Indian J. Vet. Med. Vol. 46, No. 1, 2026 pp. 38-40

Therapeutic Management of *Anaplasma bovis* Infection and Hypophosphatemia in a Cross Breed Cattle

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Abstract

An eight-year-old Holstein Friesian cow in eight months of pregnancy was presented with the history of inappetence to anorexia and decreased rumination from last seven days with clinical signs such as anorexia, tachycardia, tachypnea, fever, swollen lymph nodes, pale icteric mucous membranes and severe tick infestation. Haematological analysis revealed marked anemia, lymphocytosis, granulocytosis, monocytosis and thrombocytopenia. The serum biochemical analysis showed increased levels of alkaline phosphatase, aspartate aminotransferase, total bilirubin, globulin, blood urea nitrogen and creatinine while the levels of total protein, albumin and phosphorus found decreased. The Giemsa-stained blood smears revealed presence of numerous intracytoplasmic morulae of *Anaplasma bovis* in the monocytes. Clinical signs and haemato-biochemical and blood smear findings confirmed the case diagnosis for concurrent *Anaplasma bovis* infection and hypophosphatemia. The treatment of cow with oxytetracycline for 5 days along with buffered phosphorus preparation for 3 days revealed gradual improvement leading to complete clinical recovery in 5 days.

Keywords: *Anaplasma bovis,* Haematobiochemical changes, Hypophosphatemia

Bovine Ehrlichiosis is a tick-borne disease caused by small, pleomorphic, Gram negative, obligate intracellular bacteria belonging to the family Rickettsiaceae, order Rickettsiales and genus Anaplasma. *A. bovis* infection in cattle is considered to be asymptomatic or subclinical in most cases but the disease is more serious in crossbred and newly imported cattle in tropical areas (Aguiar *et al.*, 2014; Prasath *et al.*, 2016). Nutritional hemoglobinuria is an economically important disease of buffaloes observed during advanced pregnancy or early lactation in high yielding animals maintained exclusively on dry roughages, or fed on diets containing cruciferous plants, and has been attributed to hypophosphatemia. The present article describes clinical signs, hematobiochemical alterations and therapeutic management of concurrent *Anaplasma bovis* infection and hypophosphatemia in Holstein Friesian cow.

An eight-year-old Holstein Friesian cow in 8th month of pregnancy was presented with the history of inappetence to anorexia and reduced rumination from seven days with clinical signs such as anorexia, fever (103.4 ^{0}F), tachycardia (88 beats/minute), increased respiration rate (44/minute), swollen lymph nodes, pale icteric mucous membranes and severe tick infestation. The haematological analysis revealed marked anemia, leukocytosis (lymphocytosis, granulocytosis, and monocytosis), and thrombocytopenia (Table 1). The microscopic examination of Giemsa-stained blood smears revealed the presence of intracytoplasmic inclusions (morulae) within monocytes or mononuclear cells with variable morphology. The serum biochemical analysis revealed increased levels of alkaline phosphatase, aspartate aminotransferase, total bilirubin, conjugated and unconjugated bilirubin, blood urea nitrogen and creatinine, while the levels of total protein, albumin, and phosphorus were found to be decreased (Table 2).

The cow was treated with oxytetracycline (@ 20 mg/kg IV once daily), dextrose 5% (@ 500 ml IV), vitamin B1, B6 and B12 (@ 10 ml IM) for 5 days. Hypophosphatemia was treated with buffered phosphorous preparation (@ 50 ml IV once daily) for 3 days. With 24 hours of first dose of the treatment, cow showed positive clinical response with resumption of feed intake and rumination on second day of the treatment. Complete recovery was appreciated following therapy.

The clinical signs such as fever, pale icteric mucous membranes, swollen lymph nodes, anorexia,

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https://doi.org/10.56093/ijvm.v46i1.179579

and dark yellow urine (bilirubinuria) recorded in the affected eight-month-pregnant crossbred cow of the present study can be attributed as outward manifestations of the above-cited various pathological mechanisms in response to concurrent *Anaplasma bovis* infection and hypophosphatemia (Prasath *et al.*, 2016; Constable *et al.*, 2017). The same therapeutic regimens were found effective to treat *A. bovis* infection and hypophosphatemia separately in earlier studies (Chhabra *et al.*, 2015; Constable *et al.*, 2017).

Table 1: Hematological Changes Associated with Concurrent *Anaplasma bovis* Infection and Hypophosphatemia in Holstein Friesian Cow.

Parameters	Result	Reference Interval (Constable *et al.*, 2017)
TEC ($\times10^{12}$/L)	2.57	5.10-7.60
Hb (g/dL)	5.20	8.50-12.20
PCV (%)	15.90	22-33
MCV (fl)	62.20	38-50
MCH (pg)	20.20	14-18
MCHC (g/dl)	32.50	36-39
RDW (%)	15.50	15.50-19.70
TLC ($\times10^{9}$/L)	28.42	4.90-12
Lymphocytes ($\times10^{9}$/L)	11.99	1.60-5.60
Granulocytes ($\times10^{9}$/L)	8.50	1.80-6.30
Monocytes ($\times10^{9}$/L)	7.93	0-0.80
Platelets ($\times10^{9}$/L)	95.00	200-650

Table 2: Biochemical Changes Associated with Concurrent *Anaplasma bovis* Infection and Hypophosphatemia in Holstein Friesian Cow.

Sr.	Parameter	Result	Reference Interval (Constable *et al.*, 2017)
1.	Alkaline Phosphatase (U/L)	474.90	0-200
2.	SGPT/ALT (U/L)	36.65	11-40
3.	SGOT/AST (U/L)	140.06	78-132
4.	Bilirubin (Total) (mg/dL)	4.39	0.01-0.50
5.	Bilirubin (Direct) (mg/dL)	1.71	0.04-0.44
6.	Indirect Bilirubin (Direct) (mg/dL)	2.68	0-0.30
7.	Total Protein (g/dL)	5.39	5.70-8.10
8.	Albumin (g/dL)	1.72	2.10–3.60
9.	Globulin (g/dL)	3.67	3.0-3.48
10.	Blood Urea Nitrogen (mg/dL)	37.38	20–30
11.	Creatinine (mg/dL)	2.21	1.0–2.0
12.	Calcium (mg/dL)	12.37	9.70–12.40
13.	Phosphorus (mg/dL)	3.94	5.60–6.50
14.	Glucose (mg/dL)	70.00	45–75

References

Aguiar, D. M., Ziliani, T. F., Zhang, X., Melo, L. A., Braga, I. A., Witter, R., Freitas, L. C., Rondelli, A. L., Luis, M. A., Sorte, E. C., Jaune, F. W., Santarém, V. A., Horta, M. C., Pescador, C. A., Colodel, E. M., Soares, H. S., Pacheco, R. C., Onuma, S. S., Labruna, M. B. and McBride, J. W. 2014. A novel *Ehrlichia* genotype strain distinguished by the TRP36 gene naturally infects cattle in Brazil and causes clinical manifestations associated with ehrlichiosis. *Ticks Tick Borne Dis.*, **5(5)**: 537–544.

Chhabra, S., Randhawa, C. S. and Sethi, A. P. S. 2015. Nutritional haemoglobinuria in a buffalo herd fed with maize husk and barley grit. *Buffalo Bull.*, **34(4)**: 465–468.

Constable, P. D., Hinchcliff, K. W., Done, S. H. and Grunberg, W. 2017. Phosphorus deficiency. In: *Veterinary Medicine: A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs, and Goats*. 11th Edn., W.B. Saunders Ltd. pp. 1485–1491.

Prasath, N. B., Selvaraj, J., Jeyathilakan, N., Saravanan, M., Saravanan, M., Ahamad, D. B. and Sasikala, M. 2016. Occurrence of *Anaplasma bovis* (*Ehrlichia bovis*) with varying morphology in a crossbred cow in Tamilnadu, India. *Indian J. Vet. Pathol.*, **40(2)**: 165–167.

Received : 29.05.2025 **Accepted : 20.06.2026** **Published : 30.06.2026**