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Caseous Lymphadenitis (CL) in Goats and Sheep

Introduction

Caseous Lymphadenitis (CL) is a chronically infectious disease of sheep and goats that is caused by the bacterium *Corynebacterium pseudotuberculosis.* Prevalent on all continents throughout the world, CL causes ulcerative lymphadenitis in horses and superficial abscesses in bovines, swine, rabbits, deer, laboratory animals, and humans. This zoonotic disease (a disease transmitted from animals to humans) is usually underestimated because CL is not a reportable disease in many countries, including the United States.



Figure 1. **CL abscess on goat.**

Some economic losses due to CL are caused when breeding stock is no longer marketable, when carcasses are condemned due to internal abscesses, when animals die, or when abscesses devalue animal hides.

Diagnosis, Prevention, Treatment & Biosecurity Measures

The primary mode of infection is direct contact with pus or the secretion from abscesses that contain the *C. pseudotuberculosis* bacteria. The CL bacteria can exist in contaminated soil for a long period of time. In a study conducted by scientists at the Brazilian Agricultural Research Corporation (EMBRAPA), the C. *pseudotuberculosis* was found in the soil of semi-arid environments for up to two years.

The *C. pseudotuberculosis* bacteria enters the body of an animal or a human through the skin, by ingestion or inhalation, or by coming in contact with contaminated equipment, facilities, pastures, and feed and water troughs where a herd may congregate. Herd mates that come into direct contact with a ruptured abscess can also spread the infectious bacteria from animal to animal.

Sheep and goats can be infected at any time in their lifetime, and the morbidity rate in herd can reach as high as 15-50%. CL abscesses are more frequently found in older animals, four years or older. Does and ewes can transmit CL to kids and lambs through the milk if a CL abscess if found in the mammary gland.

Upon infection, *C. pseudotuberculosis* will multiply and spread throughout the body via the bloodstream. Subsequently, lymph nodes and internal organs including the lungs, kidney, and liver become infected and can develop abscesses. The spinal cord can also develop CL abscesses. Once infected an animal is considered to be a carrier for life. The period of incubation, the time between the initial

infection and the appearance of physical signs, can vary from 2 to 6 months. However, some animals within a herd appear to be very resistant to this disease. They may be infected with the CL bacteria, but not develop the disease.

Clinical Signs

The first usual indication of CL infection is the presence of an external abscess visible behind the ears, beneath the jaw or neck, on the shoulders, or in the rear flank region. Abscesses may also appear between the hind legs where a scrotal sac or udder attaches. Internal abscesses are detectable only through necropsy, an examination after the animal is dead. Unfortunately, it is the internal abscesses that are fatal, whereas external abscesses are the ones generally responsible for disease transmission. Sheep are more prone to internal abscesses and goats are more prone to external abscesses. If an animal is experiencing chronic weight loss, it may be carrying internal CL abscesses on vital organs.

Diagnosis

Producers must be aware that not all abscesses or cases of chronic weight loss in sheep and goats are associated with CL. The diagnosis is based on clinical signs detected by sight and by physical examination. The CL abscesses range from firm to soft swelling, and some are well-defined with rounded shapes on the surface of the animal's body. CL abscesses typically contain pasty thick yellow-green pus with a foul odor. Internal abscesses cannot be seen except by X-ray, a biopsy, or during a postmortem examination. Serologic tests are available but their reliability is questionable.



Figure 2. **A goat with a CL abscess on the body surface**

When you suspect CL, confirm the presence of the *C. pseudotuberculosis* microorganisms by submitting a sample of the abscess content to a diagnostic lab for analysis. If the laboratory result is positive, then CL is deemed responsible for the abscess.

Treatment

There is no cure for CL. However, CL abscesses must be treated to prevent ruptures and further contamination of other animals and environments. If you have an animal that develops an abscess:

- Immediately isolate the animal from the herd.
- Place the infected animals on a concrete floor or other surface that will make disinfecting easier to avoid spreading the CL microorganism.
- Wear gloves when draining abscesses to avoid contamination. The abscess is about to rupture when it has lost hair.
- Use a disposable scalpel to cut the surface of the abscess and drain it before it ruptures on its own in the field.
- Create a cross cut (+) to better drain an abscess.



Figure 3. **Drain pus from abscess using a cross "+" cut.**

- Completely drain the abscess of its content; a large amount of pus with the consistency of toothpaste may appear. You may wish to collect some of the pus with a new syringe for submission to a diagnostic lab for pathogen isolation and identification.



Figure 4. **Completely drain the abscess**



Figure 5. **Wash the abscess cavity.**

- Wash the resulting abscess cavity thoroughly with hydrogen peroxide, then flush it with an iodine solution.
- Keep the infected animal from the rest of the herd until the abscess is completely healed.
- Disinfect the area where the animals with the abscesses were housed.
- Keep records of abscess cases.
- Incinerate gloves, napkins, and lining material immediately after use.

The control of the CL disease by vaccination remains controversial although toxoid vaccines are now commercially available in some countries. A vaccine for sheep is commercially available in the United States. This vaccine is made with killed germs and seems to be effective in decreasing the incidence and severity of the disease in sheep herds. However, the vaccine is not approved for use in goats. Autogenous vaccines (vaccines made from bacteria strains isolated from a specific herd) are another source of available immunization in sheep and in goats. However, a reputable certified laboratory must produce the vaccine. Before using an autogenous vaccine, test it in several animals for adverse side effects. Goats seem to be more sensitive to the side effects of these types of vaccines.

Biosecurity/Biocontainment Measures

- There is not an effective treatment for CL. Antibiotics are ineffective. However, certain management practices can help to minimize the impact of CL on the herd or flock. Conduct frequent visual examinations of the herd and note the presence of abscesses. This may require a closer inspection in wool sheep and fiber goat breeds where long course hair or wool can hide abscesses. The same is true of long-eared goats such as Boer and Nubian goats where submandibular abscesses can be hidden under the ears.
- Avoid purchasing animals with visible abscesses or abscess scars. Examine males before introducing them to the doe herd. A male with erupted abscess can contaminate the females.
- Avoid giving injections in the shoulder region where an injection-site reaction can be confused with a CL abscess. Use a clean needle with each animal to prevent the spread of *C. pseudotuberculosis* from asymptomatic carriers to non-infected animals. This would be of particular concern with the use of automatic syringes. Other microorganisms such as Arcanobacterium (Actinomyces) pyogenes can enter via animal skin the same way CL microorganisms enter, and cause abscesses. Using non-sterile needles can cause infection at injection sites.
- Always disinfect equipment such as ear taggers, tattooing needles, hoof trimmers, or wool shears that might break the skin of animals when used. Shearing equip

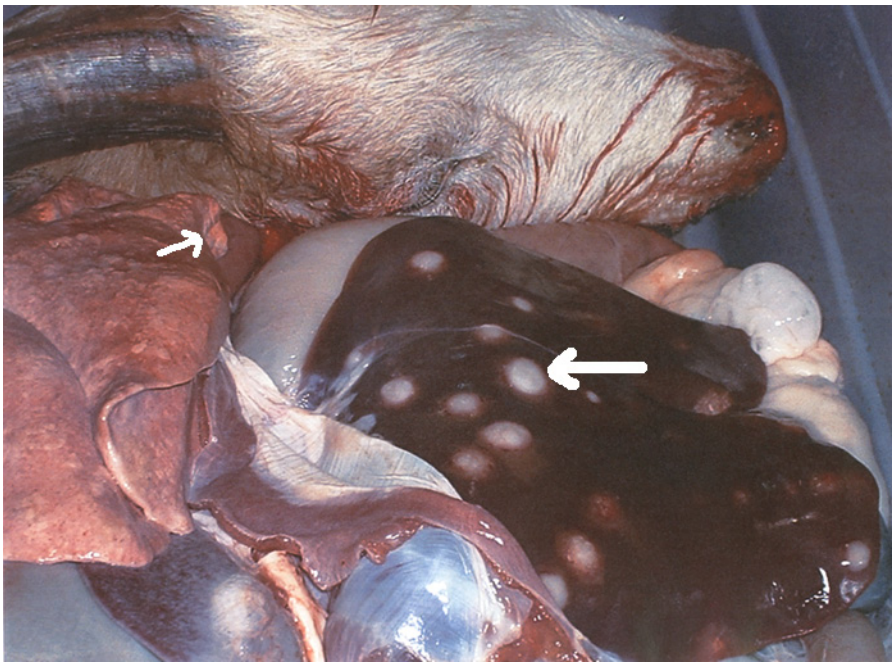


Figure 6. **Internal CL abscess in goat liver and lung.**

NOTE ON FORMALDEHYDE TREATMENT:
Although formaldehyde is effective in treating abscesses it can be caustic and irritant to the skin, mucosa membranes, and lungs. Formaldehyde is toxic, can be diffused through the skin to other organs, and has an accumulative effect in the goat's body. Formaldehyde is also a carcinogenic agent to humans and is not allowed in animals, including those consumed by humans. Some producers have reported losses of animals after the inoculation of formaldehyde in the treatment of CL abscesses. Formaldehyde can be found in the meat and milk after being infused in abscesses.

ment is of special concern as a hidden abscess might be ruptured during shearing.
- Cull infected animals from the herd to help reduce the risk of CL infection.
- Consider maintaining a closed herd.

Conclusion

Caseous Lymphadenitis or CL is of great economic importance because it can decrease profitability of the herds: meat, breeding stock marketing, wool, and reduce overall productivity of the herds. CL can be transmitted to other species including humans. It is imperative that producers, producers associations, governmental agencies, researchers and laboratories work together to develop ways to eradicate CL from our herds.

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Maria Leite-Browning, DVM, *Extension Animal Scientist,* Alabama A&M University

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