

Canine Brucellosis and Herpesvirus

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Canine Brucellosis (*Brucella canis*)

Introduction

Canine brucellosis is a contagious bacterial infection caused by *Brucella canis*, it is a leading cause of infertility in breeding kennels. Canine brucellosis has a worldwide distribution; it affects all breeds of dogs and can be transmitted from dogs to humans. Clinical signs in humans vary from non-specific "flu-like" symptoms to infertility, cardiac and neurological signs. In dogs it has a predilection for the reproductive tract (steroid-dependent tissues), but can also be found in the eyes, spinal column, liver, spleen and lymph nodes. The main route of infection is by direct contact with body fluids that contain the bacteria, such as semen, vaginal secretions and urine. Aborted materials are a major source of infection. Bacteria gain entry to the body through the genitals, nose, eyes and mouth, and are taken to the affected organs via the blood and lymph nodes.

Clinical symptoms

In the female, infertility is the most common clinical sign seen, with 75% of cases resulting in late-term abortion (45-55 days of gestation). Aborted puppies will typically display generalized signs of bacterial infection. Following abortion or parturition the female will excrete a brownish or green-grey discharge, which will remain highly infective for several weeks.

In the male, severe inflammation and/or infection of the epididymis (portion of the testicle where sperm mature and are stored) will result in enlarged painful testicles in the early phase of infection and firm, shrunken testicles in the later stages. Affected male dogs will become sterile due to testicular damage causing anti-sperm antibody formation. Prostatitis (inflammation of the prostate gland) may also develop, with associated clinical signs such as difficulties urinating and defecating.

Generalized non-reproductive clinical signs in both sexes may include lethargy, weight loss and exercise intolerance. More specific clinical signs will depend upon the organ infected but may include inflammation of the spine, eye, heart and skin.

Diagnosis

There are many tests available for the detection of *Brucella canis* infection in dogs, but no single test is 100% accurate. Slide agglutination tests that detect antibodies to *Brucella spp.* are often used as a screening tool. These tests are rapid and inexpensive but cross-reactivity with other bacterial species is common so false positive results do occur. Therefore if a positive test result is obtained it is important to confirm this with an alternative test that is more

specific for *Brucella* spp. antigens. A definitive diagnosis can be made by positive culture of the bacteria in blood or tissue, however infection may not always be detected at early stages of the disease and antibiotic treatment will affect the result. PCR testing can confirm the presence of active infection by detecting DNA of the *Brucella* spp. but laboratory tests are not yet universal. Diagnostic imaging such as ultrasound and radiography may reveal abnormalities of the prostate and testicles in male dogs and inflammation of the spine in cases of discospondylitis.

Treatment

Sadly there is no known cure for canine brucellosis. Due to the fact that the bacteria live within cells, it is very difficult for antibiotics to effectively penetrate and eradicate the disease. Long courses of antibiotic combinations have been attempted but the infection often reappears. Whilst neutering, antibiotic treatment and isolation of infected dogs can be performed, due to the potential of disease spread to humans, euthanasia is recommended.

Infection control in kennels

When abortions, infertility or testicular abnormalities are detected in dogs during routine inspection, immediate blood testing for brucellosis should be performed on all affected animals.

The kennel should be quarantined during the eradication process (no additions to the kennel, no selling or re-locating and no breeding). Serological testing and blood cultures should be performed on all animals to help identify the sources of infection and any animal testing positive must be removed. Monthly testing should then be carried out and any new positive animals removed. Testing should continue until there are no new positive results for at least 3 months.

After this period, testing should be carried out every 3 months for a year and a preventative plan put in place. Good hygiene practices are vital for the eradication of the disease; all organic material should be removed from infected kennels prior to thorough disinfection.

It is essential that dogs tested positive are not kept as breeders, even if they are of high genetic value as eradication in a kennel will only be successful if all infected animals are removed.

Prevention

Serological testing should be performed on all females and males prior to breeding. Periodic testing should then be conducted on all breeding dogs twice yearly. Any new animal entering the kennel should be quarantined for 8-12 weeks and tested for *Brucella canis* at the beginning and end of the quarantine period. *Brucella canis* is not just transmitted by sexual activity; so all maiden and virgin dogs should also be tested. Vaccination is not recommended as it only provides partial protection against the disease and will confound diagnosis on serology.

Canine brucellosis is a reportable disease in many states (not California). In the event of a positive result your veterinarian can seek advice from the state veterinarian regarding a plan of action.

Public health significance

Whilst there are only a few reported human cases of *Brucella canis*, the infection can be transmitted from dogs to humans. Most reports have been from people that have direct contact with aborted material, such as laboratory technicians and breeders. Immunocompromised individuals are of particular concern, especially pregnant women and young children. Clinical signs in people range from uncomfortable, flu-like symptoms to septicemia, infertility, cardiac and neurological disease. Humans will respond to antibiotic therapy but prolonged courses are required.

Canine Herpesvirus Infection-1 (CHV-1)

Introduction

CHV-1 is widespread in domestic dog populations with a reported incidence as high as 60-80% in certain areas. In the vast majority of these cases CHV-1 is primarily maintained in the form of a mild respiratory disease with little clinical significance. However in naïve pregnant females it is the most common cause of viral abortion and neonatal death ("fading puppy syndrome"). CHV-1 is spread by direct oral or nasal contact with infected secretions, passage across the placenta in utero or via sexual transmission. Animals that recover from the disease become chronic carriers with a lifelong latent (inapparent) infection. Periodic reactivation of shedding tends to occur at times of stress or immunosuppression, such as overcrowding or pregnancy.

Clinical signs

Clinical signs will depend upon the age and the immune status of the infected animal, with neonatal and immunosuppressed animals being more likely to have severe clinical signs.

Exposure of a naïve pregnant bitch to CHV-1 may result in fertility, resorption, abortion, stillbirths or delivery of compromised puppies.

Puppies infected in utero or at the time of parturition have a high rate of "fading puppy syndrome". Newborn puppies born to naïve bitches are particularly susceptible to this fatal systemic disease. This is due to the lack of maternally derived immunity, their incompletely developed immune system and inadequate temperature regulation. Clinical signs associated with "fading puppy syndrome" include, loss of appetite, failure to thrive, vocalization, increased respiratory rate, abdominal pain, diarrhea, bleeding from the nose, neurological signs and sudden death. Death of infected puppies usually occurs 3-7 days after the onset of clinical signs and the whole litter may be affected.

Exposure of CHV-1 to older puppies (>3-5 weeks of age) tends to result in either a less severe form of the disease or inapparent infection (latency), however they may develop severe signs including deafness and blindness at a later stage.

Infection in adults tends to be inapparent or mild and generally restricted to the upper respiratory tract. Signs associated with sexually transmitted infection of CHV-1 in adults are usually self-limiting lesions of the genital tract. Whilst the clinical signs may be mild, infected adult animals are an important source of shedding and therefore transmission of the infection to other dogs.

Diagnosis

Diagnosis of CHV-1 is challenging, especially in newborn puppies, as clinical signs often resemble that of bacterial sepsis. CHV-1 should be suspected in puppies that do not respond to broad-spectrum antibiotics. If a puppy dies, necropsy should be performed to help reach a diagnosis so that treatment can be appropriately directed in the rest of the litter. Serology screening and PCR testing may be used for detection of the virus in adults.

Treatment

Since CHV-1 does not replicate in temperatures above 37°C the mainstay of treatment is keeping the puppies body temperatures above this. If clinical signs have not already started, warming is a very effective treatment. Whelping boxes should be maintained between 37.7-40 °C, adjustable ceramic heating bulbs are very useful for warming. Once clinical signs have developed treatment is often unrewarding and residual heart and neurological damage may occur. Antiviral drugs such as Acyclovir have been proven in humans but there is no conclusive evidence of their effectiveness in dogs, so they should be used with caution.

Prevention

All female dogs should be screened for CHV-1 prior to breeding to document adequate maternal antibodies. In the case of naïve bitches, natural immunizing prior to breeding by exposure to older dogs is advised. If this is not possible, planned C-sections can be performed to avoid CHV-1 exposure to puppies in the birth canal.

Strict isolation of naïve bitches and newborn puppies in the "high-risk" period (3 weeks prior to whelping and 3 weeks post whelping) to prevent exposure and infection is crucial. Keeping puppies warm in the first two weeks of life when they are unable to thermo regulate is vital to prevent replication of CHV-1. CHV-1 is rapidly inactivated by common disinfectants so good hygiene measures and infection management should be maintained to prevent reproductive disease.

An inactivated vaccine is available in Europe, with two injections being given, the first when the bitch is in heat and the second injection one-two weeks before whelping. There are no studies on the vaccines efficacy, and it is not currently available in the USA.