

## Contagious Bovine Pleuropneumonia (cbpp)

**Etiology:** *Mycoplasma mycoides subspecies mycoides*, a Gram-negative bacteria consisting of cells bounded by plasma membrane. Its organisms differ from other bacteria in that they are deficient in cell walls.

### Definition:

Contagious bovine pleuropneumonia is highly contagious and generally accompanied by pleurisy. Susceptible cattle become infected by inhaling droplets disseminated by coughing in affected cattle. The organism can also be found in saliva, urine, fetal membranes, and uterine discharges. Transplacental infection of the fetus can occur. The incubation period varies, but most cases occur 3–8 wk after exposure. Of recovered animals, 25% may become carriers with chronic lung lesions.

### Epidemiology:

- CBPP is widespread in Africa and occurs in some countries of Asia and Europe with minor outbreaks occurring in the Middle East.
- In some localities, susceptible herds may show up to 70% morbidity, but much lower infection rates (~10%) associated with clinical signs are more common. Mortality is likely to be ~50% in herds experiencing the disease for the first time
- The focus of infection is often provided by recovered 'carrier' animals in which a pulmonary sequestrum preserves a potential source of organisms for periods as long as 3 years
- The principal route of infection is by the inhalation of infective droplets from active or carrier cases of the disease.

### Economic impacts:

- ☞ The direct losses are from mortality, reduced milk yield, vaccination costs, disease surveillance and research programs
- ☞ The indirect costs are due to the chronic nature of the disease including:
  - Reduced fertility
  - Losses due to quarantine
  - Loss of cattle trade
  - Loss of weight and working ability
  - Delayed marketing

### **Clinical Findings:**

- **In acute cases**, signs include fever up to 107°F (41.5°C); anorexia; and painful, difficult breathing, agalactia and cessation of rumination.
- In hot climates, the animal often stands by itself in the shade, its head lowered and extended, its back slightly arched, and its elbows turned out.
- Percussion of the chest is painful; respiration is rapid, shallow, and abdominal. soft, moist cough at first only on exercise may result.
- The disease progresses rapidly, animals lose condition, and breathing becomes very labored, with a grunt at expiration.
- Auscultation reveals pleuritic friction sounds in the early stages of acute inflammation, and dullness, fluid sounds and moist gurgling crackles in the later stages of effusion.
- Edematous swellings of the throat and dewlap may occur and swelling of the large 'movable joints may be present
- The animal becomes recumbent and dies after 1–3 wk.
- Chronically affected cattle usually exhibit signs of varying intensity for 3–4 wk, after which the lesions gradually resolve and the animals appear to recover.
- Subclinical cases occur and may be important as carriers. Infected calves may present primarily with polyarthritis that is seen as swelling of joints and lameness.

### **Clinical Pathology**

1. Isolation or detection of organism Isolation of the organism is essential for the diagnosis. The organism is nutritionally very fastidious and special laboratory media is required for growth and identification by PCR or Latex agglutination test).
2. Serological tests such as (CFT or ELISA).

### **Necropsy findings:**

1. The thoracic cavity may contain up to 10 L of clear yellow or turbid fluid mixed with fibrin flakes, and the organs in the thorax are often covered by thick deposits of fibrin.
2. The disease is largely unilateral, with more than 80%–90% of cases affecting only one lung. The affected portion is enlarged and solid. On section of the lung, the

typical **marbled appearance** of pleuropneumonia is evident because of the widened interlobular septa and subpleural tissue that encloses gray, yellow, or red consolidated lung lobules.

3. In chronic cases, the lesion has a necrotic center sequestered in a thick, fibrous capsule, and there may be fibrous pleural adhesions. Organisms may survive only within the inner capsule of these sequestra, and these animals may become carriers.

**Diagnosis:**

1. Clinical signs and the characteristic gross pathologic lesions of the lungs.
2. Complement fixation, latex agglutination, or competitive ELISA tests can be used to aid definitive diagnosis.
3. Confirmation is often by isolation of the mycoplasma followed by growth inhibition or immunofluorescence test using hyperimmune rabbit sera against the mycoplasma, or increasingly by PCR.

**D.D:** Diseases which must be differentiated from CBPP include:

- **Rinderpest** Erosive stomatitis, dysentery,
- **FMD:** Salivation, lameness, fever, and vesicular stomatitis
- **Hemorrhagic septicemia** Acute disease with death in 6 to 72 hours. Edema of the neck and brisket, lung lesions similar to CBPP.
- **Theileriosis** (East Coast fever) :Coughing, nasal and ocular discharge, diarrhea, enlargement of peripheral lymph nodes, ulceration of abomasum. No lung lesions
- **Ephemeral fever** Ocular discharge, drooling saliva, lameness, enlarged joints, self-limiting disease of short duration; most affected cattle recover quickly;
- **Pulmonary abscesses** Large abscesses containing foul-smelling purulent material; may have total destruction of lung
- **Tuberculosis** Tubercular nodules may resemble CBPP sequestra but they are degenerative cheese-like lesions, often calcified.
- **Echinococcal** (hydatid cysts) Pulmonary cysts with a double wall and containing clear fluid, often calcified when old
- **Actinobacillosis** Generalized lesions of lung and other adjacent tissues
- **Farcy** Abscesses of lungs containing foul smelling material and enlarged local lymph nodes

**Treatment** is recommended only in endemic areas because the organisms may not be eliminated, and carriers may develop as antibiotic is ineffective in chronic cases. Tylosin (10 mg/kg, IM, bid, for six injections) and danofloxacin 2.5% (2.5 mg/kg/day for 3 consecutive days) have been reported to be effective.

**Control:**

- ☞ The disease is reportable by law in many countries from which it has been eradicated by slaughter of all infected and exposed animals.
- ☞ In countries where cattle movement can readily be controlled, the disease can be eradicated by quarantine, blood testing, and slaughter.
- ☞ Where cattle cannot be restricted, the spread of infection can be limited by immunization with attenuated vaccine (eg, T1/44 strain). However, the vaccine is effective only if herd coverage within a country is high.
- ☞ Tracing the source of infected cattle detected at abattoirs, blood testing, and imposition of strict rules for cattle movement also can aid in control of the disease in such areas. Because carriers may not be detectable clinically or serologically, they constitute a serious problem in control programs.

