Abortion in Sheep

Abortion is the expulsion before full term of a fetus which is incapable of independent life.
Premature birth : is the expulsion before full term of a fetus which is capable of independent life.
Stillbirth : is the expulsion of a dead full term fetus.
Gestation length : although the usually accepted length is 147 days, it is important to recognise that there are individual and breed variations, with a range of 140-150 days to be expected.
Noninfectious causes :The following factors have been implicated, and should be considered if infectious causes are eliminated:

- Inadequate nutrition.
- Pregnancy toxaemia.
- Stress.
- Poor handling.
- Vaccination.
- Transport.
- Concurrent disease.
- Pasteurellosis.
- Chronic fluke.

Infectious causes of abortion.

Protozoon Toxoplasma gondii
Neospora caninum

Bacteria Chlamydophila abortus (Chlamydia psittaci)
Campylobacter fetus , Campylobacter jejuni
Salmonella abortus ovis ,Salmonella arizonae , Salmonella Dublin ,
Salmonella typhimurium
Leptospira interrogans
Listeria monocytogenes
Miscellaneous bacteria : e.g. Yersinia, Histophilus ovis

Rickettsia Ehrlichia (Cytoecetes) phagocytophila , Coxiella burnetii

Virus Pestivirus
Fungae Aspergillus fumigatus , Claviceps purpurea ,Various mycotoxins

Enzootic Abortion of Ewes (EAE)

Chlamydophila abortus is the cause of EAE, which is characterized by late term abortions, stillbirths, and weak lambs.

C pecorum is the cause of chlamydial arthritis and conjunctivitis of sheep.

EAE occurs worldwide and is most important in intensively managed sheep. Abortions occur during the last 2–3 week of gestation regardless of when infection occurs, and the fetuses are fresh with minimal autolysis.

There is placentitis with necrotic, reddish brown cotyledons and thickened brown intercotyledonary areas covered by exudate.

Chlamydial elementary bodies can be found by examination of appropriately stained smears of the placenta or vaginal discharge, but the organisms cannot be differentiated from Coxiella burnetii, which occasionally causes abortion in sheep.

Definitive diagnosis

is by identification of C abortus by ELISA, fluorescent antibody staining, PCR, or isolation.

Ewes seldom abort more than once, but they remain persistently infected and shed C abortus from their reproductive tract for 2–3 days before and after ovulation.

Rams can be infected and transmit the organism venereally.

Control

consists of isolating all affected ewes and lambs and treating in-contact ewes with long-acting oxytetracycline or oral tetracycline.

C abortus bacterins are available and are effective in reducing abortions.

a modified live vaccine is available for use.

C abortus is zoonotic but human cases are rare. All have involved pregnant women, who developed life-threatening illness. Only in a few cases in which the fetus was delivered by cesarean section did the infant survive. Pregnant women should not work with pregnant sheep, especially if abortions are occurring.

Query or Queensland (Q) fever

Query or Queensland fever can cause goats to abort. Q fever is caused by the microorganism *Coxiella burnetii* and is a disease that affects many animals and humans. Ruminants can contract Q fever when grazing contaminated pastures and from tick bites. In a co-grazing system, infected cows and sheep may be a source of infection for goats. Other animal species and humans can be infected by inhaling contaminated dust. In infected goats, the microorganism can be found in the

placenta, uterine fluid, and milk. Infected animals show no symptoms of the disease until aborting or having stillborn kids in late pregnancy. Does do not generally show any symptoms of the disease until 1 to 2 days before abortion, when they experience a lack of appetite and depression.

Diagnosis

Diagnosis is based on isolation of *Coxiella burnetii* in the placenta. Be aware of possible infection by *Coxiella b.* Wear gloves when helping the doe at the time of kidding or when handling aborted fetus. Placenta and aborted fetuses should be burned or buried. Detection by PCR and immunofluorescence tests of *Coxiella b.* in parturition products and vaginal secretions at abortion are preferred over serological tests.

Treatment and Prevention

There is no vaccine to prevent Q fever in goats. Feeding 200 mg/head/day of chlortetracycline in the feed for 19 days or using 20 mg/kg of long-acting oxytetracycline every 3 to 14 days should control the infection.

Listeria

Listeriosis is caused by the bacteria *Listeria mono-cytogenes* (Lm), which can be found in soil, contaminated water, and spoiled, concentrated hay or silage. It can live in soil and fecal contents for a long time. After infecting, the bacteria multiply and spread throughout the animal's body, causing fever and decreased or loss of appetite. Lactating does show reduced milk production. Infected does show neurological disturbance due to encephalitis (inflammation of the brain). Abortion can occur at early stages of pregnancy and infected does can produce stillborn or weak kids.

The prevalence of Lm on goat farms is seasonal. Management practices are associated with listeriosis and fecal shedding of Lm. Awareness of risk factors may be used to develop control measures to reduce disease and introduction of Lm into the human food chain. Listeria is a public health concern and may affect humans. It primarily affects people whose immune systems are inefficient, including newborns and the very old. In pregnant women, listeria may cause infant deaths, meningitis, or spontaneous abortions.

Diagnosis

Brain tissue, aborted placenta, and fetus specimens should be isolated and identified for the presence of Lm. Tissue must be identified, refrigerated (4 degrees C), and sent to a reference laboratory for isolation of Lm. This microorganism has been isolated from the spinal fluid, nasal discharge, urine, feces, and milk of infected does. Serology is not used routinely for diagnosis because many healthy animals have high *Listeria* titers. Immunofluorescence is effective for quickly identifying Lm in smears from dead animals, tissue from aborted fetuses, milk, meat, and other sources.

Treatment and Prevention

Stop using contaminated food. Generally, procaine penicillin should be administered every 6 hours for 3 to 5 days then daily for an additional 7 days. Administration of 500 mg of chlortetracycline a day per goat is also recommended. Chloramphenicol, oxytetracyclin, and ampicillin have shown success in treating listeriosis. Intravenous sodium chloride, glucose solutions, and sodium bicarbonate are also useful.

Leptospira

Leptospirosis can cause abortion, stillbirths, or the birth of premature or weak, infected kids. The most common serovars, a subdivision of a species different from other strains, causing abortions in goats are *Leptospira interrogans, grippotyphosa,* and *pomona*. Goats are susceptible to these strains, with abortion occurring after infection at the time when the microorganisms start to multiply in the doe's blood. Some have shown anemia and jaundice (yellowing of the tissues, usually resulting from abnormal liver function) and hemoglobinemia (part of red blood cells that carries oxygen). However, an infected doe may not have fever or jaundice.

Diagnosis

Diagnosis is based on the microscopic agglutination test (MAT) and the ELISA. Isolation and identification of *Leptospira spp* in the doe's urine, placenta, or fetal kidney tissues is the most accurate method of diagnosis.

Treatment and Prevention

Tetracycline and oxytetracycline may be successful if given early in acute cases. Erythromycin, enrofloxacin, and tiamulin are also effective in acute cases.

Oxytetracycline, amoxicillin, penicillin G, Tylosin, and doxycycline can be used with success. Treatment has a limited effect on the course of disease once uremia (presence of excessive amounts of urea and other nitrogenous waste products in the blood) has developed.

When abortion caused by *Leptospira* is diagnosed in a goat herd, further abortions can be prevented by promptly immunizing the entire herd and simultaneously treating all animals with antibiotics. Only sick does should be treated with antibiotics. In a zone with a high incidence of leptospirosis, annual immunization of the herd is recommended. Management methods to reduce transmission include controlling rodents, keeping the herd from potentially contaminated streams and ponds, separating goats from wildlife, selecting replacement stock from herds that are seronegative for leptospirosis, and immunizing replacement stock.

Campylobacter spp Infection (Vibriosis)

Infection with Campylobacter fetus and C jejuni results in abortions in late pregnancy or stillbirths.

Ewes may develop metritis after expelling the fetus. Placentitis occurs with hemorrhagic necrotic cotyledons and edematous or leathery intercotyledonary areas. The fetus is usually autolyzed, with 40% having orange-yellow necrotic foci (1–2 cm diameter) in the liver.

Diagnosis relies

By finding Campylobacter organisms in dark field or fluorescent antibody preparations or

by isolation from abomasal or placental smears or in uterine discharge.

Identification of the species involved is important because in some areas C jejuni is as common as C fetus, and some vaccines do not include C jejuni.

Strict hygiene is necessary to stop an outbreak.

Use of tetracycline may help prevent exposed ewes from aborting.

The disease tends to be cyclical, with epizootics occurring every 4–5 yr; therefore, vaccination programs, which help prevent outbreaks, should be consistently practiced. C jejuni is zoonotic and is one of the most common causes of enteritis in humans.

Toxoplasmosis

Toxoplasmosis is caused by the *Toxoplasma gondii* microorganism. It is another common cause of infectious abortion in goats, other animals, and humans. Cats can be carriers of *T. gondii.* Cats often defecate and bury their feces in the hay and food storage areas of barns. Does can become infected by ingesting food or water contaminated by feces.

T. gondii enters the bloodstream of the doe and spreads to other tissues. In pregnant does, *T. gondii* can invade and multiply in the placenta and pass to the fetus, causing fetal death, fetal mummification (where the doe reabsorbs the fetal fluid), stillbirth, or the birth of weak kids. In some cases, the pregnancy can progress normally and the doe can give birth to a normal kid. Abortions from this microorganism occur mainly in the last trimester of pregnancy and may occur in does of all ages and in successive pregnancies.

Humans can be infected by *T. gondii* by ingesting meat and milk from animals with toxoplasmosis. Toxoplasmosis can be a public health concern because children who are allergic to cow milk often consume non-boiled goat milk.

Diagnosis

Diagnosis is based on clinical signs and by isolation of *T. gondii* from placental and fetal tissue.

Samples for diagnosis should be shipped on ice but not frozen. If the placenta is not available or is decomposed, diagnosis can be done by testing for the presence of the antibody against *T. gondii* in fetal fluid or in doe serum. *T. gondii* can be isolated from the vaginal mucosa, saliva, nasal secretion, and urine from experimentally infected goats and in the milk of naturally infected goats. Toxoplasma infection in both humans and animals can be diagnosed using various serological tests, such as indirect haemagglutination, indirect immunofluorescence (IFAT), or ELISA.

Serological analysis using IFAT and ELISA has been widely employed to detect herds contaminated by *Toxoplasma*, including swine and sheep.

PCR (polynucleotide chain reaction) can be effective in the diagnosis of toxoplasmosis. DNA can be extracted from the lung, muscle, and mesenteric lymph

node of the doe and lung tissues of the aborted fetus. A direct PCR assay is effective for the diagnosis.

Treatment and Prevention

Feeding decoquinate (2 mg/kg bw/day) or monensin (15-30 mg/head/day) throughout pregnancy may reduce the abortion rate in a herd with a history of toxoplasmosis.

Sulfonamides are used to treat toxoplasmosis in goats.

Clindamycin (12.5 mg/kg, IM, BID for 3 weeks) is also recommended. There is no vaccine available.

Control of toxoplasmosis is based on management practices; pregnant females should not be exposed to infected cat feces.

Brucellosis

Brucellosis, also known as undulant fever or Malta fever in humans, is caused by **Brucella ovis**s a cause of epididymitis in rams, but it also causes late-term abortions, stillbirths, and birth of weak lambs.
B melitensis is rare but causes abortion in areas where it is found.

B abortus occasionally causes abortion in sheep. *Brucella* can be found in milk, urine, feces, placenta, and vaginal secretions that accompany natural birth or abortion.

Brucella then spreads through the blood and becomes localized in the lymph nodes, udder, uterus, testes, and spleen. Infected does show signs of fever, depression, weight loss and diarrhea that can also be accompanied by lameness or mastitis, inflammation of the mammary gland. orchitis, an inflammation of the testicles.

Brucella abortions occur late gestation, resulting in placentitis with edema and necrosis of the cotyledons and thickened, leathery intercotyledonary areas.
Many fetuses aborted due to B ovis are alive at the beginning of parturition, although fetuses can be mummified or autolyzed. Most fetuses aborted due to B melitensis or B abortus are autolytic.

Diagnosis

Diagnosis is achieved by isolating the microorganisms from the aborted fetus, placenta, or vaginal discharge in laboratory tests. Positive animals are identified by serologic examination. The indirect enzyme-linked immunosorbent assay (iELISA) is sensitive and specific, and shows potential for use as a bulk milk test for detecting B. melitensis antibodies in goat milk.

Treatment and Prevention

There is no treatment for brucellosis in goats. It is mandatory to eliminate infected animals.
Culture of the placenta, abomasal contents, and the dam's vaginal discharge are diagnostic.
A vaccine for B melitensis is available in some countries. B melitensis and B abortus are zoonotic.

Salmonellosis

Salmonella Abortus ovis, S dublin, S typhimurium, and S arizona have caused abortions in sheep.
Most ewes are sick and febrile before aborting. There are no specific placental lesions, and the fetus is autolyzed.

Diagnosis

by culture of placenta, fetus, or uterine discharge. Salmonella spp are zoonotic.

Bluetongue

Bluetongue (BT) is caused by a blue tongue virus of the genus *Orbivirus* and family Reoviridae.

-*Culicoides* spp are the principal vectors of the disease and is considered to be the main species involved in the transmission of the disease .The infected midges can remain infective for life.

Mechanical transmission by the ticks and blood sucking flies such as *Stomoxys* spp.
Bluetongue virus cause of abortion, fetal mummification, stillbirth, and congenital brain malformation in lambs. The clinical syndrome, serotypes involved, and diagnosis are the same as for cattle

Most, if not all, reproductive failure is caused by attenuated vaccine viruses rather than field viruses.
experimentally the virus has been demonstrated to be capable of crossing the ovine placenta. The virus should be consi
dered to be a potential problem in sheep

Control

by management procedures to reduce exposure to biting midges and vaccination. Inactivated and modified live vaccines are available and widely used, but the availability of each varies between countries.

Modified live vaccines are predominately used in regions with a long history of bluetongue,

If used, the vaccine should not be given to pregnant ewes. Also, the vaccine should not be given when Culicoides spp are active because they can and do transmit the vaccine virus to unvaccinated animals, including pregnant females.

Border Disease

Border disease occurs worldwide and is an important cause of embryonic and fetal deaths, weak lambs, and congenital abnormalities.

It is caused by a pestivirus closely related to bovine viral diarrhea (BVD) virus and classical **swine fever (hog cholera) virus**.

Abortion can occur at any stage of gestation. There are no clinical signs in the dam. Live infected fetuses usually are undersized, and they often have congenital tremors and an **abnormally hairy coat (hairy shaker lambs)**.

Diagnosis

is by identification of border disease virus in the placenta or fetal tissues (kidneys, lungs, spleen, thyroid glands, abomasum)

by fluorescent antibody staining,

virus isolation, or demonstration of precolostral antibodies.

There are no vaccines available. Inactivated BVD virus vaccines are sometimes used on sheep .

What to do when abortion occurs:

- Never ignore abortions in a goat herd. Conduct a thorough investigation immediately.
- Isolate the animal from the herd and keep it in a quarantine pen for further examination.
- Consider many different causes of abortion.
- Inform your veterinarian if you suspect infectious abortion in a goat herd; the veterinarian will refer you to a nearby diagnostic center.

- Consult the diagnostic laboratory prior to submitting your sample. The diagnostic center should be aware of the infectious agent most likely to be present in the area.
  Note: Diseased tissue requires proper handling.
- To facilitate the diagnosis, keep detailed records and accurately identify each aborting animal and the stage of pregnancy at which the animal aborted.
- Refrigerate (avoid freezing) any fetus and placenta of an aborted kid to send to the diagnostic laboratory.
- Work with the local veterinarian to draw blood and to send serum samples from aborting does to the diagnostic laboratory for immunological tests.
- Consult your local veterinarian when you suspect infectious abortion in your herd. This might constitute a public health issue. Your veterinarian can guide you on the treatment and prevention procedure.
- Ask for performance and health records before purchasing new animals.
- Quarantine any new animals before introducing them into your existing herd.
- Be aware that certain classes of dewormers administered to pregnant does can cause insidious abortion or stillbirths, which can be mistaken as abortions caused by infectious agents.
- Be aware that certain poisonous plants can cause abortions in does. Identify plants in your area that can cause abortion and try to eliminate them from the pasture.
- People who assist does at kidding or collect placental or fetal waste for disposal or diagnostic evaluations should be aware of the danger of infection and are advised to wear plastic gloves. The gloves should be burned to prevent environment contamination.

Quaternary ammonium compounds are satisfactory disinfectants.