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Bacillary Hemoglobinuria (Redwater Disease) In Cattle

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Bacillary hemoglobinuria is an acute infectious disease of cattle caused by *Clostridium hemolyticum*, a spore-forming bacterium. Synonyms include redwater disease and infectious hemoglobinuria. The disease occurs primarily in cattle, rarely in sheep and hogs, and has been reported most frequently in the western United States, along the Gulf of Mexico and in South America.

Bacillary hemoglobinuria poses a constant threat to susceptible cattle, particularly since the spore form of the organism can survive for long periods of time outside the animal. The disease occurs most often in lowland pastures, intermountain meadows and valleys and in poorly drained irrigated lands. It is rarely seen in dry upland ranges where cattle have little or no access to stagnant surface water.

Flood waters can carry the disease organisms from infected to previously noninfected areas. Also, some animals that have had mild attacks of the disease may serve as immune carriers and shed the organisms in the feces. Therefore, the disease is transmitted to susceptible cattle by ingestion of feces, meat and bones of carcasses, surface water and soil that are contaminated with the disease organisms.

Susceptibility will vary somewhat, especially in herds where the disease is prevalent. Animals from these herds are often immune to the disease because of prolonged exposure to the organism or because of subclinical infections. In non-infected areas where cattle are suddenly exposed, the disease often affects animals 6 to 12 months of age. The disease usually occurs during the summer and early fall, less frequently during other seasons.

Clinical signs include rapid onset, sudden cessation of appetite, lactation and rumen and bowel movements, shallow and labored breathing, elevated temperature (103 to 106°F), increased and weakened pulse, reluctance to move and extreme weakness.

Within 48 to 72 hours, the animal will pass a characteristic dark red, clear, foamy urine, and blood or bile-stained mucoid feces.

Pregnant cows may be sick only 10 to 12 hours before death. Clinical signs may persist for 3 to 4 days before causing death in nonpregnant cows, bulls and steers. The expected death rate is 95% in untreated animals.

The organisms that cause redwater disease are believed to localize and remain dormant in the liver of certain cattle, then suddenly begin rapid growth after the liver has been damaged in some manner. Liver damage has often been attributed to the effects of liver flukes although other causes have also been reported.

The rapidly growing organisms produce and secrete two potent toxins in infected animals, one which causes massive rupture of circulating red blood cells and the other which causes severe damage to the lining of blood vessels and other tissues. At death, from 60 to 80% of the red blood cells are destroyed and the hemoglobin escapes through the damaged blood vessels, resulting in a red discoloration of the urine, feces and tissues of the major internal organs. Other post mortem lesions include an enlarged, discolored liver with necrotic areas, variable sized hemorrhages in many of the major organs, rapid onset of rigor mortis and a pungent disagreeable carcass odor.

Diagnosis of bacillary hemoglobinuria is based on the history, clinical signs, post mortem lesions and by laboratory methods including bacteriology, serology and fluorescent antibody techniques. Other diseases that may be confused with bacillary hemoglobinuria include leptospirosis, other anemias, anthrax, black leg and infectious necrotic hepatitis.

Because of the rapid onset and short clinical course of the disease, prompt treatment is essential.

Large doses of penicillin or broad-spectrum antibiotics are injected at 12-hour intervals. Replacement fluid therapy is also helpful. Sick animals should also be protected from inclement weather, given adequate rest and supplied with adequate feed and water. Handling and restraint of animals should be limited to avoid the chance of sudden death from overexertion. Dead carcasses should either be burned or deeply buried to eliminate spread of organism's spore forms to other cattle.

The most effective method of preventing the disease in infected areas is by vaccination. Commercial bacterins now available confer an immunity for about 6 months. In areas where the disease occurs throughout the year, 2 to 3 vaccinations are required annually for all cattle over 6 months of age. In areas where the disease occurs seasonally, a single injection of bacterin given to all cattle 6 months of age and older 3 to 4 weeks before they are turned out onto infected pastures is usually enough. All cattle transported from a noninfected into an infected area must be vaccinated as soon after arrival as possible.

Similarly, all cattle in contact with other cattle from an infected area should be vaccinated.

Research Needs

Recent studies have shown there are methods available to produce vaccines which will stimulate a long-lasting immunity in cattle. Research is needed to develop a vaccine for bacillary hemoglobinuria in cattle which will produce a higher level of immunity for a longer period than is currently available.

Liver fluke infections are apparently an important factor in the development of bacillary hemoglobinuria in cattle. Effective methods of treating and preventing liver fluke disease in cattle could also help reduce the incidence of bacillary hemoglobinuria. Research on liver fluke control is currently being conducted at the University of Idaho Research and Extension Center at Caldwell and at the Washington State University Northwest College of Veterinary Medicine.