

Pasteurellosis (Hemorrhagic septicemia)





Definition.

Respiratory disease is common among camels, as shown by the reports of bronchopneumonia and pneumonia lesions at abattoirs, but little is known of the complex aetiology of these diseases. Pasteurellosis / Hemorrhagic septicemia is an acute fatal disease of camels caused by *Pasteurella multocida* type A or several serotypes of *Mannheimia haemolytica* is characterized by fever, edema of the throat region, dyspnea, and sudden death. *P. multocida* type A is considered to be a common inhabitant of the upper respiratory tract and it may cause disorders, in association with other microorganisms such as parainfluenza type 3 virus, in animals weakened by exposure to cold, malnutrition or gastro-intestinal parasitism.

Aetiology.

The disease is caused by certain serotypes of *Pasteurella multocida*, a Gram-negative Coccobacillus Order: Pasteurellales. Family: Pasteurellaceae. *Pasteurella multocida* type A or several serotypes of *Mannheimia haemolytica* are the cause of pneumonic pasteurellosis in camels. Both organisms are residing mostly as a part of the normal respiratory flora of camels and other animals. . It may become pathogenic when the vitality of the camel is lowered by malnutrition, parasitism or due to inclement weather such as high humidity or rainfall.

Epidemiology.

The worst epidemics occur during the rainy season, animals in poor physical condition. The disease is primarily found when the resistance of the body is lowered by harmful environmental influences such as transportation over long distances, deficiencies of dietary vitamins and minerals, heavy parasitic infestation, and sudden changes in weather. It has also been observed that pasteurellosis is commonly observed in camels when there is a history of trypanosomiasis. In other domestic animals, the parainfluenza-3 virus plus *Pasteurella* organism are well established as the cause of hemorrhagic septicemia. Pasteurellosis occurs in camels throughout Egypt, Somalia, Saudi Arabia, India, Iran, Iraq, and Russia.

P. multocida is transmitted by direct contact with infected animals and on fomites. Camel become infected when they ingest or inhale the causative organism, which probably originates in the nasopharynx of infected animals. In endemic areas, up to 5% of cattle and water buffalo may normally be carriers. *P. multocida* can survive for hours and possibly days in damp soil or water; viable organisms are not found in the soil or pastures after 2-3 weeks. Biting arthropods do not seem to be significant vectors. Morbidity depends on immunity and environmental conditions, including both weather and husbandry; morbidity is higher when animals are herded closely, in poor condition, or exposed to wet conditions. Mortality is nearly 100% unless the animal is treated very early in the disease; few animals survive once they develop clinical signs. Antibiotic treatment is effective if it is started very early, during the pyrexia stage. Various vaccines can provide protection for 6–12 months.



Clinical Signs.

In camels infection associated with *Pasteurella Multocida* and *Mannheimia haemolytica* shows a wide range of pulmonary and septicaemic infections. *M. haemolytica* infections include primary and secondary pneumonia (pneumonic pasteurellosis). *P. multocida* is associated with hemorrhagic septicaemia in adults and enzootic pneumonia complex in young animals. Immune status and severity of infection depends on the predisposing factors like stress, climate change, Herd health status, deficient nutrition, concomitant infections, and virulence factors. Acute febrile respiratory disease with fulminating fibrinopurulent bronchopneumonia and fibrinous pleurisy. Disease develops within 10 to 14 days (cough, dyspnea, mucopurulent nasal and ocular discharges). Animals may die as a result of toxemia (young animals (2-3 days) before development of pulmonary lesions.

There are three different clinical forms in camels with *Pasteurella* infection: peracute, acute, and abdominal forms. It has been suggested that the acute form is identical to hemorrhagic septicemia. Clinical signs of pasteurellosis include increased rectal temperature (40°C), pulse, and respiration rate, dyspnea, dullness, depression, and abdominal pain associated with hemorrhagic enteritis. There is subcutaneous swelling of the neck and between the mandibles. Mandibular and cervical lymph nodes also become enlarged and painful. Affected camels also show signs of dilated nostrils and open-mouthed breathing. In some cases, there is a tar colored feces (melena), abdominal pain, and coffee colored urine. Prognosis is guarded in these cases. Both recovered and sick animals will discharge the organism through excretions and secretions of the body.

Laboratory diagnosis.

P. multocida is not always found in blood samples before the terminal stage of the disease, and is not consistently present in nasal secretions or body fluids of sick animals. Blood from tips of ears (from live animal only). In freshly dead animals, a heparinised blood sample or swab should be collected from the heart within a few hours of death, and a nasal swab. A long bone should be taken from animal that have been dead for a long time. Other visceral organs may also be sampled if a necropsy is not feasible, blood samples can be taken from the jugular vein by aspiration or incision; blood samples should be placed in a standard transport medium and transported on ice packs. Spleen and bone marrow provide excellent samples for the laboratory, as these are contaminated relatively late in the post-mortem process by other bacteria.

Identification of the agent.

The diagnosis of HS depends on the isolation of the causative organism, *P. multocida*, from the blood or bone marrow of a dead animal by cultural and biological methods, and the identification of the organism by biochemical, serological and molecular methods.

Blood smears from affected animals can be stained with Gram, Leishman's or methylene blue stains. The organisms appear as Gram-negative, bipolar-staining short bacilli.

No conclusive diagnosis can be made on direct microscopic examinations alone.



Samples may be cultured on casein/sucrose/yeast agar containing 5% blood.

Conventional blood agar may also be used. Details, including biochemical methods for identification of the organisms. Serotyping methods include the rapid slide agglutination test, indirect haemagglutination test, somatic antigen agglutination tests, agar gel immunodiffusion and counter immunoelectrophoresis. Details are found in the OIE Terrestrial Manual.

PCR technology can be applied for rapid, sensitive and specific detection of *P. Multocida*; the rapidity and high specificity of two of the *P. multocida*-specific assays provide optimal efficiency without the need for additional hybridisation

Although the use of hybridisation can confirm specificity, this approach is usually possible only in specialised laboratories. The *P. multocida*-specific PCRs identify all subspecies of *P. multocida*.

Once presumptive (or definitive) identification has been made, further differentiation of isolates can be achieved by genotypic fingerprinting methods. PCR fingerprinting is feasible for any laboratory with PCR capability.

Prevention and control.

Medical prophylaxis: -

Antimicrobial susceptibility testing (AST) is particularly necessary for *P. multocida* for which resistance to commonly used antimicrobial agents has occurred. The following agents have proven their clinical efficacy: penicillin, amoxicillin (or ampicillin), cephalothin, ceftiofur, cefquinome, streptomycin, gentamicin, spectinomycin, florfenicol, tetracycline, sulfonamides, trimethoprim/sulfamethoxazole, erythromycin, tilmicosin, enrofloxacin (or other loroquinolones), Amikacin and norfloxacin.

Inactivated vaccines:-

Vaccination is routinely practiced in endemic Areas Three preparations are used – dense bacterins combined with either alum adjuvant or oil adjuvant, and formalin-Inactivated bacterins; the oil adjuvant bacterin is thought to provide protection for up to one year and the alum bacterin for 4–6 months. Maternal antibody interferes with vaccine efficacy in calves.

References.

1. OIE Terrestrial Animal Health Code. www.oie.int/en/international-standard-setting/terrestrial-code/access-online/
2. Bacterial diseases of dromedaries and bactrian camels, I.E.MUSTAFA Executive Vice-Chancellor, University of the Sudan in Kordofan.
3. The Merck Veterinary Manual. 2015 Veterinary Edition.