Contagious Bovine Pleuropneumonia

Importance
Contagious bovine pleuropneumonia (CBPP) is extremely infectious in cattle, and causes lung and occasionally joint disease. Economic losses can be significant due to high infectivity and the presence of chronic subclinical carriers. The response to antibiotic treatment can be incomplete, creating chronic carriers; therefore slaughter is generally recommended for infected animals. Humans have not been found to be susceptible to contagious bovine pleuropneumonia.

Etiology
Mycoplasma mycoides mycoides small colony type (SC type) is the causative agent of contagious bovine pleuropneumonia. *M. mycoides mycoides* large-colony type is not pathogenic in cattle, but in sheep and goats can cause septicemia, polyarthritis, mastitis, encephalitis, conjunctivitis, hepatitis, and occasionally pneumonia. Contagious caprine pleuropneumonia is caused by a different *Mycoplasma* agent (see contagious caprine pleuropneumonia outline).

Species affected
The genus *Bos* including European breeds *Bos taurus*) and zebu (*Bos indicus*) cattle are the main hosts for contagious bovine pleuropneumonia. European breeds seem to be more susceptible than African breeds. Animals less than 3 years old are also more susceptible. Bison and yak have been infected in zoos, and infections have been reported in water buffalo (*Bubalus bubalis*). Wild bovids and camels are resistant.

Geographic distribution
Contagious bovine pleuropneumonia is endemic in Africa, the Middle East, and parts of Asia (especially India and China). Contagious bovine pleuropneumonia is not currently found in the Western hemisphere. The United States has been CBPP-free since 1893.

Transmission
Close contact is necessary for transmission, which occurs primarily through the inhalation of infected droplets from a coughing animal. The organism is also present in saliva, urine, fetal membranes, and uterine discharges. Transplacental infection has been known to occur. Introduction of a carrier animal to a susceptible herd is the most common cause of outbreaks.

Incubation period
The incubation period for contagious bovine pleuropneumonia can be long (20-123 days). After experimental direct tracheal infection, the clinical signs appear in 2-3 weeks.

Clinical signs
In adult animals, lethargy, anorexia and fever are the first signs of CBPP, followed by a cough. The signs progress to include thoracic pain, dyspnea, an increased respiratory rate, and elbow abduction. Animals with chronic infections have less obvious signs of pneumonia, but may cough with exercise. These animals are often thin and may have a

recurrent mild fever. Infected calves commonly have polyarthritis with or without pneumonia. Joints may be warm and swollen and extremely painful.

Post mortem lesions

The post mortem lesions of CBPP include thickening and inflammation of lung tissues with extensive fibrin accumulation. Large amounts of straw-colored fluid may be present in the thoracic cavity. A characteristic marbled appearance of the affected lungs is caused by the presence of both acute and chronic lesions in the interlobular septa. Edema progresses to fibrin and then fibrosis. Encapsulated sequestra containing necrotic tissue can be found even in recovered animals. The organism can survive for many months within these sequestra.

Morbidity and Mortality

Morbidity and mortality rates vary greatly. Morbidity increases with close confinement. Mortality can be affected by secondary factors in overall health such as nutrition and parasitism and can range from 10 to 70 percent.

Diagnosis

Clinical

Contagious bovine pleuropneumonia is difficult to diagnose based on clinical signs alone as there can be many causes of severe pneumonia in cattle. Animals CBPP frequently present with unilateral pneumonia. In a herd with signs of pneumonia in adults and polyarthritis in calves, CBPP should be considered. Post mortem lesions may be more useful in the diagnosis.

Differential diagnosis

Differentials for acute infections include acute bovine pasteurellosis, and bronchopneumonia and pleuropneumonia resulting from mixed infections. Bovine pasteurellosis generally spreads more rapidly through a herd, so may be distinct. Chronic infections should be differentiated from hydatid cyst, actinobacillosis, tuberculosis, and bovine farcy.

Laboratory tests

Mycoplasma mycoides mycoides is isolated and identified by metabolic and growth inhibition tests, MF-dot test and polymerase chain reaction. Serological tests include complement fixation (used only for herds, not individual diagnosis), competitive ELISA (under validation by International Atomic Energy Agency and several reference laboratories) and hemagglutination. An agglutination test is available for use in active outbreaks at the herd level.

Samples to collect

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Before collecting or sending any samples from animals with a suspected foreign animal disease, contact the AVIC. These samples should only be sent under secure conditions, by authorized personnel, and to authorized laboratories to prevent the spread of disease.

Samples include lung lesions, pleural fluids, lymph nodes, and lung tissue exudate. These should be not be frozen for isolation of the organism. Acute and convalescent serum samples can also be tested.

Recommended actions if contagious bovine pleuropneumonia is suspected

Notification of authorities

Contagious bovine pleuropneumonia should be reported immediately to state or federal authorities upon diagnosis or suspicion of the disease. Federal: Area Veterinarians in Charge (AVICS) http://www.aphis.usda.gov/vs/area_offices.htm
State vets: http://www.aphis.usda.gov/vs/sregs/official.html

Quarantine and Disinfection

Quarantine of exposed and infected animals is recommended along with testing and slaughter of infected animals. Antibiotic treatment is not effective due to the sequestration of the organism. *M. mycoides mycoides* (SC type) may survive in the environment for a few days, but does not survive in meat or meat products. It is inactivated by common disinfectants. The organism survives well with freezing.

Public health

Humans have not been found to be susceptible to *Mycoplasma mycoides mycoides*.

For More Information

World Organization for Animal Health (OIE)
http://www.oie.int

OIE Manual of Standards
http://www.oie.int/eng/normes/mmanual/a_summry.htm

OIE International Animal Health Code
http://www.oie.int/eng/normes/mcode/A_summry.htm

USAHA Foreign Animal Diseases book
http://www.vet.uga.edu/vpp/gray_book/FAD/

References

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"Contagious Bovine Pleuropneumonia." In *The Merck Veterinary Manual*, 8th ed. Edited by S.E. Aiello and A. Mays. Whitehouse Station, NJ: Merck and Co., 1998, pp. 1078-1079.

Brown, Corrie "Contagious Bovine Pleuropneumonia." In *Foreign Animal Diseases.* Richmond, VA: United States Animal Health Association, 1998, pp. 154-160.

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