

## ABORTION DISEASES



These  
diseases are  
known to  
occur in  
Afghanistan.



### 1. Definition

The ewe and doe are both normally very fertile animals but may have a high incidence of abortions when compared to other farm animals. Infectious causes of abortion play an important role in this process and could be a major source of economic loss. Major infectious causes of abortion in sheep and goats are chlamydiosis [enzootic abortion of ewes (EAE)], toxoplasmosis, brucellosis, Q-fever, campylobacteriosis, and listeriosis.

### 2. Etiology

**Chlamydiosis** is caused by *Chlamydophila psittaci*, a Gram negative, intracellular bacteria.

**Toxoplasmosis** is caused by *Toxoplasma gondii*, an intracellular protozoan.

**Brucellosis** is caused by *Brucella melitensis*, a small gram-negative coccobacillus, specific for goats; *Brucella ovis*, specific for sheep; and occasionally, *Brucella abortus* infection occurs in goats running with infected or vaccinated cattle. Although considered goat specific, *B. melitensis* may cause abortion in sheep.

**Q-fever** is caused by *Coxiella burnetii*, an obligate intracellular rickettsial (bacterial) organism.

**Campylobacteriosis** is caused by *Campylobacter jejuni* and *Campylobacter fetus* (formerly *Vibrio fetus intestinalis*)

**Listeriosis** is caused by *Listeria monocytogenes*, a gram positive, non-acid fast bacteria. Abortion strains are often serotype 1.

### **3. Transmission**

**Chlamydiosis:** Pigeons and sparrows may serve as reservoirs for the organism, and it has been suggested that ticks or insects may play a role in transmission of the disease. Aborting females shed large numbers of organism from the uterine discharge, fetus and placenta, particularly in the first three weeks after abortion, which is ingested by other animals.

**Toxoplasmosis:** Cats are pivotal in the transmission of *Toxoplasma gondii*. They become infected by ingestion of infected rodents and birds which can lead to excretion of large numbers of environmentally resistant oocysts. Cats often defecate and bury their feces in the hay and food bins of barns. Ewes and does become infected by ingestion of food or water contaminated with oocysts from feces of infected cats. The organism enters the blood and spreads to other tissues within two weeks of ingestion of oocysts. In the pregnant ewe or doe, *Toxoplasma* can invade and multiply in the placenta and then spread to the fetus causing abortion, fetal death, and resorption of the fetus, stillbirth, birth of live but weak lambs and kids, or the birth of a normal offspring depending on the stage of pregnancy.

**Brucellosis:** The most common route of transmission is by the ingestion of contaminated food and water. The organism enters through mucous membranes and becomes localized in lymph nodes, udder, uterus, testes, and spleen. In pregnant animals, localization in the placenta leads to the development of placentitis with subsequent abortion.

**Q-fever:** Cattle, sheep, goats, and wildlife may carry the organism which is shed in large numbers in placentas, uterine fluids, colostrum, and milk. Therefore, cows and sheep may be a source of infection for goats when they share pasture. Animals and humans can be infected by inhaling contaminated dust. Tick bites and grazing contaminated pastures are other modes of transmission.

**Campylobacteriosis:** The major source of infection is the placenta and the uterine discharge of aborting animals. The main route of transmission is through ingestion of organisms shed in vaginal fluid and placenta at the time of abortion or parturition, or through inhalation of aerosol.

**Listeriosis:** *Listeria monocytogenes* may be found in soil, water, plant litter, silage, and the digestive tract of ruminants. The organism can survive in soil and feces for a very long time, and grows in poorly fermented silage (pH level greater than 5.5). On some farms abortion is contributed to silage feeding, while abortions have been reported on farms in which the sheep and goats were fed hay with the addition of concentrate, or were on woody browse.

#### **4. Species affected**

Most of the diseases that cause abortion are zoonotic, including chlamydiosis, Q-fever, toxoplasmosis, campylobacteriosis, brucellosis and listeriosis. Owners should be advised to wear gloves when handling aborted fetuses and to burn or bury any placentas and fetuses not needed for diagnostic efforts. In addition pasteurization of milk for human consumption should be stressed.

#### **5. Clinical signs**

**Chlamydiosis:** Abortions usually occur in the last month of gestation but can occur as early as day 100 of gestation. Does and ewes are not normally ill but may show a bloody vaginal discharge two to three days prior to abortion. The fetus may be autolyzed or fresh. Some weak

newborns may be seen, and a few females may retain the placenta. Occasionally there is concurrent respiratory disease, polyarthritis, conjunctivitis, and retained placentas in the flock.

**Toxoplasmosis:** Goats appear to be more susceptible to *Toxoplasma* infection than sheep. Abortion can occur in does of all ages but primarily in does that acquire infection during pregnancy although abortion may be repeated in the next gestation. Ewes and does infected prior to breeding do not abort. Those infected 30 to 90 days after breeding usually have fetal resorption or mummification. Most observed abortions occur in the last trimester of gestation, 2 to 3 weeks before term, after occurrence of infection during the latter half of gestation. Ewes and does themselves are generally clinically normal at the time of abortion.

**Brucellosis:** Infection occurs in both sheep and goats and produce abortion in late pregnancy. As in other species, there may be an “abortion storm” when the disease is introduced followed by a period of herd resistance during which abortions do not occur. A systemic reaction with fever, depression, loss of weight and sometimes diarrhea occurs and may be accompanied by mastitis, lameness, hygroma, and in males, orchitis.

**Q-fever:** In livestock, the disease is usually inapparent. However, occasional abortion outbreaks due to *Coxiella burnetii* have been reported in sheep and goats. Clinical signs are infrequent but abortion or stillbirth usually occurs late in gestation due to severe damage to placenta and necrosis of cotyledons and thickening of the intercotyledonary areas. Some does abort without apparent clinical signs, while others show anorexia and depression 1 to 2 days before abortion.

**Campylobacteriosis:** Clinical signs include late gestation abortions in does/ ewes and weak and/or stillborn lambs/ kids. Aborting animals may

or may not show signs of systemic illness. A mucopurulent or sanguinopurulent vaginal discharge is reported in all aborting animals.

**Listeriosis:** Abortion results from infection early in gestation, but later infection results in stillborn or weak offspring. The abortion form and the encephalitic form of listeriosis do not usually occur simultaneously in a herd. Abortion occurs in the last 2 months of pregnancy and is preceded by septicemia. Signs of septicemia may include fever, decreased appetite and reduced milk production.

## **6. Pathologic findings**

The lesion common in all cases of infectious abortion is placentitis. From the placentitis, the fetus either dies due to inability to exchange nutrients through the placenta, or becomes infected itself and dies. A prolonged period of uterine disease and infertility may follow and in case of infectious abortion, the disease threatens the rest of the herd.

**Chlamydiosis:** The fetus may be autolyzed or fresh. The placenta shows regional to generalized placentitis (white to yellow necrotic areas) involving the cotyledons and intercotyledonary space.

**Toxoplasmosis:** Abortion occurs due to necrosis of the placenta, particularly the cotyledons. The intercotyledonary areas of the placenta are usually normal with the cotyledons having white to yellow focal areas of necrosis and calcification up to 1 cm in diameter. These lesions are clearly visible to the eye when the cotyledons are washed in saline.

**Brucellosis:** On gross examination, the placenta is normal in *B. melitensis* infection in goats, whereas *B. ovis* infection of sheep result in thickened, necrotic placentitis. The aborted foetuses are often fresh but can be somewhat autolyzed. Often, the affected foetus has no gross lesions in affected organs. In *Brucella ovis* infections, calcified plaques

on the walls and soles of the hooves and accessory digits are considered a characteristic lesion.

**Q-fever:** There is severe damage to placenta and necrosis of cotyledons and thickening of the intercotyledony areas.

**Campylobacteriosis:** The placenta is often edematous, with necrosis of cotyledons, and thickened brown intercotyledony areas covered by exudate. Aborted fetuses have grossly visible liver necrosis.

**Listeriosis:** There is some necrosis of cotyledons and the intercotyledony areas, and the fetus is usually autolyzed. The fetal liver (and possibly lung) may have necrotic foci, 0.5-1 mm in diameter.

## **7. Diagnosis**

A systematic approach is essential for the diagnosis of abortions in sheep and goats. The investigator must obtain a good nutritional and clinical history, including possible exposure to carrier animals. Although history seldom provides information pointing directly to the cause of abortion, clues may be found that will indicate what needs to be done to determine the diagnosis. When abortion occurs, the animal should be isolated and any aborted fetus kept for further laboratory examination. In sheep and goats, the entire fetus, placenta, and paired serum samples from aborting dam should be submitted to the diagnostic laboratory. Without the placenta, identification of chlamydiosis and toxoplasmosis is unlikely.

**Chlamydiosis:** Diagnosis is by history of abortion along with clinical signs and demonstration of the characteristic inclusion bodies in the impression smears of placenta, fetal tissue or uterine discharge. A definitive diagnosis is made by culturing the organism from the placenta or fetal tissue. Serological testing is also a valuable aid in diagnosis

**Toxoplasmosis:** A presumptive diagnosis can be made from placental lesions alone, if placenta is available. Presence of white to yellow focal areas of necrosis and calcification on the cotyledons is characteristic of only toxoplasmosis and can be used in the field as a diagnostic tool. On the other hand, *Coxiella burnetii*, *Brucella* spp. and *Chlamydia* spp. usually cause placentitis that include the intercotyledonary region. Positive diagnosis of toxoplasmosis requires isolation of the organism from placenta or fetal brain, lung and muscles. The samples for isolation studies should be shipped on ice but not frozen.

**Brucellosis:** Identification of brucellosis as the cause of abortion is usually made by isolation of the organism from aborted fetus, placenta or vaginal discharge. Various agglutination, precipitation and complement fixation tests are used to detect carrier animals.

**Q-fever:** Diagnosis is based on placental findings, serology and isolation of the organism. While isolation of *Coxiella burnetii* is the ideal means for diagnosis of the disease, it is usually not feasible due to the contagious and zoonotic potential of the organism. The Fluorescent Antibody (FA) Test can be used to identify organism in frozen section of placenta.

**Campylobacteriosis:** Definitive diagnosis of *Campylobacter* abortion is through isolation of the organism. Direct microscopic examination and isolation of *Campylobacter* spp. from placenta, fetal abomasal contents and maternal vaginal discharge is the preferred diagnostic procedure.

**Listeriosis:** Diagnosis is by isolation of the organism from the placenta, abomasal contents, or uterine discharge.

#### **8. Treatment:**

The diagnosis in the event of an abortion storm often is not available for several days. It is reasonable to begin treatment of remaining pregnant

animals with tetracycline, since most infectious agents causing abortion in sheep and goats are susceptible to tetracycline. One possible protocol is three injections of long-acting tetracycline at 20 mg/kg at 3-day intervals. Meat and fiber producing herds are commonly treated with oral tetracycline (400 to 500 mg per head per day) for two weeks. In dairy herds, it is more customary to treat individual non-lactating does or ewes by injection of long-acting oxytetracycline preparation at a dose of 20 mg/kg SC every 10 to 14 days. Withdrawal time in lactating animal should be observed.

### **9. Prevention and control**

There is no recommended vaccination for most of these diseases in Afghanistan. Fetal membranes and dead fetuses should be buried or incinerated to prevent infection of other animals. Control of toxoplasmosis is based on preventing exposure of pregnant females to cat feces. Cats should be prevented from defecating in feeders or hay.

Fetal membranes and dead fetuses of sheep or goats that abort should be handled with caution by persons wearing gloves to prevent infection in humans. Goat and sheep milk should be pasteurized or boiled before human consumption.

*(photos, next page)*



Multifocal necrosis of cotyledons,  
*Toxoplasma* abortion



Multifocal hepatic necrosis,  
characteristic of *Listeria* abortion



Circular zones of necrosis, liver,  
characteristic of *Campylobacter*  
abortion



Suppurative epididymitis, seen  
with *Brucella ovis*.