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Case Report

Therapeutic Management of Parturient Haemoglobinuria with Concurrent Anaplasmosis in A Pregnant Buffalo - A Case Report

P. Udhayabanu[1*], Mayur Jadav[1], Mahendran K.[2], and Priyanka M.[3]

[1]M.V.Sc scholar, Division of Medicine, ICAR- Indian Veterinary Research Institute, Izatnagar- 243 122, Bareilly INDIA
[2]Senior Scientist, Division of Medicine, ICAR- Indian Veterinary Research Institute, Izatnagar- 243 122, Bareilly INDIA
[3]Scientist-Division of Medicine, IVRI- Regional campus, Hebbal, Karnataka -560 024 INDIA

*Corresponding Author: udhayabanu651999@gmail.com

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Abstract

A 6-year-old pluriparous buffalo cow 8 weeks into its late trimester of pregnancy was presented to the Referral Veterinary Polyclinic and Teaching Veterinary Clinical Complex, ICAR-IVRI with the history of inappetence, respiratory distress and passing brownish-red coloured urine since 10 days. Clinical examination revealed pale mucous membrane, tachycardia, tachypnoea and straining during defecation. Laboratory examination revealed anaemia, hypophosphatemia and haemoglobinuria. Blood smear examination revealed the presence of Anaplasma sp. Based on these findings, the case was diagnosed as parturient haemoglobinuria with concurrent anaplasmosis. The buffalo was treated by IV infusion of 40% solution of sodium acid phosphate along with supportive therapy. Inj. Oxytetracycline diluted with NS was given intravenously and Inj. Ferritas was given intramuscularly on every alternative day. On the 7th day of treatment, urine colour were became clear and marked increase in food intake was noticed from the 3rd day onwards. Uneventful recovery was noticed.

Keywords: Anaplasmosis, Hypophosphatemia, 40% Sodium Acid Phosphate, Parturient Haemoglobinuria, Oxytetracycline.

Introduction

Parturient haemoglobinuria is an acute, metabolic disorder commonly noticed in high- yielding cattle and buffaloes. This metabolic disorder causes a significant threat to high yielding buffaloes than cattle which is characterized by reduced level of phosphorus concentration, intravascular haemolysis, haemoglobinuria, anaemia, anaemic anoxia and leads to death (MacWilliams, *et al*., 1982). Purohit *et al*., (2018) mentioned that, the incidence of parturient haemoglobinuria were highly recorded in buffaloes than cattle; however, in buffaloes the condition was commonly seen during advanced pregnancy or one month after parturition. The complete mechanism and pathogenesis of parturient haemoglobinuria in unknown. The considerable risk factors include feeding of cruciferous plants especially, *Brassica* sp.(Cabbage), mustard, lucerne, berseem, sorghum straw, sugarcane tops and beet reduces the phosphorus level in the body (Bhikane and Syed, 2014). Low intake of dietary phosphorus during early lactation and high requirement of phosphorus for the growth of foetus may result in hypophosphatemia (Purohit *et al*., 2018).

As a major mineral, phosphorus is required for the synthesis of adenosine triphosphate (ATP) and thereby in the glycolysis pathway. Adenosine triphosphate (ATP) maintains the structure, function and integrity of the erythrocytes. Deficiency of phosphorus depletes the ATP concentration and impairs the glycolytic pathway of RBCs, disrupts the RBC membrane, predisposes to RBCs fragility, and ultimately results in haemolysis, hemoglobinemia and acute haemoglobinuria (Radostits *et al*., 2007).

Namratha *et al*., (2020) stated that anaplasmosis is an acute, important tick-borne rickettsial disease causing economical loss to the farmer due to its deleterious effects like anaemia, weight loss, reduced milk yield, abortion and eventually death of the animal. The causative agents are *Anaplasma marginale* and *Anaplasma centrale*, in which the latter causes mild anaplasmosis in cattle.

As *Anaplasma* sp., is an obligate intracellular protozoon, it infects the matured erythrocytes by the endocytic process and multiplies by binary fission to destroy the further RBCs. These parasitized RBCs get phagocytosed by the reticuloendothelial system like spleen and liver. Due to the complete destruction of infected RBCs, affected animals shows mild to severe anaemia and icterus without any clinical signs of hemoglobinemia and haemoglobinuria (Radostits *et al*., 2007).

This paper describes the diagnosis and successful treatment of peri parturient haemoglobinuria in a pregnant buffalo with concurrent Anaplasmosis.

Case History

A 6-year-old pluriparous buffalo (Fig. 1) cow 8 weeks into its late trimester of pregnancy was presented to Referral Veterinary Polyclinic and Teaching Veterinary Clinical Complex, ICAR-IVRI with the history of inappetence, respiratory distress and passing brownish red coloured urine (Fig. 2a) since 10 days. The buffalo was treated by a local vet, but no improvement was noticed.

Clinical Examination and Diagnosis

On clinical examination, pale mucous membrane, heart rate 82 beats/min, respiratory rate 16 breaths/min, reduced rumen motility, RT 101^0F were observed. Blood samples from the jugular vein was collected for haematological and biochemical estimation. Haematological examination revealed a Haemoglobin count of 6.7 g/dl, Haematocrit 20.1%, Total Erythrocyte count of 4 x 10^6/ µl, Total Leucocyte count of 4.45 x 10^3/ µl and PLT 124 x 10^3/ µl. No endoparasites were noticed on faecal examination. A blood smear was found to be positive for *Anaplasma* species (Fig. 2). Biochemical examination showed a total protein 8.53 g/dl, SGOT 468 IU/L, serum creatinine 1.8 mg/dl, BUN 32 mg/dl and reduced serum phosphorus level 1.6 mg/dl (Table 1). Based on these findings, the case was diagnosed as Parturient haemoglobinuria in a pregnant buffalo with concurrent anaplasmosis.

Treatment

The animal was treated for 5 days with Inj. Sodium acid phosphate (Urimin 40% solution) at a total dose of 50 ml in 300 ml of Normal Saline intravenously (Fig. 4) BID for 3 days and SID for 2 days. 10 ml of injection Tranexamic acid was administered intramuscularly on the day of presentation to arrest the bleeding and Inj. Ferritas (Iron

Sorbitol, Folic acid and Vit. B12) 10 ml intramuscularly SID for 3 days. For anaplasmosis, Inj. OTC was given at a dose of 10 mg/kg diluted in 500 ml of Normal Saline BID for 5 days. Oral hematinics and Boli. Ecotas were given for a week BID. The animal had an uneventful recovery with the therapeutic intervention on the 7th day of treatment.

Fig. 1: A 6 years old pluriparous buffalo cow 8 weeks into its late trimester of pregnancy

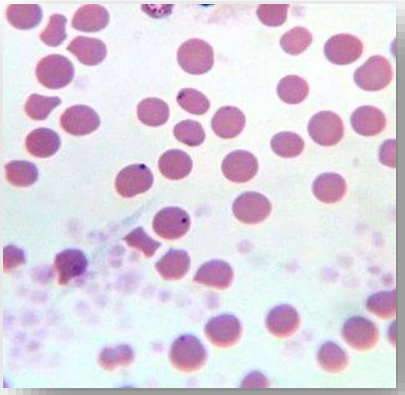

Fig. 2: Blood smear shows the presence of *Anaplasma sp.*

Fig 3 (a, b, c): Pre-treatment and Post recovery urine finding

Fig 4: I/V administration

Discussion

Injection Sodium acid phosphate: 40.3% w/v (equivalent to elemental phosphorus 8 % w/v) @ 50 g/kg/day (total dose) intravenously diluted with 300 ml of normal saline and slowly infused for 30 mins for 5 days found to be

effective in controlling hypophosphatemia which was in accordance with Radostits *et al*., (2007) and Cohrs and Grunberg, (2018). On the 5th day of treatment, the urine colour (Fig. 3b) was gradually improved and became normal straw colour (Fig. 3c) on 7th day of treatment, which can be identified as reduced to complete stoppage of haemoglobinuria. The clinical improvement of the buffalo was effectively attributed to the hypophosphatemia, which can be further proved by improved appetite on the 3rd day of phosphorous supplementation aided by the oral haematinics and Boli. Ecotas were administered for a week. Anemia can be managed with Inj. Ferritas SID improved the haematological parameters on the 7th day of treatment. Inj. Oxytetracycline at 10 mg/kg diluted in 500 ml of NS was given intravenously BID to treat the anaplasmosis. (Radostits *et al*., 2007; Namratha *et al*., 2020). On the 7th day of treatment, blood smear examination was negative for *Anaplasma* sp. Drugs like short-acting OTC at 6-10 mg/kg intravenously for 3-5 days and a single shot of long acting OTC at 20 mg/kg deep intramuscularly are used to treat clinical anaplasmosis. These drugs will not eliminate the infection but helps in improving the persistence of immunity. The improvement in the clinical, biochemical, haematological and parasitological parameters proved that the buffalo was recovered from the disease uneventfully.

Table 1: Haematological and biochemical values of 6-year-old pregnant buffalo cow on the day of presentation and after treatment

Sl.no	Particulars	Before Treatment	After Treatment	Reference range (Radostits *et al*., 2007)
1	Hb (g/dl)	6.7	8.4	6-12
2	PCV (%)	20.1	26	24-46
3	RBC (10^6 cells/ µl)	4.24	5.6	5-8
4	WBC (10^3cells/ µl)	4.45	9	8-12
5	Platelets (10^3cells/ µl)	124	356	1-5
6	Total protein (g/dl)	8.53	8.21	5.7-8.1
7	SGOT (IU/L)	468	284	78-132
8	Creatinine (mg/dl)	1.8	1.5	1-2
9	BUN (mg/dl)	28	21	6-27
10	Serum Phosphorus (mg/dl)	1.6	5.6	5.5-6.5

Conclusion

From this case report, phosphorus deficiency during the late trimester of pregnancy, predisposes to peri-parturient haemoglobinuria in buffaloes. Replacement therapy of phosphorus alleviate the clinical signs and improves the recovery. Adequate dietary intake of phosphorus is required for maintenance as well as for milk production especially during the early lactation period.

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Contribution by Authors

Each co-author contributes equally.

Conflict of Interests

There is no conflict of interest.

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