

BOTULISM

Etiology:

Botulism is caused by toxins. The toxins are produced by the bacterium *C. botulinum*, an anaerobic, gram-positive, spore-forming, rod-shaped organism.

Transmission

C. botulinum and *C. botulinum* spores are found in soil worldwide, in the intestinal tracts of mammals and fish, and internal organs of shellfish.

1. Transmission occurs when animals (including humans) ingest the toxins preformed by the bacteria or ingest the bacteria, which then start to produce toxins.
2. Preformed toxins are found in decaying carcasses; decaying vegetable matter; and improperly home-canned foods (especially vegetables with low acid content, such as green beans, beets, and corn) and fruits.
3. They can also be found in improperly cooked beef, pork, poultry, and milk products.
4. Transmission can also occur through a wound infection.
5. Feeding on an infected carcass can also be a source of infection, if eaten by another animal.

Clinical signs in animals

Cattle sheep and horses :

1. Drooling of saliva and tongue paralysis
2. Incoordination
3. Drooping eyelids
4. Lying down in sternal position

Clinical signs in humans

There are three forms of botulism in humans:

1. Foodborne botulism
2. Wound botulism
3. Infant botulism.

Foodborne botulism

The clinical signs of foodborne botulism usually appear within 12 to 36 hours following ingestion of the toxin in contaminated food.

1. There is no fever, but nausea, vomiting, abdominal cramping, and diarrhea.

2. The initial neurological signs include double vision, loss of pupillary response to light, drooping eyelids, difficulty eating, and dry mouth.
3. Death is usually due to respiratory failure.

Wound botulism

Most cases of wound botulism occur when an anaerobic wound is contaminated with *C. botulinum*, primarily from the soil.

1. Patient may develop a fever, and the wound may produce an exudate (pus).

Infant botulism

It usually affects babies less than 6 months old, although it may also be seen in older infants. Infant botulism results from ingestion of *C. botulinum* spores that grow in the gastrointestinal tract and produce toxins.

1. The initial sign of infant botulism, in over 90% of cases, is constipation.
2. This is followed by general weakness, poor feeding with swallowing difficulty, a weak or abnormal cry, and poor head control.

Diagnosis

In people, diagnosis of botulism is based on history, clinical signs, and detection of *C. botulinum* or its toxin in feces or serum.

Prevention in animals

1. Avoid feeding spoiled or contaminated feed.
2. Properly dispose of dead animals.
3. Do not allow animals to feed on dead animals or decaying carcasses.
4. Vaccines are available .

Prevention in humans

1. There is no vaccine to prevent botulism in humans.
2. Wash all foods well before processing them.
3. Before eating home-canned foods, examine the container and the food.
4. Cook home-canned vegetables and meats before eating .
5. Honey should not be fed to children under 1 year old because it may contain spores of *C. botulinum*.
6. All wounds or cuts should be cleaned well and properly bandaged if necessary.

Brucellosis

Etiology

Brucellosis is an infectious disease caused by gram-negative intracellular bacteria of the genus *Brucella*. The *Brucella* genus consists of a variety of different species, including *B. abortus*, *B. melitensis*, *B. suis*, *B. ovis*, and *B. canis*. Humans are susceptible to infection with *B. abortus*, *B. melitensis*, *B. suis*, and *B. canis*.

Transmission

Transmission of brucellosis can occur by

1. Direct contact and aerosol routes.
2. The highest concentration of the bacteria in infected animals is found in vaginal discharges, semen, and urine but can also be found in milk, blood, placenta, and fetal fluids and tissues.
3. *Brucella* can infect a susceptible host by entering through mucous membranes, breaks in the skin, and ingestion.
4. In cattle, the udder is often colonized due to direct contact of contaminated hands.
5. Fomites (inanimate objects).
6. Humans can become infected by ingesting contaminated, unpasteurized milk and cheese products or by direct contact or aerosolization of contaminated bodily fluids of infected animals.

Clinical Signs in Animals

1. Abortions are common and may be the only sign of brucellosis.
2. Other reproductive complications include retained placenta, decreased lactation, stillbirths, and infertility.
3. Arthritis.
4. Mastitis and lameness.

Clinical Signs in Humans

1. Brucellosis in humans can cause similar symptoms as the flu.
2. It generally has an acute onset of intermittent fever, headache, weakness, malaise, fatigue, profuse sweating, depression, weight loss, generalized aching, vomiting, and diarrhea.
3. Many people have spontaneous recovery after a period of 2–4 weeks.

4. With chronic infections, an undulating fever (fever can come and go) is common along with irritability, insomnia, mental depression, and emotional instability. Chronic cases can last from 3 months to a year or more without treatment .

Diagnosis

1. Brucellosis can be diagnosed by serology, culture.
2. Serology is most commonly used for diagnosis. Serological testing include rapid slide agglutination test, IFA, and ELISA.
3. Brucella can also be detected by culturing blood, semen, urine, vaginal secretions, and milk.

Prevention

1. Vaccinations for Brucella are available for cattle, sheep, and goats.
2. If working with infected animals and/or carcasses, be sure to wear the proper protective clothing (boots, impermeable clothing, gloves, face masks, goggles)
3. Practice good hand hygiene before and after handling the animals.
4. Ensure that proper environmental cleaning and disinfection is performed, especially after handling aborted fetuses and fluids.
5. Avoid consumption of raw milk and unpasteurized dairy products.

Campylobacter

Etiology

Campylobacteriosis is an intestinal bacterial infection caused by a gram-negative bacterium called Campylobacter. There are three main strains that tend to cause disease in domestic animals and humans: *C. jejuni* and *C. coli*, and *C. fetus*.

Transmission

1. Campylobacter is usually transmitted via the fecal–oral route by direct contact or by contaminated fomites.
2. The bacteria can be found in feces, vaginal discharges, aborted fetuses, fetal membranes, and semen, which can in turn contaminate food and water sources.
3. Contact with infected pets
4. Consumption of undercooked meats and poultry, raw milk, and unchlorinated water (swimming lakes) are common sources of Campylobacter.
5. Flies can also be transmitting the bacteria.

Clinical Signs in Animals

1. In calves and other young livestock, clinical signs may include thick, mucoid diarrhea with occasional flecks of blood, and possible fever.
2. In cattle, infection may cause infertility, early embryonic death, and a prolonged calving season.
3. Abortions, stillbirths, and weak lambs can occur in sheep.
4. Infections in sheep can be followed by metritis and occasionally death.

Clinical Signs in Humans

1. Diarrhea, abdominal pain, malaise, fever, nausea, and vomiting.
2. Chronic cases may cough, headache, signs of meningitis, weight loss, and possibly abortion in the latter half of pregnancy

Diagnosis

1. Diagnosis of campylobacteriosis is achieved most commonly by fecal culture.
2. In humans, serologic testing is available; however, there is currently no serological testing available for infected animals.

Prevention

1. Campylobacter is susceptible to many disinfectants, including, bleach, ethanol, and phenolics.
2. Good hand hygiene.
3. Control of flies and rodents.
4. Fecal contamination into water and feed sources should be prevented.
5. Vaccines can be used to prevent abortions in sheep.
6. Humans should also avoid consuming untreated water (swimming in contaminated lakes), unpasteurized milk products, and undercooked chicken.

Salmonellosis

Etiology

Salmonellosis is caused by a gram-negative, aerobic, rod-shaped bacteria. There are over 2400 different serotypes of *Salmonella* spp., but the most typical ones seen in clinics and humans are *S. enteritidis* and *S. typhimurium*. *Salmonella* is naturally found in many wild and domestic animals.

Transmission

1. Transmission can occur by ingesting the bacteria in contaminated food, such as undercooked meat, and water sources.
2. Transmission can occur by the fecal–oral route via contaminated hands.
3. Both animals and humans can be carriers without being clinical for this infection.

Clinical Signs in Animals

1. Most infected patients develop gastroenteritis signs, including vomiting, diarrhea, fever, anorexia, malaise, and abdominal pain.
2. Severely dehydrated.
3. Infection can also cause abortions and joint problems.

Clinical Signs in Humans

1. In humans, Salmonella is associated with a sudden onset of headache, abdominal pain, cramping, diarrhea, nausea, vomiting, and/or dehydration.

Diagnosis

Isolation of the Salmonella by culture is the most definitive way to diagnose salmonellosis and serology test.

Prevention

1. Isolation precautions include disposable gloves, and boot covers; face shield; and excellent hand hygiene.
2. If possible, all equipment should be designated for an isolation area only. However, if the equipment must be used on other patients, it must be properly cleaned and disinfected before use.
3. Wash hands thoroughly with warm water and soap after using the bathroom, changing a diaper, or contact with animals; always wash hands before handling food.
4. Wash and properly store all vegetables and fruits.
5. Avoid cross-contamination from contaminated food to uncontaminated food.
6. Avoid eating raw or undercooked meats and poultry.
7. Vaccines are available for a few serotypes but do not offer protection for all the zoonotic serotypes.



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