

Babesiosis a Protozoan Borne parasitic Disease in Dairy Industry and its Prevention Protocol

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ABSTRACT

Babesiosis or red water disease is a fatal disease of Livestock. Livestock should be diagnosed early, and proper steps should be taken for its control, for proper eradication of this disease

Introduction

The livestock industry is an integral part of agriculture. In Pakistan round, about 65% of people are directly or indirectly connected with the agricultural background from which they meet their daily needs. In Pakistan Livestock has great socio-economic importance because many small Dairy holder farmers are earning by selling milk, meat, and animals. Hence being Pakistani our livestock industry is at the top due to most of the peoples having direct livelihood on animals' by-products like milk, meat eggs as well sale of animals. The livestock industry is at risk due to many diseases of infectious origin. Protozoan-born parasitic diseases like Theileriosis, Babesiosis, Trypanosomiasis, Anaplasmosis, Toxoplasmosis, etc. are heavily important in contexts of economics, livestock, and public health. Among all protozoan diseases, Babesiosis is a disease of vulnerable and vital importance that is commonly termed Red Water Fever in field conditions [1].

Babesiosis is a tick-transmitted haemoprotozoan infection of cattle, buffalo, horses, sheep, goats, and wild animals. There are over 100 species of *Babesia* identified, however only a handful of species have been documented as pathogenic in humans. People who contract Babesiosis suffer from malaria-like symptoms. As a result, malaria is a common misdiagnosis of the disease. The disease is most common in exotic and crossbreeds. In cattle, the highest infection rate is observed at 6-12 months of age. It has been recorded in a 14-day-old cow calf in a sub-acute manner. Ticks of the family Ixodidae are the main source of transition during the hot and humid season via transovarial as well as transstadial transmission [2]. The disease is transmitted under natural conditions through ticks. *Rhiphcephalus microplus* and *R. annulatus* are the major vectors of bovine. Babesiosis is transmitted by *Rhiphcephalus*, haemaphysalis, Dermacentor, and Ixodes ticks also [3]. In general, the disease is transmitted transovarially and transcardially. It is also transmitted by parenteral injection of infected blood or organ emulsion or blood transfusion. Blood donor should be negative for Babesiosis

Life cycle

The life cycle of Babesiosis starts with infection of hard ticks *Boophilus microplus*. The protozoa *Babesia* are transmitted in host blood when ticks feed on the blood of cattle. Protozoa enter the red blood cells via saliva. In RBCs, the parasite proliferates by asexual reproduction and produces multiple copies. The cell increases in size and the cell bursts many merozoites in the blood that further attack the next RBCs micro and macro gametes formation occurs, so multiplication continues. The infected RBCs are again fed by ticks by blood from the host and micro as well micro gametes will go into gametogenesis to form a zygote in the mid-gut of the tick. The ultimate developmental stage of the zygote converts into sporozoite in the salivary gland of the ticks. The sporozoite is in the final stage and is shifted again by saliva during feeding on host blood from ticks. In this way, the whole life cycle of Babesiosis continues throughout the season [5].

Clinical signs

The incubation period varies depending on the species of babes involved and it ranges from 5-10 days. Multiplication of protozoa occurs in peripheral vessels and there is intravascular hemolysis. It has been pointed out that proteolytic enzymes are liberated from the infected erythrocytes. These enzymes interact with components of blood and thus increase. Erythrocytic fragility, hypotensive shock, and disseminated intravascular coagulation. It is also postulated that coating of R.B.C by parasitic antigen neutralizes the normal surface charge and thereby favors auto agglutination of R.B.C. Complete Anorexia, Ruminant atony, anemia, decrease body weight, constipation, high fever 105F to 106F, Parasitemia,

Haemoglobinurea are the main clinical attributes. Death occurs due to anemic anoxia [6].

Diagnosis

History, Clinical signs-Hemoglobinuria is the cardinal sign, Examination of a blood smear, ELISA.PCR is a helpful tool for the diagnosis of disease.

Treatment

1. Imidocarb Dipropionate This is used @ 2.5 mg/kg body weight.
2. Diminazine @ 12 mg/kg body weight by deep intramuscular
3. Analgesic, antipyretic for control of fever and abdominal pain
4. Iron sulfate intravenously
5. Whole blood therapy to correct severe anemia
6. Avoid *Ixodes* habitat and contact with tick-infested vegetation
7. Wear clothing consisting of a long-sleeved shirt, long pants, and boots
8. Use a repellent and treat clothing
9. Development of tick-resistant breeds of cattle that would resist the ticks like Sahiwal breeds.
10. Avoid a hot and humid environment that is suitable for tick survival.
11. Continuous usage of permethrin spray in cravings sends services in the shed of animals favors satisfactory results.

Babesiosis is the Major threat in the livestock industry during the summer season during which arthropod-born vector activity is high. So, we can avoid such huge losses in terms of production (Milk production, Meat, Mutton) Reproduction (calving interval, Abortion, Mummification Maceration problems), and Mortality Rates by following the above-mentioned control strategies.

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