, Cornell University, Ithaca, New York.

Two hours prior to surgery, collect a specimen from the clitoral sinuses and submit with removed clitoral sinuses (or portion) to the National Veterinary Services Laboratories, (NVSL), Ames, IA or to a laboratory approved by APHIS.

Within 2 hours prior to treatment, collect a specimen from the clitoral fossa and clitoral sinuses if present and submit with the clitoral sinuses (or portion) to NVSL or a laboratory approved by APHIS. For 5 consecutive days, clean, wash (2 percent chlorhexidine) and coat the external genitalia and vaginal vestibule with not less than 0.20 percent nitrofurazone ointment. Wait 7 days after cleaning and washing. Collect three separate sets of specimens not less than 7 days apart from the clitoral fossa. Collect one additional specimen from the endometrium of the uterus during estrus.

Pregnant mares are treated the same as above. except 7 days after foaling collect three specimens from the endometrium of the uterus and one specimen from the foal. Collect specimens from the vaginal vestibule of the female foal and the prepuce of the male foal.

Stallions

One specimen each shall be taken from the prepuce, the fossa glandis, and urethral sinus of the stallion and be cultured for CEM. After the specimens have been cultured for CEM, for at least 5 consecutive days the prepuce, penis (including the fossa glandis) and urethral sinus of the stallion shall be thoroughly cleaned and washed while in full erection with a solution of not less than 0.2% nitrofurazone by an accredited veterinarian under the monitoring of a State or Federal veterinarian.

The stallions must be tested for CEM by being bred to two mares. The test breeding shall be performed in not less than 7 days after treatment is completed.

Mares selected for test breeding must be permanently identified before the mares are used for testing with the letter T (hot iron, freezemarking, or lip tattoo).

Before breeding, the mares must be qualified as free from CEM by negative culture of two sets of specimens (bacteriological swabs) collected at intervals of not less than 7 days and a negative complement fixation (CF) test.

The two mares are to be bred by the stallion. The mares are then cultured for CEM by collecting three sets of specimens from each of the mucosal surfaces of the cervix, the clitoral fossa, and the clitoral sinuses on the second, fourth, and seventh days after being bred.

Another set of specimens, the fourth set, must be collected from the endometrium of the uterus, the clitoral sinuses, and clitoral fossa during the next estrus. If natural estrus does not occur within 28 days of the date of the breeding, hormonal precipitation of estrus shall be carried out. The test mares are required to have two negative CF tests after they are bred. Serum samples are to be collected between the 15th and 40th days after breeding. The intervals between collection of serum samples should not be less than 7 days.

NOTE: The clitoral sinusectomy is not required for thoroughbred mares from England, France, Ireland, and Germany.

Thoroughbred mares and stallions from England, France, and Ireland shall be treated as follows:

Mares

Collect one set of specimens during estrus from the endometrium and the mucosal surfaces of urethra, clitoral fossa, and cervix. Collect two sets of specimens from the mucosal surfaces of the urethra, clitoral fossa, and cervix. The samples should be collected at intervals of not less than 7 days apart, and the last of the sets shall be collected within 30 days of export.

Stallions

Collect three sets of specimens from the prepuce, urethral sinus, and fossa glandis (including the diverticulum of the fossa glandis) at intervals of not less than 7 days and with the last of the sets collected within 30 days of export.

Upon completion of the USDA import quarantine in the United States, the horses are free to compete without any further restrictions.

GUIDE TO THE LITERATURE [top](#)

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