Veterinary and Animal Science 3 (2017) 1–3

Contents lists available at ScienceDirect

Veterinary and Animal Science

journal homepage: www.elsevier.com/locate/vas

Case report on babesiosis associated pre-hepatic jaundice in a malabari goat

Y. Ajith[a,*], T.U. Rajeswari[a], S. Raj Siji[a,b], Chandran Dilip[a]

[a] District Veterinary Hospital, AHD, Thiruvanathapuram, Kerala, India
[b] College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala, India

ARTICLE INFO

Keywords:
Babesiosis
Goat
India
Jaundice
Kerala
Therapeutics
Tick borne disease

ABSTRACT

Pre-hepatic jaundice associated with babesiosis in a malabari goat and its successful management is described. The animal was presented with muco-purulent nasal discharge, dyspnoea, coughing, icteric sclera and oral mucosa, bloated abdomen, diarrhoea, hematochezia and coffee coloured urine. History of tick infestation was reported by the owner. Clinical examination revealed pyrexia, tachycardia, tachypnea, pre-scapular and pre-femoral lymphadenopathy and respiratory wheezes. Laboratory investigations revealed anaemia, neutrophilia, thrombocytopaenia, hypoproteinemia, hyperbilirubinemia and haemoglobinuria. On microscopic examination, small pyriform *Babesia* sp. (probably *B. ovis*) could be detected in Giemsa stained peripheral blood smear. The animal had undergone babesicidal therapy using diminazene aceturate (3.5 mg/kg bodyweight deep IM, two doses at 48hr interval) and oxytetracycline (10 mg/kg body weight once daily for 5 days), and supportive therapy using NSAIDs, polyionic isotonic fluids, antihistamines, B complex vitamins, stomachic and iron supplements. The animal made an uneventful clinical recovery after two weeks.

1. Introduction

Babesiosis is a highly prevalent tick borne disease affecting a wide range of host species worldwide, especially ruminants of tropical and subtropical countries where an abundant tick population is present (Demessie & Derso, 2015). It can cause severe damage to the health and production of domestic animals; hence, has huge potential impact on the economics of livestock farming (Kivaria, 2006). The causative agents of babesiosis are intra-erythrocytic protozoan parasites from the phylum Apicomplexa and the order Piroplasmida. There are two major species involved in caprine babesiosis; *Babesia motasi*, the large (2.5–4×2 μm^2 size) piriform shaped organisms found in pairs at acute angle inside erythrocytes, causing severe haemolytic anaemia and fever, and *B. ovis* (1–2.5 μm size), the small round shaped form usually found towards the margin of RBCs, causing mild signs of anaemia, jaundice and haemoglobinuria (Taylor, Coop, & Wall, 2007). In India, the most pathogenic species causing severe forms of the disease in goats is *B. motasi* (Friedhoff, 1997). The major vectors involved in the transmission of *B. motasi* and *B. ovis* are *Haemaphysalis* sp. and *Rhipicephalus bursa*, respectively (Fakhar et al., 2012). Clinically, babesiosis occurs as variable forms ranging from mild to severe in relation with the species of babesia involved, age and immune status of the animal (Zintl, Gray, Skerrett, & Mulcahy, 2005). The clinico-haemato-biochemical changes and successful management of acute febrile form of small *Babesia* sp. (probably *B. ovis*) infection and associated pre-hepatic jaundice in a goat is described here.

2. Case report

A one year old female malabari goat weighing 30 kg was presented to the District Veterinary Centre, Thiruvananthapuram, Kerala with the complaints of anorexia for the last four days. The animal was dull and depressed with a cough, muco-purulent nasal discharge, laboured breathing, absence of rumination, bloated abdomen, diarrhoea, hematochezia and dark brown coffee coloured urine. The owner reported that the animal was suffering from severe tick infestation and has been treated one month previously using ivermectin (Hitek® injection, 1% w/v; Virbac) injection at the dose rate of 200 μg/kg body weight subcutaneous route. The animal was properly dewormed 42 days previously using fenbendazole (Panacur® 150 mg tablet, MSD Animal health) at the dose rate of 5 mg/kg body weight once daily for three consecutive days. On detailed clinical examination, pyrexia, tachypnea, tachycardia and ruminal atony were observed (Table 1). The sclera, oral and conjunctival mucous membranes were icteric (Figs. 1 and 2). Supra scapular and pre-femoral lymph nodes were enlarged and palpable. Respiratory wheezes on auscultation of thorax and tympanic sound on percussion of abdomen were observed.

Blood was collected from jugular vein in sterile vials containing EDTA and clot activator for haematological and biochemical analysis, respectively. Haemoglobinuria was evident on urinalysis and was

* Corresponding author. Present address: Indian Veterinary Research Institute, Izatnagar, Bareilly, UP 243122, India.
E-mail address: ajithy123456789@gmail.com (Y. Ajith).

http://dx.doi.org/10.1016/j.vas.2017.01.001
Received 30 August 2016; Received in revised form 6 January 2017; Accepted 9 January 2017
Available online 10 January 2017

Table 1
Clinical parameters of the goat infected by *Babesia* sp. (Day 0).

Parameters	Patient value	Normal range[a]	Remarks
Temperature (°F)	106.4	101.3–103.5	Pyrexia
Respiratory rate (per minute)	43	16–34	Tachypnea
Heart rate (per minute)	96	70–80	Tachycardia
Rumen motility (per two minutes)	Absent	2–3	Ruminal atony

[a] The Merck Veterinary Manual (2015).

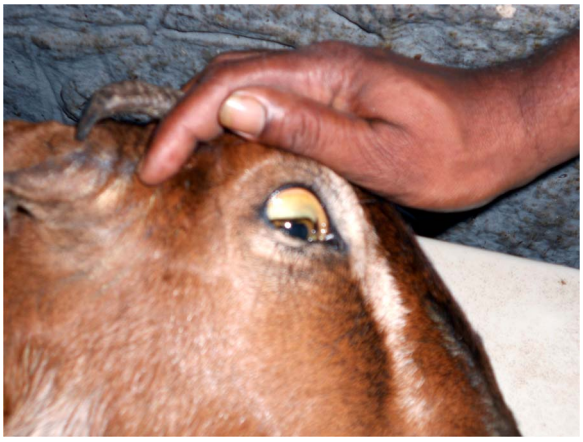

Fig. 1. Icteric sclera and conjunctival mucous membrane of *Babesia* sp. infected goat.

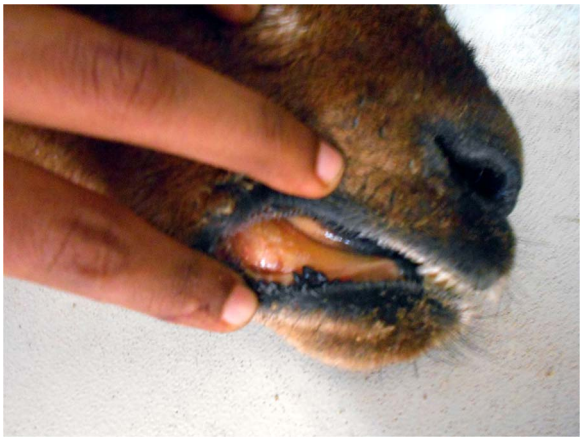

Fig. 2. Icteric oral mucous membrane of *Babesia* sp. infected goat.

differentiated from hematuria by using a centrifugation method (Ajith et al., 2016; Fairley & Birch, 1982). Fecal samples were examined by the concentration method and found to be negative for any parasitic ova and oocysts (Truant, Elliott, Kelly, & Smith, 1981). Blood smears were prepared from the ear vein and examined after staining by the Giemsa method; small intracellular pyriform stages in the RBCs (Fig. 3), probably *B. ovis* (based on the clinico-epidemiological knowledge), could be detected (Taylor et al., 2007). The haemato-biochemical analysis revealed anaemia, leukocytosis with neutrophilia, thrombocytopaenia, hypoproteinemia and unconjugated hyperbilirubinemia (Table 2).

The animal was stabilised by administering intravenous crystalloid solution (Dextrose Normal Saline @20 ml/kg body weight), meloxicam (Melonex® injection, 0.5% w/v, Intas pharmaceuticals) at 0.5 mg/kg body weight, pheniramine maleate (Avilin® VET injection, 2.2%, w/v, MSD animal health) at 1 mg/kg body weight and Neurobion forte®, Merck limited (Thiamine, Pyridoxine, Nicotinamide, D-Panthenol and

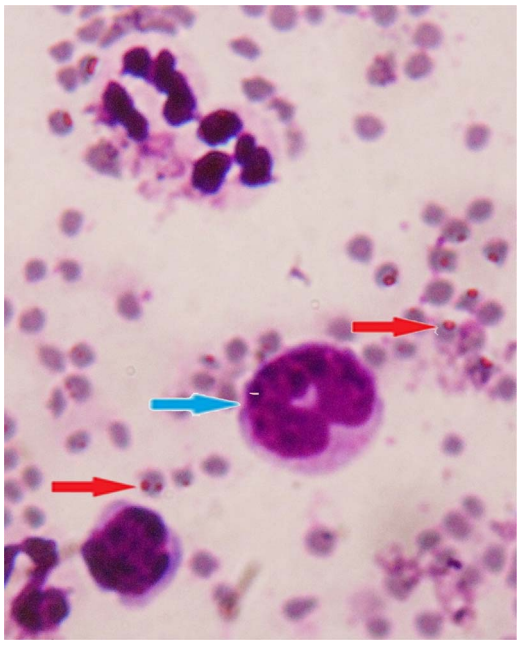

Fig. 3. Giemsa stained peripheral blood smear of the goat showing intracellular *Babesia* sp. (Probably *B. ovis*) organisms (red arrow) and "Band cell", the large immature neutrophil with unsegmented nucleus (blue arrow).

Table 2
Haemato-biochemical parameters of the goat infected by *Babesia* sp. (Day 0).

Parameters	Patient value	Normal range[#]	Remarks
Haemoglobin concentration (gm/dl)	5.4	8–12	Anaemia
Packed Cell Volume (%)	18.6	22–38	
Total Erythrocyte Count-TEC (million cells/μL)	5.7	8–18	
Total Leukocyte Count-TLC (thousand cells/μL)	18.6	4–13	Leukocytosis
Differential Leukocyte Count (%)			
Neutrophils (%)	76	30–48	
Lymphocytes (%)	17	50–70	Neutrophilia
Monocytes (%)	3	0–4	
Eosinophil (%)	4	1–8	
Basophil (%)	0	0–1	
Thrombocyte count (thousands/μL)	86	300–600	Thrombocytopenia
Total protein (g/dL)	6.1	6.4–7.0	Hypoproteinemia
Albumin (g/dL)	1.8	2.7–3.9	
Globulin (g/dL)	4.3	2.7–4.1	Hyperglobulinemia
A: G ratio	0.42	0.66–1.44	
Aspartate aminotransferase-AST (U/L)	229	167–513	
Alanine aminotransferase-ALT (U/L)	18	6–19	
Blood Urea Nitrogen-BUN (mg/dL)	37.2	10–20	
Creatinine (mg/dL)	0.29	1–1.8	
Total bilirubin (mg/dL)	2.2	0–0.1	Unconjugated
Direct bilirubin (mg/dL)	0.4	0–0.1	Hyperbilirubinemia
Indirect bilirubin (mg/dL)	1.8	0–0.1	

*The Merck Veterinary Manual (2015).

Cyanocobalamin) at 0.1 ml/kg body weight. A combination babesicidal therapy using Diminazene aceturate (Berenil® vet RTU, 7% w/v, MSD animal health) at 3.5 mg/kg body weight deep IM; two doses at 48hr interval and Oxytetracycline (Terramycin®, 5% w/v, Pfizer Ltd.) at

10 mg/kg body weight diluted in twice amount of normal saline IV once daily for five days was provided. The supportive therapy included NSAID, antihistamine, Ketonex® bolus (Dried yeast and Nicotinic acid), Cadila pharmaceuticals Ltd. (1/4th boli twice daily) and Belamyl® injection (B complex vitamins with liver extract), Sarabhai Zydus animal health Ltd. at 0.05 ml/kg body weight IM for five days and dried ferrous sulphate (100 mg per kg body weight orally twice daily with drinking water) and multivitamin vitamin syrup – Becosules® (Pfizer Ltd.) 10 ml twice daily for two weeks. The level of parasitemia was monitored daily by examining Giemsa stained peripheral blood smear and was found to be negative for intra-erythrocytic piroplasms by day 5 onwards. The animal recovered by two weeks from jaundice and other clinical signs.

3. Discussion and conclusions

Caprine babesiosis is a tick borne haemoprotozoan disease causing significant production loss among goat herds (Alessandra & Santo, 2012). The major causative agents of caprine babesiosis are *B. ovis* and *B. motasi*; both transmitted by the tick *Rhipicephalus bursa* (Radostits, Gay, Hinchcliff, & Constable, 2007). Like other tick borne infections, babesiosis also shows significant relation to the abundance of the tick vector. In India, the overall prevalence of tick population is highest (83.74%) during monsoon season and is highly associated with the incidence of babesiosis (Nagar, Raizada, & Saxena, 1977; Singh & Rath, 2013). The pathology of babesiosis is related to the haemolytic anaemia, as a consequence of the intravascular destruction of erythrocytes either by the immune system or by the direct damage caused by the parasite itself, and with associated symptoms (Furlanello, Fiorio, Caldin, Lubas, & Solano-Gallego, 2005).

In a study conducted on newly purchased Tellicherry goats from Kerala, 34.5% animals were infected by *B. ovis* and affected animals showed clinical signs including inappetence, weakness, coughing, nasal and ocular discharges, diarrhoea, pyrexia, abortion, anaemia, thrombocytopaenia and leukocytosis with neutrophilia (Muthuramalingam et al., 2014). Severe cases of caprine babesiosis were associated with jaundice, diarrhoea, haemoglobinuria, microcytic hypochromic anaemia, hypoproteinemia and increased Erythrocyte Sedimentation Rate (ESR), AST activity, ALT activity, BUN and Icterus Index (Sulaiman, Arslan, Al-Obaidi, & Daham, 2010). Babesiosis due to *B.* ovis infection is usually associated with a mild chronic form of disease, accompanied by jaundice and haemoglobinuria (Taylor et al., 2007). Experimental infection of sheep by transfusing *B.* ovis infected blood resulted in development of mild to moderate haemolytic anaemia and jaundice (Rahbari, Nabian, Khaki, Alidadi, & Ashrafihelan, 2008). In the present case, the elevated unconjugated bilirubin levels (pre-hepatic jaundice), hemoglobinuria, and signs of systemic inflammatory responses suggest acute febrile haemolytic form of *B. ovis* infection.

The treatment of babesiosis in food animals can be advocated after considering the efficacy, potency, withdrawal period, adverse effects and price of the chemotherapeutic agent. Even though, several antihemoprotozoal drugs can be used against babesiosis in goats, diminazene aceturate is the drug used worldwide due to its efficacy, availability and cost effectivenesss (Taylor et al., 2007). In sheep, diminazene aceturate and imidocarb dipropionate were effective 80% and 100%, respectively in eliminating parasitemia (Rashid et al., 2010). In cattle, sheep and goats, use of combination of diminazene aceturate and oxytetracycline was found to be more effective than either of the drugs used alone (Ijaz et al., 2013; Saini & Sankhala, 2015). Along with appropriate babesicidal therapy, it is essential to provide supportive therapy in complicated babesiosis for the early uneventful recovery of the animals (Jacobson & Swan, 1995). In the present case, combination therapy using diminazene aceturate and oxytetracycline along with supportive care was effective in eliminating parasitemia and early recovery of the animal.

4. Ethical approval

The article reports a clinical case presented at the District Veterinary Centre, Thiruvananthapuram, Kerala. All protocols followed were in accordance with the guidelines from the standard textbooks in Veterinary Medicine.

Acknowledgements

The authors acknowledge the help provided by the Chief Veterinary Officer, District Veterinary Centre, Thiruvananthapuram, Kerala for conducting this case study.

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