

Canine Pregnancy Failure

Lab Locations:

Atlanta, GA

Chicago, IL

Dallas/Fort Worth, TX

Honolulu, HI

Houston, TX

Los Angeles, CA

Memphis, TN

New York, NY

Phoenix, AZ

Portland, OR

San Francisco, CA

Tampa, FL

Determining the cause of pregnancy loss in the dog can be frustrating. Despite a thorough investigation, identifying a specific cause of abortion is not always possible. It is very important to obtain proper tissue and blood samples for submission to Antech laboratories when attempting to find the reason for abortion, premature delivery, still-birth or the birth of weak neonates.

The maintenance of pregnancy depends on many biological interactions between the pregnant female and the embryo or fetus. Before implantation, the fluid environment within the uterine tubes and the uterus supports early embryonic development. If this environment is inhospitable, embryos may not survive. Embryonic deaths that occur before or during implantation are not recognized because the embryos are lost before pregnancy can be diagnosed. Specific causes of early embryonic death are difficult to identify.

Aged gametes, chromosomal and developmental defects have been associated with an increased incidence of early miscarriage in women. In bitches, these could result in early embryonic death and infertility. After implantation, the conceptus depends almost entirely on the dam. The conceptus will not survive if the dam is unable to adjust to the physical requirements and demands of pregnancy. Hypothyroidism, hypoluteoidism, nutritional deficiencies, uterine abnormalities, and exposure to some medications or infectious agents during pregnancy may contribute to impaired placental function, resulting in abortion. A list of chemical agents that may be harmful during pregnancy has been published in Kirk's *Current Veterinary Therapy X*, W B Saunders, pp 1291-1299, 1989.

Abortion is defined as the expulsion, before full term, of a conceptus incapable of independent life. Clinical signs of abortion in the bitch include vaginal discharge and abdominal contractions with expulsion of live or dead fetuses. Vaginal discharge associated with abortion should be differentiated from that occurring with conditions such as vaginal masses or foreign bodies, endometritis, and open-cervix

pyometra. Signs of septicemia may also be present in some cases of abortion.

A thorough reproductive background including the breeding dates for the current and previous pregnancies; litter data for the sire or sires used; previous whelping dates, and the results of previous pregnancies (e.g. the number of puppies and whether live or stillborn, assisted or unassisted delivery, abortion), as well as the vaccination history; results of previous *Brucella canis* serologic testing; and information about the animal's housing and diet are important for determining potential causes of pregnancy losses. The physical examination will indicate the general health and nutritional status of the bitch as well as the possibility of any concurrent disease process. Potential infectious causes of abortion are included in Table 1.

Recommended laboratory diagnostic tests include a CBC, serum chemistry profile, comprehensive thyroid hormone profile, urinalysis, and serologic tests for *B. canis*, *Toxoplasma gondii*, and canine herpes virus. Any canine herpes virus titer present at the time of abortion is of diagnostic significance because the antibody response is short-lived. Also, antibody titers for *B. canis* may be undetectable until as late as 4-8 week postinfection, and so titers may not be elevated at the time of abortion. Interpretation of titer results is difficult and should be done with the assistance of a clinical pathologist.

To identify the presence of inflammatory cells and bacterial infection, collect samples from the anterior vagina or from vaginal discharge for cytologic examination and culture. Because a variety of organisms can be isolated in healthy animals (e.g. *Escherichia coli*, staphylococci and streptococci), cytology results and clinical signs must be considered when interpreting vaginal culture results. Place samples to be cultured for *Mycoplasma* or *Ureaplasma* species in Amies transport media (Copan swab) for shipment to the laboratory (must be refrigerated). *Brucella canis* must be cultured on brucella blood agar plates.

One of the most important, but often overlooked, diagnostic procedures in aborting bitch-

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es is the examination of aborted fetuses and their membranes. Advise owners to collect these in a clean manner and to refrigerate and present them with the bitch.

Brucella canis infection has been reported in people; therefore aborted tissues should be handled with extreme care.

Histopathologic examination and culture of selected fetal tissues are recommended. Fetal lung and liver tis-

ues are preferred for isolating *B. canis* organisms. Cultures of fetal stomach contents are beneficial in identifying other bacterial species. Chromosome analysis can be performed in dogs if genetic abnormalities are suspected; however, this analysis is not commonly available. Contact Antech Diagnostics if you have questions concerning appropriate samples and their handling and submission.

Table 1: Infectious Causes of Canine Abortion

<i>Brucella canis</i>	Most common bacterial cause of abortion in bitches. Abortion occurs between 45-55 days of pregnancy. Infertility follows infection and abortion, vaginal discharges and aborted fetal tissues are highly infectious to other females.
<i>E. coli</i> , <i>S. aureus</i> , <i>Strep.</i> species	Frequently cultured from vaginal discharges or fetal tissues after abortion; their role is unknown. May be associated with infertility, persistent vaginal discharge, and repeat abortion in older females.
β -hemolytic <i>Streptococcus</i> species	Fetal infection has been reported, resulting in abortion or the birth of weak, non-viable pups.
<i>Mycoplasma</i> and <i>Ureaplasma</i> species	Opportunistic organisms normally found in the vaginal canal. In heavy infections, may cause infertility, early embryonic death, resorption, abortion, stillbirth, or the birth of weak, nonviable pups.
Canine herpesvirus	Causes fatal infections in newborn puppies and vaginitis in bitches. Can cross the placenta and infect puppies, resulting in fetal death, mummification, abortion, premature birth, or the delivery of weak, nonviable pups.
Canine distemper virus	May cause spontaneous abortion with or without fetal infection. Often abortion results from stress of the clinical disease.
Canine adenovirus (infectious hepatitis)	May cause spontaneous abortion with or without fetal infection. Often abortion results from stress of the clinical disease.
<i>Toxoplasma gondii</i>	Protozoal parasite causing mild disease in adult dogs. May be more severe when present with distemper virus, which is known to suppress the immune system. Fetal infection may occur. <i>T. gondii</i> has been found in the milk of lactating bitches.
<i>Neospora caninum</i>	Protozoal parasite resembling <i>T. gondii</i> . Can infect the brains and spinal cords of developing fetuses or neonates. Newborns have progressive muscular weakness leading to death.

[Contributed by Jeanette L. Floss, DVM, MS, Dipl. ACT, Indianapolis, IN.]

References: Carmichael et al, Biol Stand 56: 371-383, 1984; Olson and Jones, Current Ther Theriogenol 2 (Morrow, ed), Saunders, Philadelphia, 1986, pp 469-475; Dubey et al, JAVMA 193: 1259-1263, 1988; Evermann, Current Vet Ther X (Kirk, ed), Saunders, Philadelphia, 1989, pp 1313-1316; Floss and Hardin, Vet Med. 91: 846-849, 1996.

LAB TIPS

Estrogen Testing in Small and Large Animals

In humans, estrogen testing typically measures total estrogen levels (e.g. estradiol, estrone, estriols) because this assesses the relevant endocrine function for human clinical diagnosis. In animals, however, the adrenal estrogens and breakdown products of estrogens (mostly alcohols) cross-react in this total estrogen assay to give spuriously high readings.

Therefore, **the relevant estrogen for clinical testing in animals is estradiol, 17 beta.** This assay has been validated for dogs, cats, horses, pigs and cattle. Normal serum levels for dogs and cats are: Males and Spayed Females, < 15 - 20 pg/mL; Females, varies with the stage of estrous cycle;

Note: With the heartworm season approaching, please remember the preferred specimen for heartworm testing is a Red Top tube. Lavender Top tubes can cause false positives.