Clostridial Diseases

A PowerPage Presented By

Clostridial bacteria cause a multitude of diseases that affect animals. They produce endospores which are extremely resistant to heat, drought, and disinfectants. When they reach a favorable microenvironment in the host, they grow and release toxins. The specific toxin depends on the species of bacteria and determines the nature of the disease that is caused. For the most part, clostridial diseases are not contagious through direct transmission. This PowerPage reviews the various clostridial diseases in animals. These diseases are also summarized in chart form on the Clostridium PowerChart located in the non-species specific section of the PowerPages.

Blackleg (*Clostridium chauvoei)*

Transmission and Epidemiology

- Primarily affects sheep and cattle between 6 months and 2 years of age
- Endospores are ingested and then cross G.I. tract into the bloodstream
- Endospores become deposited throughout the body
- Bacteria become activated and multiply in an anaerobic environment, particularly **bruised or damaged muscle tissue**
    - This commonly occurs after **transport, handling, injection**, or other rough activity

Clinical Signs

- Lameness, fever, depression, anorexia
- Swelling with possible palpable **crepitus** from gas bubbles
- Animals may die rapidly without signs of illness (within 12-48 hours)

Diagnosis and Lesions

- Presumptive diagnosis can be based on gaseous swelling in a young animal
- On postmortem, the infected area is black and necrotic with gas bubbles
    - A **foul, sweet odor**, often described as resembling "rancid butter" is present

Treatment and Prevention

- The disease is often fatal unless identified early and treated with penicillin
    - Survivors may have permanent deformity
- Carcass should be immediately disposed of without contaminating environment
- Prevented by vaccination with 7-way bacterin vaccine
    - Often given as a "7-way" vaccine against *Clostridium chauvoei, septicum, novyi, sordellii* and *perfringens* types C & D

Malignant edema (*Clostridium septicum)-*

Also known as "Big Head" or "Swelled Head" in rams

Transmission and Epidemiology

- Primarily affects sheep but also cattle and goats, any age
- *C. septicum* is found in the G.I. tract of most domestic livestock and is shed in feces resulting in contamination through the pasture
- Disease develops when an **open wound** is infected with bacteria
    - May be introduced from **injury, castration, difficult parturition**, etc.

Clinical Signs

- Localized swelling and edema that may gravitate to dependant portion of the wound

- Depression, anorexia, high fever
- Death often occurs within 24-48 hours

Diagnosis and Lesions

- On postmortem, the infected area is darkened with a foul odor. There is **swelling without gas accumulation**

Treatment and Prevention

- Often fatal unless identified early and treated with penicillin
- Prevented by vaccination with 7-way bacterin vaccine

Redwater Disease (*Clostridium haemolyticum*)- Bacillary hemoglobinuria

Note: Do not confuse this with other conditions sometimes referred to as "Redwater" including Babesiosis

Transmission and Epidemiology

- Affects cattle and sheep
- Endospores are ingested and the bacteria lodge in the liver
- When damage occurs in the liver (often due to the **liver fluke**, *Fasciola hepatica*), the bacteria replicates
- The toxin released results in red blood cell lysis

Clinical Signs

- Reddish discoloration of urine due to **hemoglobinuria** secondary to red blood cell lysis
- Labored breathing
- **Anemia**, icterus
- Dehydration, fever

Diagnosis and Lesions

- Extremely pale animal with red urine in the bladder and thin, watery blood
- Often a **large necrotic area in the liver**

Treatment and Prevention

- Early treatment with antibiotics (penicillin or tetracycline) and antitoxin serum
- Prevented by vaccination with bacterin given every 6 months and by controlling liver flukes

Black Disease (*Clostridium novyi* type B)- Infectious Necrotic Hepatitis

Transmission and Epidemiology

- Primarily affects sheep but occasionally cattle on a high grain ration
- Endospores are ingested and the bacteria lodge in the liver (similar to *C. haemolyticum*)
    - In sheep, the liver fluke, *Fasciola hepatica* plays an important role in the disease in creating a desirable environment for the bacteria to grow
- Toxins released cause severe liver damage and result in red blood cell destruction

Clinical Signs

- Sheep are often found dead, with no evidence of clinical signs
- The disease is less common in cattle and clinical signs may be reluctance to move, lost appetite and a dull and listless appearance

Diagnosis and Lesions

- Large areas of damaged tissue in liver appear gray to black with a foul smell

Treatment and Prevention

- No effective treatment usually as disease often progresses rapidly
- Prevented by vaccination with 7-way bacterin vaccine

Tetanus (*Clostridium tetani*)

Transmission and Epidemiology

- Found worldwide and can affect most animals although **horses and pigs** are most susceptible
- Organism is found widespread in soil and is introduced through injuries such as **puncture wounds, castration sites, banding, and dehorning**
  - Organism **does not actively invade or create a larger wound**
- Incubation period of 10-21 days followed by production of a potent nervous system toxin

Clinical Signs

- Extended "**sawhorse**" stance
- Difficulty chewing food ("**lock jaw**")
- **Stiff tail, prolapsed third eyelid, flared nostrils**
- Severe muscle tremors/spasms
- **Sensitivity to noise** and movement

Diagnosis and Lesions

- Diagnosis is based on clinical signs; often no postmortem lesions are present

Treatment and Prevention

- Treated with tranquilization and antibiotics (penicillin), tetanus antitoxin, and supportive care to prevent dehydration or starvation
- Prevention with vaccination and by diligent cleaning of surgical instruments

Botulism (*Clostridium botulinum)*

Transmission and Epidemiology

- Relatively rare in livestock
- Usually **introduced through contaminated feed** where the organism has already produced high levels of toxin into the foodstuff

Clinical Signs

- **Ascending paralysis** leading to respiratory paralysis and death

Diagnosis and Lesions

- No specific postmortem signs

Treatment and Prevention

- No effective treatment, no vaccine

Enterotoxemia (*Clostridium perfringens* type C)

Transmission and Epidemiology

- Usually seen in **calves less than 7 days old**
- A normal GI tract inhabitant that only causes disease under certain circumstances

Clinical Signs

- Sudden onset, some calves may die without showing any symptoms
- Clinical signs include
  - Weakness
  - Abdominal distension
  - Bloody diarrhea
  - Convulsions
- Often associated with an increase in dietary intake allowing proper growth environment for bacteria

Diagnosis and Lesions

- Extremely **reddened sections of fluid filled small intestines**; "purple gut"

Treatment and Prevention

- Usually fatal once signs are present. Can attempt to treat by correcting dehydration and electrolyte imbalances with IV fluids and giving broad spectrum antibiotics and antitoxin
- Prevention by herd vaccination. Can vaccinate at birth with antitoxin (antiserum) or can vaccinate cows with toxoid

Clostridium sordellii

Transmission and Clinical Signs

- Route of transmission is unknown
- A cause of sudden death primarily in feedlot cattle

Diagnosis and Lesions

- Massive **black hemorrhage and muscle necrosis in the brisket and throat**

Treatment and Prevention

- No treatment
- Prevented by vaccination with 7-way bacterin vaccine

Overeating Disease (*Clostridium perfringens* type D)

Also known as "pulpy kidney disease" in sheep (name comes from rapid carcass decomposition which leads to pulpy kidneys on postmortem…this is not always found)

Transmission and Epidemiology

- More common in sheep than cattle, most commonly less than 2 years of age, typically on a high grain ration
- A normal GI tract inhabitant that only causes disease after excessive ingestion of feed or grain

Clinical Signs

- Decrease in appetite
- Weakness, incoordination
- Diarrhea
- Nervous signs, death

Treatment and Prevention

- Prevented by vaccination with 7-way bacterin vaccine