***Babesia bigemina* infection in a 14-day old Jersey crossbred calf: a case report**

R. Venu · N. Sailaja · K. Srinivasa Rao ·
N. Jayasree · W. L. N. V. Vara Prasad

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Abstract *Babesia bigemina* infection was diagnosed in a 14-day old Jersey female calf. The infected calf showed clinical symptoms of high fever, increased respiratory rate, pale conjunctival mucous membrane and haemoglobinuria. Blood smears were prepared and subjected for Giemsa staining method. Microscopic examination of the stained blood smear confirmed the characteristic intra-erythrocytic *B. bigemina* organisms.

Keywords *Babesia bigemina* · 14-Day old Jersey calf

Introduction

Bovine babesiosis is a tick borne disease caused by intra erythrocytic protozoan parasites of the genus *Babesia*. Two major and important species in cattle, *Babesia bovis* and *B. bigemina* have major economic impact on the cattle industry (Bock et al. 2004). Blood protozoan parasitic diseases threaten an estimated 250 million cattle worldwide (Radostits et al. 2000). In another study, 1.2 billion cattle are exposed to babesiosis but this number is not a true reflection of the number at risk to disease (McCosker

1981). Usually young calves are resistant to babesiosis infection due to reverse age resistance. This paper presents a case of severe *B. bigemina* infection in a 14-day old Jersey crossbred female calf.

Case report

A 14-day old Jersey crossbred female calf was presented with recumbent position with high body temperature. Clinical examination revealed pale conjunctival mucous membrane suggestive of severe anaemia, increased respiratory rate, loss of body weight and haemoglobinuria since 1 day. Based on the clinical findings the calf was suspected for haemoprotozoan infection and subsequently thick and thin blood smears were prepared from the tip of the ear. The animal body was thoroughly checked for the presence of ticks but on external visualization no ticks could be detected. Blood smears were subjected to Giemsa staining method following the standard protocol (Benjamin 1986). The stained blood smears were examined under oil immersion lens of binocular microscope (100×) for the detection of haemoprotozoan parasites.

Results and discussion

Microscopic examination of the stained blood smears from the suspected calf revealed intra erythrocyte piroplasm stages of *B. bigemina*. Based on the morphological features viz., elongated, rounded dividing forms and multiple organisms and also the characteristic pear shape with an acute angle in the erythrocytes confirmed that *B. bigemina* (Fig. 1). No other haemoprotozoans could be detected. Based on the results, the calf was treated immediately with

R. Venu (✉) · K. Srinivasa Rao
Department of Veterinary Parasitology, College of Veterinary
Science, Tirupati 517 502, Andhra Pradesh, India
e-mail: venuparas2001@yahoo.com

N. Sailaja
Department of Veterinary Pathology, NTR College of Veterinary
Science, Gannavaram, India

N. Jayasree · W. L. N. V. Vara Prasad
Department of Veterinary Pathology, College of Veterinary
Science, Tirupati 517 502, Andhra Pradesh, India

Fig. 1 Intra-erythrocytic *Babesia bigemina* organisms

diminazene aceturate at the rate of 5 mg/kg body weight intramuscularly along with supportive therapy including intravenous infusions. The infected calf showed no response to treatment and few hours later the animal was found dead. Probable cause of death may be due to severe *B. bigemina* infection. Post—mortem examination was not performed keeping in view of the owner's sentiment towards his animal.

Babesia bigemina infection in young calves was reported earlier by several authors from India (Mallick et al. 1980; Karunakaran et al. 2011; Vairamuthu et al. 2012). Yeruham et al. (2003) reported *B. bovis* infection in 2-day old calf in Israel. In the present case, the age of the infected Jersey crossbred calf was 14 days. There is an age-related immunity to primary infection of cattle with *B. bovis* and *B. bigemina* (Riek 1963). Young calves exhibit a strong innate immunity compared to adult cattle (Trueman and Blight 1978; Goff et al. 2001). The infection rate in animals is at 6–12 months of age. The average age at which calves in enzootic areas become infected is 11 weeks, but at this early age clinical signs and pathological changes are mild and short lived (Radostits et al. 2000). In the present case the mother of the calf was introduced from a known source into the dairy farm at seventh month of pregnancy. Based on the previous history the mother of the calf showed neither babesiosis infection nor any tick infestation. But in the same dairy farm 2 months before one cow was diagnosed as *B. bigemina* infection and it was treated successfully. In the present case, the probable source of infection occurred after the birth but may not be from its mother. The same observation was reported earlier by Mallick et al. (1980), who reported *B. bigemina* infection

in a 14-day old indigenous calf. Karunakaran et al. (2011) reported the same infection in 20-day old Jersey calf and concluded that, the probable reason for the calf to get infected may be intra uterine transmission as the mother of the calf had been treated earlier for the babesiosis during third trimester of pregnancy.

In conclusion, majority of the cases with *B. bigemina* infection is usually reported in adult animals, but rare in endemic areas of babesiosis calves had a degree of immunity, related both to colostral- derived antibodies and to age, that persists at least for about 6 months. At high levels of tick transmission, all new born calves will become infected with babesiosis by 6 months of age, few show clinical signs if any and subsequently be immune either natural like climatic conditions or artificial viz., acaricidal treatment may lead to transmission of *Babesia* to calves is insufficient to ensure all are infected during this critical early period (Jorgensen 2008).

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