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Concurrent *Babesia Bigemina* and *Anaplasma Marginale* Infection in a Jersey Cow

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Haemoprotozoan diseases cause devastating losses to the livestock industry and hence pose major constraints to the dairy industry. Bovine babesiosis and anaplamosis is a tick – borne, parasitic infection that causes significant morbidity and mortality. The present paper reports on the occurrence of concurrent *Babesia bigemina* and *Anaplasma marginale* infection in a Jersey cow in Tirunelveli city, Tamil Nadu.

Case History and Clinical Observation

A 5 years old female Jersey cow weighing 300 kg body weight was presented to the Teaching Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with the history of anorexia, tick infestation, dyspnoea and passing blood mixed urine for the past two days.

Peripheral blood sample in a tube containing EDTA was collected from ear vein in a clean, grease free, dry slide for examination of blood parasites and clot activator tube for the serum separation to rule out any variations in the biochemical parameters. Smear was prepared for complete blood count to evaluate the presence of anaemia .The peripheral blood smear was stained with Leishman – Giemsa (LG) stain as per the procedure described by Garby *et al*. (2006) to rule out any haemoprotozoan parasites and to carry out differential leucocyte count.

Results and Discussion

Microscopical examination of the blood smear (**Fig:1**) revealed the presence of numerous large pear shaped, paired organism *Babesia bigemina* placed centrally at an acute angle and small round to spherical *Anaplasma marginale* organisms placed at the periphery of the erythrocytes. Based on the morphological features, the organisms were identified as *Babesia bigemina* and *Anaplasma marginale*, as per the morphological features prescribed by Soulsby (2012). Blood picture revealed the anaemic changes like hypochromasia, anisocytosis, poikilocytosis, presence of Howell–Jolly bodies, leptocytes, target cells, erythrophagocytosis and neutrophilia were also noticed.

The haemoglobin (Hb), packed cell volume (PCV), red blood cell count (RBC) and platelet count were reduced indicating anaemia and thrombocytopenia. The white blood cell count (WBC) was within the normal range (Table 1).

There was a reduction in total protein, albumin and potassium and an elevation in Alanine Transaminase (ALT), Alkaline phosphatase (ALP), total bilirubin and direct bilirubin in the serum (Table 2).

After the confirmation of concurrent infection, the animal was treated with Inj. Diminazene diacetuarate @ 15.5 ml intramuscularly (Berenil @ 3 – 5 mg/kg). Inj. oxytetracycline @ 60 ml (OTC @ 20mg /kg), Inj. Phosphorous @ 15 ml, Inj. Neurokind @ 15 ml, Inj. Iron dextran @ 6 ml, Inj. Dextrose normal saline @ 1000 ml and Inj. Intalyte @ 1000 ml were given intravenously. Bolus Ferritas @ 2 boli bid and syrup. Aystimin @ 20 ml bid were prescribed orally. Therapeutic treatment was continued for 5 days and advised the owner to give the oral prescription for the 14 days. The animal showed improvement slowly in the physical condition and became normal after the treatment.

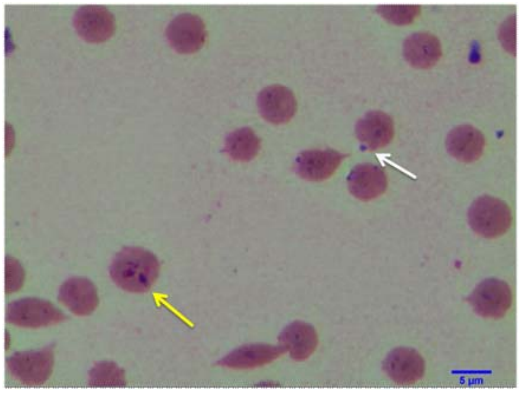

Fig: 1 - Jersey Cow - Blood smear - *Babesiabigemina*(Yellow arrow) and *Anaplasmamarginale*(White arrow). Scale bar L&G, 5µm

Babesia bigemina and *Anaplasma marginale* was transmitted by *Rhipicephalus (Boophilus) microplus* which is considered to be the main vector (Aubry *et al*., 2011). The clinical signs are in accordance with the previous work of Bram, (1983) which is characterized by progressive haemolytic anaemia associated with high fever, haemoglobinuria, jaundice, dullness/ depression, rapid deterioration of the physical condition, serosanguineous urine, muscle tremors, pale mucus membrane and laboured breathing.

Table 1: Haematological Parameters

S.No	Parameters		Reference Values
1	Hb (g/dL)	4.2	8.0 – 14.0
2	PCV (%)	14.7	26.0 – 42.0
3	RBC x 10^6/µl	2.8	5.0 – 8.0
4	WBC x 10^3/µl	10500	4.0 – 12.0
5	Platelets	1,19,000	1,50,000 – 3,00,000
6	Neutrophils (%)	47	30 – 40
7	Lymphocytes (%)	44	60 – 70
8	Eosinophils (%)	5	6 – 7
9	Monocytes (%)	4	3 – 4

In the present case, the haematological parameters revealed anaemia is in accordance with Ananda *et al.* (2009). The anaemia might be due to damage caused by the organisms inside the RBC's during their multiplication and platelet count was significantly less in this infected animal. The haemogram and blood picture of the animal indicated anaemia, it reflects that animal's haemopoietic system being activated in response to erythrophagocytosis is in agreement with Meenakshisundram *et al.* (2014).

The total protein and albumin level were decreased due to deprivation of diet protein resulting from anorexia and liver insufficiency and the hypokalaemia is due to lower feed intake. The ALT and ALP increased due to hepatic necrosis or alteration in cell membrane permeability leading to leakage of these enzymes or any cholestasis due to jaundice. Hyperglycaemia might be due to intravasvscular

hemolysis, it further caused marked hyperbilirubinaemia and the glucose is in accordance with the reports of Ashok Kumar and Joshi (1995).

Table 2: Biochemical Parameters

S.No	Parameters		Reference Values
1	Total protein (g/dL)	4.4	6.7 – 7.5
2	Albumin (g/dL)	1.7	3.0 – 3.6
3	ALT (IU/L)	44	14 - 38
4	ALP (IU/L)	239	90 - 170
5	TBil (mg/dL)	1.48	0.1 – 0.5
6	DBil (mg/dL)	0.52	0.04 – 0.14
7	Glucose (mg/dL)	188	45 - 75
8	Potassium (mEq/L)	1.1	3.9 – 5.8

The diminazene diacetuarate is given at the rate of 3-5 mg/kg body weight IM and long – acting oxytetracycline at 20 mg/kg body weight might have reduced the severity of bovine babesiosis and anaplasmosis. Supportive treatments like corticosteroids, haematinics and fluid therapy (Kahn, 2010) were also recommended for RBC stabilization and production and the liver stimulants could be advised for complete recovery from the anaemia and for the betterment of physical condition of the animal.

Conflict of Interest: All authors declare no conflict of interest.

References :

Ananda, K.J.,D'Souza, P.E. and Puttalaksnmamma, G.C. (2009). Prevalence of Haemoprotozoan diseases in crossbred cattle in Bangalore north. *Vet. World.*,**2**(1): 15 - 16

Ashok Kumar and Joshi, B.P. (1995). Studies on blood glucose levels as a metabolic profile in clinical appraisal in buffaloes.*Indian J.Vet. Med.,* **15** (2): 71 - 73

Aubry, P. and Geale, D.W. (2011).A review of bovine anaplasmosis.*Transbound.Emerg. Dis.*, **58** (1): 1 - 30

Bram, R.A. (1983). Tick – bornelivestock and their vectors: the global problem. Tick and tick – borne diseases, FAO Animal Production and Health paper.*Wld. Ani. Rev.***, 36**: 7 – 11

Garbyl, R.S., Agarwal, N. and Kumar,P. (2006). Leishman-Giemsa Cocktail, An Effective Romanowsky stain for air dried cytologic smears. *Acta Cytol.,***50**: 403-406.

Kahn. C.M., (2010).The Merck Veterinary Manual.10thEdn. Merck and Co., White house Station, N.J, U.S.A. p19 - 23

Meenakshisundaram. A, Anna, T.andMalmarugan,S. (2014). Concomitant *Theileriaannulata* and *Anaplasmamarginale* infection in a cross bred dairy herd. *Ind.J.Vet & Anim. Sci. Res.,***43** (6): 422-425

Soulsby, E.J.L, (2012). Helminths, Arthropods and Protozoa of Domesticated animals.7thEdn. ELBS and Bailliere Tindall, London, p381.

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