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Transplacental transmission of Babesiosis in six week old Holstein Friesien Calf

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Abstract

Bovine babesiosis caused by different species of intraerythrocytic *Babesia* mainly *Babesia bigemina* and *Babesia bovis*. Babesiosis is mainly transmitted by ticks, however, transuterine/ transplacental transmission can not be ignored. In the present study both mother and its 42-day- old calf were infected with babesiosis. Since simultaneous infection of babesiosis in mother and its young calf has not been reported so far, hence it is placed on the record. Due to good body condition score and young age of the calf, after the treatment, very next day coffee colored urine became clear which is indicating, timely treatment of babesiosis in young calves is highly effective.

Keywords: *Babesia bigemina*, transplacental, young calf, parasitaemia

Introduction

Bovine babesiosis caused by different species of intraerythrocytic *Babesia* mainly *Babesia bigemina* and *Babesia bovis*. *Babesia* comes under family Babesiidae, order Piroplasmida and phylum Apicomplexa. It is transmitted by ticks and according to ^[1] 80% of world cattle population is exposed to tick infestation and one engorged tick is responsible for 0.7g milk production loss or average financial loss including production losses plus cost of control per animal per year is US\$7.3/head/year. It is an important emerging zoonosis of humans and second most occurring blood borne disease of animals ^[2]. Adult animals are more susceptible for babesiosis than young one. Further, resistance against babesiosis diminishes after the 9-12 months age of calf. Likewise indigenous cattle and buffaloes are more resistant than cross-bred animals ^[3]. More than one fifth of agriculture household are having less than 0.01 hectare land and their principal source of income is livestock. Farmers having cattle head can withstand distress due to adverse weather condition ^[4]. Exotic and indigenous cattle population in Indore is 1,63,849 and 76, 025, respectively ^[5]. Babesiosis is mainly transmitted by ticks and it is assumed that it is also transmitted by transuterine/ transplacental route. Since simultaneous infection of babesiosis in mother and its young calf has not been reported so far, hence it is placed on the record.

Case history

A Holstein-Friesian crossbred calf of Santer village of tehsil Mhow, district Indore was attended on the complaint of coffee colored urine. On clinical examination, calf was showing high rise of temperature 105.3°F, increased pulse rate, laboured breathing, pale conjunctiva and anorexia. Body condition score of calf was 5 (fat deposition on hip bones, ribs very well covered, tail head area was very lumpy and body outline bulging due to fat) while body condition score of mother was 2 (backbone visible, hips & shoulder bones visible, ribs visible faintly, tail head area slightly recessed, body outline bony) ^[6]. The mother (Holstein-Friesian crossbred cow) was showing only pale conjunctiva, otherwise, the clinical symptoms like temperature, pulse rate and respiration rate were normal.

Materials and Methods

Drop of blood from ear vein of mother and its calf for detection of haemoparasites was taken. The area of puncture was cleaned with 70% alcohol, smaller marginal ear veins were punctured with sterile needle and the first drop of blood was taken for thin smear preparation.

Simultaneously by taking aseptic measures 2 ml blood sample in EDTA vacutainer from mother and its calf were collected separately from jugular vein for detection of anaplasmosis and for evaluation of various hematological parameters. According to [7] blood from jugular vein should be preferred as *Anaplasma* does not accumulate in capillaries. After proper labeling, the collected material was brought to the Department of Veterinary Parasitology, College of Veterinary Science and A.H., Mhow where blood smear preparation and haematological parameters were studied. Blood smears were prepared from collected blood, air dried and fixed with methanol. Fixed blood smears were stained with Giemsa stain and examined under oil immersion. Blood samples were evaluated for various haematological parameters, viz. Hb (gm %), TEC (10^6 /cumm), PCV (%) and blood cellular changes i.e. TLC (10^3 /cumm) and differential leucocyte count (%) [8]. Number of infected RBCs, out of 1000 RBC were counted and then result was expressed as percentage.

Results and Discussion

Although appetite, respiratory rate, pulse rate and temperature of mother were normal and level of parasitaemia was very low (0.002%). The level of parasitaemia in calf was higher than the mother which was about 1%. When haematological parameters were compared between mother and its calf, the difference was observed as, Hb concentration (9.50 and 11.01), PCV value (29.25 and 33.50), TEC level (6.23 and 7.10) and TLC values (7.75 and 8.95), respectively. Decreased values of hematological parameters particularly in cattle might be due to the presence of piroplasms in RBCs leading to lysis [9] and release of toxic metabolites by piroplasms might have negative impact on the process of erythropoiesis [10]. Both mother and its calf were treated with diminazineaceturate@5 mg/kg body weight intramuscularly along with supportive therapy. Very next day of the treatment, urine of the calf was found as clear. Both mother and its calf showed good response to diminazene acetate which was also revealed by haematological parameters at 10th day of infection i.e. Hb concentration (10.60 and 11.90), PCV value (32.35 and 34.50), TEC level (7.12 and 8.15) and TLC values (8.05 and 9.25), respectively.

Less severe form of babesiosis in calf and positive response to the treatment in the form of absence of haemoglobinuria on next day of the diminazene therapy might be due to the fact that, up to the age of 11 weeks, clinical signs and pathological changes are mild and short lived in case of calves [11], which might also due to inverse age resistance observed in calves [12]. As per [13], the resistance in young ones is due to transfer of maternal antibodies by feeding of colostrum. While after inoculation of *B. divergens* in calf, no difference was reported clinically as well as serologically by [14]. There are some non-immunological factors which are responsible for hindrance of the development of *Babesia* in erythrocytes: Shining side of babesiosis at young age (generally <9months) is that they become resistant to severe disease when rechallenged at adult age due to natural pre-immunization. At young age, biochemical characteristics of RBCs are not favorable for development of piroplasms and spleen phagocytizes the infected RBCs. Therefore, mild form of disease along with good body condition score of young calf might have been observed in the present study [15]. In spite of low level of parasitaemia, the mother was treated due to low haematological parameters [16]. Few reports of transplacental transmission of babesiosis are also available [17]. Rare cases of

transplacental transmission of *B. bigemina* in calves might be due to the strain of parasites, immune status and injury to the blood vessels of placental membranes of host [18].

Conclusion

In present study, since mother of calf was also positive for babesiosis and no ticks were present at farm as well as on the animal body, hence it appears that, the calf might have got the infection by transplacental route. Due to less severe form of the disease and good body condition score of the calf, haemoglobinuria of the calf was disappeared on very next day of the treatment, is indicating the treatment is highly effective in case of young calves. Considering the rarest case of *Babesia* infection in an adult cow and its young calf, authors want to place it on record.

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