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Concurrent theileriosis, hypomagnesemia, and hypophosphatemia in a periparturient crossbred jersey cow: A clinical case report

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Abstract

Background: The periparturient period in cattle is a critical phase characterized by profound physiological, metabolic, and hormonal changes that predispose animals to a variety of infectious and metabolic disorders. Diseases such as theileriosis, hypocalcemia, hypomagnesemia, ketosis, and metritis commonly occur during the periparturient period and can significantly compromise both maternal health and productivity. Effective nutritional management, close clinical monitoring, and early therapeutic intervention during the periparturient period are essential to reduce disease incidence and associated economic losses in dairy cattle.

Case presentation: A four-year-old recently calved crossbred Jersey cow was presented with an acute onset of anorexia, hyperexcitability, muscle tremors, ataxia, and intermittent recumbency. These neurological signs were accompanied by pyrexia, pallor of the mucous membranes, generalized lymphadenopathy, and heavy tick infestation. Clinical examination and laboratory investigations revealed concurrent theileriosis, severe hypomagnesemia, hypophosphatemia and mild hypocalcemia. Peripheral blood smear examination confirmed the presence of *Theileria* piroplasms within erythrocytes, while serum biochemical analysis showed markedly reduced magnesium levels, moderately reduced phosphorus levels and slightly reduced calcium levels.

Management and Outcome: The animal was treated with buparvaquone, magnesium and phosphorus supplementation, supportive therapy, and tick control measures. Marked clinical improvement was observed within 48 hours, with complete recovery over one week.

Conclusion: This case highlights the importance of recognizing concurrent metabolic and hemoprotozoan diseases in periparturient cattle and emphasizes the need for prompt diagnosis and integrated therapeutic management.

Keywords: Buparvaquone, theileriosis, hypomagnesemic tetany, hypophosphatemia, periparturient

Introduction

Theileriosis is a tick-borne hemoprotozoan disease of cattle caused predominantly by *Theileria annulata* in tropical and subtropical regions, including India. The disease is transmitted by *Hyalomma* ticks and is characterized by fever, lymphadenopathy, anemia, and high morbidity, especially in crossbred cattle (Radostits *et al.*, 2010; Soulsby, 1982) [8, 9].

Haemoprotozoan diseases cause devastating losses to the livestock industry and thus pose major constraints to the dairy industry throughout the world (Kohli *et al.*, 2014; Bhatnagar *et al.*, 2015) [7, 1]. They are of great economic impact on livestock affecting 80% of the world cattle population and cause economic loss due to morbidity and mortality (Kasozi *et al.*, 2014) [6].

Lateral recumbency, diarrhea and dysentery are also associated with later stages of infection (Radostits *et al.*, 2007) [8]. Cattle may also develop an extremely fatal condition referred to as turning sickness. In this disease, capillaries of central nervous system are blocked by infected cells and leads to neurologic symptoms (Gul *et al.*, 2015) [4].

Hypomagnesemic tetany, also known as grass tetany, is a metabolic disorder resulting from reduced serum magnesium levels, commonly observed in lactating cattle due to increased

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magnesium demand and reduced dietary intake or absorption (Goff, 2014; Radostits *et al.*, 2010) ^[3,8]. Clinical signs include hyperexcitability, muscle tremors, convulsions, and sudden death. Magnesium deficiency inhibits the action and release of parathyroid hormone (PTH), and this is said to be the reason for concurrent hypocalcemia.

Periparturient stress, lactation, and concurrent infectious diseases can exacerbate mineral imbalances, predisposing animals to hypomagnesemia (Constable *et al.*, 2017) ^[2]. Concurrent occurrence of theileriosis and hypomagnesemic tetany is rarely reported but may lead to increased severity of clinical manifestations and diagnostic confusion if not properly evaluated.

Case report

A four-year-old recently calved Crossbred Jersey cow, approximately 25 days postpartum, was presented with a two-day history of sudden onset anorexia, marked reduction in milk yield, and nervous manifestations characterized by excitability, generalized muscle tremors, a staggering gait, and intermittent recumbency.

Clinical examination revealed pyrexia (rectal temperature 105.2 °F), tachycardia (96 beats/min), tachypnea (38 breaths/min), pale conjunctival mucous membranes, enlarged prescapular lymph nodes, generalized muscle tremors with hypersensitivity to external stimuli (Fig.1.1), and heavy tick infestation over the neck and dewlap regions.

Laboratory evaluation revealed the presence of *Theileria* (++) piroplasms within erythrocytes on Giemsa-stained peripheral blood smear examination (Fig.1.2). Hematological examination revealed marked anemia (Table 1), as evidenced by reduced hemoglobin concentration (6.2 g/dL), packed cell volume (18%), and total erythrocyte count ($3.2 \times 10^6/\mu\text{L}$), which is consistent with hemolytic anemia commonly associated with bovine theileriosis. The mean corpuscular volume (56 fL) and mean corpuscular hemoglobin concentration (30 g/dL) were within the normal reference range, indicating a normocytic normochromic anemia. The

total leukocyte count was elevated ($15.8 \times 10^3/\mu\text{L}$), indicating leukocytosis. Differential leukocyte count revealed marked neutrophilia (72%) with relative lymphopenia (22%), suggestive of a stress leukogram and systemic inflammatory response, likely associated with acute infection and periparturient stress. Monocyte count remained within normal limits, while eosinophils were mildly reduced, further supporting stress-related hematological changes. Platelet count was markedly decreased ($120 \times 10^3/\mu\text{L}$), indicating thrombocytopenia, which may be attributed to increased peripheral destruction or consumption associated with hemoprotozoan infection.

Serum biochemical analysis (Table 2) revealed severe hypomagnesemia (0.7 mg/dL; reference range: 1.8-2.4 mg/dL), which correlated well with the observed neuromuscular signs, including hyperexcitability, muscle tremors, and intermittent recumbency. Serum calcium concentration was marginally reduced (8.2 mg/dL; reference range: 8.5-10.5 mg/dL), likely secondary to hypomagnesemia, as magnesium deficiency is known to impair parathyroid hormone secretion and action. Additionally, hypophosphatemia was evident (4.9 mg/dL; reference range: 5.6-8.1 mg/dL), which may have contributed to generalized weakness and impaired energy metabolism. Total serum protein was elevated (7.9 g/dL; reference range: 6.7-7.5 g/dL), primarily due to a marked increase in globulin concentration (5.3 g/dL; reference range: 3.0-4.5 g/dL), suggestive of chronic antigenic stimulation associated with hemoprotozoan infection. In contrast, serum albumin levels were decreased (2.6 g/dL; reference range: 3.0-3.5 g/dL), indicating hypoalbuminemia, possibly resulting from reduced intake, inflammatory response, or altered hepatic protein synthesis.

Based on the characteristic clinical signs in conjunction with hematological and biochemical abnormalities, a diagnosis of concurrent bovine theileriosis complicated by hypomagnesemia, hypophosphatemia and very mild hypocalcemia was established.

Table 1: Hematological Values on Day 0

Parameter	Results	Reference Range
Hemoglobin (Hb)	6.2 g/dL	8-15 g/dL
Packed Cell Volume (PCV)	18%	24-46%
Total Erythrocyte Count (TEC)	$3.2 \times 10^6/\mu\text{L}$	$5-10 \times 10^6/\mu\text{L}$
Mean Corpuscular Volume (MCV)	56 fL	40-60 fL
Mean Corpuscular Hemoglobin Concentration (MCHC)	30 g/dL	30-36 g/dL
Total Leukocyte Count (TLC)	$15.8 \times 10^3/\mu\text{L}$	$4-12 \times 10^3/\mu\text{L}$
Neutrophils	72%	15-45%
Lymphocytes	22%	45-75%
Monocytes	5%	2-7%
Eosinophils	1%	0-20%
Platelet Count	$120 \times 10^3/\mu\text{L}$	$200-800 \times 10^3/\mu\text{L}$

Table 2: Serum Biochemistry Values on Day 0

Parameter	Results	Reference Range
Magnesium	0.7 mg/dL	1.8-2.4 mg/dL
Calcium	8.2 mg/dL	8.5-10.5 mg/dL
Phosphorus	4.9 mg/dL	5.6-8.1 mg/dL
Total Protein	7.9 g/dL	6.7-7.5 g/dL
Albumin	2.6 g/dL	3.0-3.5 g/dL
Globulin	5.3 g/dL	3.0-4.5 g/dL

Therapeutic management

The affected cow was managed using an integrated therapeutic regimen aimed at addressing both the

hemoprotozoan infection and the associated metabolic imbalance. Buparvaquone was administered intramuscularly at a dose of 2.5 mg/kg body weight, with a repeat dose after 72 hours, to target the *Theileria* infection. In addition, long-acting oxytetracycline was administered intramuscularly at 20 mg/kg on Day 0, followed by a second dose after 72 hours, to control concurrent bacterial infections and provide supportive anti-protozoal coverage. Flumethrin pour-on was administered for tick control.

Severe hypomagnesemia was corrected through the slow intravenous administration of calcium magnesium borogluconate (Mifex, Elanco, India) at a dose of 1 mL/kg

under continuous cardiac monitoring. Rumeric, a synergistic veterinary tonic containing B-complex vitamins, amino acids, and hepatoprotective factors, was administered intramuscularly at a dose of 1 mL/40 kg body weight to support hepatic function and enhance overall metabolic recovery. To address acute hypophosphatemia and prevent hemolysis, Urimin was administered intramuscularly at 10 mL/animal as a source of inorganic phosphorus to facilitate ATP synthesis. Ringer's lactate solution (1000 mL, IV) was judiciously infused to correct dehydration, as excessive fluid therapy could result in haemodilution and further exacerbate the existing anemia. Additionally, meloxicam was administered subcutaneously at a dose of 0.5 mg/kg to control pyrexia and alleviate inflammation. All treatments were administered on two consecutive days.

The clinical response was favorable, with a marked reduction in rectal temperature within 24 hours of initiation of therapy, complete cessation of muscle tremors within 12-18 hours following magnesium supplementation, gradual return of appetite by the third day (Fig.1.3), and restoration of normal gait and milk yield by the seventh day of treatment. From Day 3, oral hematinics and other supplements were given to support haematopoiesis and metabolic recovery.



Fig 1.1: Day 0 Cow with hyperexcitability to external stimuli and lateral kinking of head

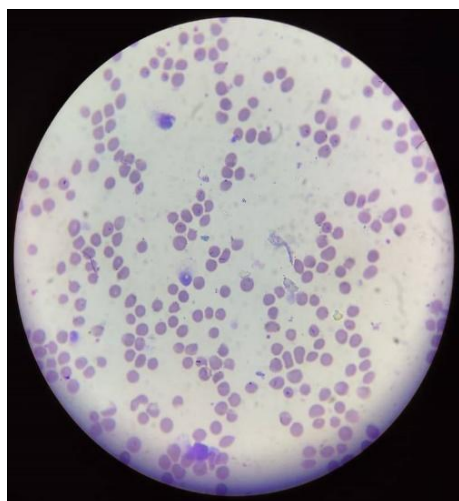


Fig 1.2: Giemsa-stained peripheral blood smear showing *Theileria* piroplasms within erythrocytes.



Fig 1.3: Day 2 Gradual return of appetite and clinical improvement in the affected cow following integrated therapeutic management.

Discussion

This case describes the concurrent occurrence of bovine theileriosis with hypomagnesemic tetany and hypophosphatemia in a periparturient crossbred Jersey cow, resulting in a complex clinical presentation characterized by pyrexia, anemia, neurological manifestations, and generalized weakness. The coexistence of infectious and metabolic disorders during the periparturient period significantly complicates diagnosis and therapeutic decision-making, underscoring the importance of comprehensive clinicopathological evaluation.

This is in accordance with Gupta *et al.* (2004) [5] and Naik *et al.* who used Buparvaquone along with supportive therapy for the successful treatment. Theileriosis is one of the most important arthropod-borne blood protozoan diseases, leading to morbidity and mortality especially in calves, which are commonly affected during the perinatal period.

The favorable clinical response observed in the present case can be explained by the underlying pathophysiological mechanisms of both diseases and the targeted therapeutic intervention. *Theileria* infection causes systemic inflammatory response, hemolytic anemia, lymphoid tissue proliferation, and pyrexia, leading to marked stress, reduced feed intake, and increased metabolic demand in affected cattle (Radostits *et al.*, 2010; Soulsby, 1982) [8, 9]. In periparturient cows, this stress is further compounded by lactation-associated mineral losses, predisposing animals to hypomagnesemia due to reduced dietary intake and impaired ruminal absorption of magnesium (Goff, 2014) [3]. Magnesium plays a critical role in neuromuscular transmission, and its deficiency results in increased acetylcholine release at neuromuscular junctions, causing hyperexcitability, muscle tremors, ataxia, and tetany, as observed in the present case (Constable *et al.*, 2017) [2].

The rapid cessation of tremors following intravenous magnesium administration supports hypomagnesemia as a major contributor to the nervous manifestations. Buparvaquone effectively eliminated the *Theileria* organisms, leading to reduction in parasitemia, fever, and systemic inflammation, while supportive therapy aided recovery of appetite and metabolic stability. Tick infestation likely acted

as a predisposing factor by facilitating protozoal transmission and exacerbating stress-induced metabolic imbalance. The combined antiprotozoal, mineral correction, and supportive therapy resulted in complete clinical recovery, highlighting the importance of addressing both infectious and metabolic components in periparturient cattle presenting with nervous signs and pyrexia.

Overall, this case highlights that periparturient cattle presenting with nervous signs and pyrexia should be evaluated not only for infectious diseases such as theileriosis but also for concurrent metabolic disturbances, including hypomagnesemia and hypophosphatemia. Early recognition and integrated therapeutic management are critical to ensuring favorable clinical outcomes and minimizing economic losses.

Conclusion

This case highlights the rare concurrent occurrence of theileriosis and hypomagnesemic tetany in a periparturient crossbred Jersey cow. Early diagnosis through hematological and biochemical evaluation and prompt integrated therapy resulted in rapid clinical recovery. The report underscores the importance of considering metabolic disorders alongside infectious diseases in periparturient cattle presenting with nervous signs and pyrexia.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Ethics approval and consent to participate

Ethical approval was not required for this case report as it involved the clinical examination and treatment of an animal presented for routine veterinary care. Informed consent was obtained from the animal owner prior to clinical evaluation, diagnostic procedures, and therapeutic interventions.

Competing Interests

The authors declare no competing interests.

Consent for Publication

Informed consent for publication was obtained from the owner of the animal involved in the study.

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Nil.

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Highlights

- The periparturient period predisposes dairy cattle to concurrent infectious and metabolic disorders due to heightened physiological and metabolic stress.
- Concurrent infection with *Theileria* spp. and severe hypomagnesemia can result in pronounced neurological manifestations in periparturient cattle.
- Hypophosphatemia may coexist with theileriosis and hypomagnesemia, contributing to weakness, impaired energy metabolism, and delayed recovery.

- Combined hematological evaluation, peripheral blood smear examination, and serum biochemical profiling are essential for accurate diagnosis of concurrent disorders.
- Prompt integrated therapy comprising antiprotozoal treatment, targeted mineral supplementation, supportive care, and tick control leads to rapid and complete clinical recovery.

References

1. Bhatnagar CS, Bharadwaj B, Sharma DK, Meena SK. Incidence of haemoprotozoan diseases in cattle in southern Rajasthan, India. *Int J Curr Microbiol Appl Sci*. 2015;4(3):509-514.
2. Constable PD, Hinchcliff KW, Done SH, Grünberg W. *Veterinary medicine: a textbook of the diseases of cattle, horses, sheep, pigs, and goats*. 11th ed. St. Louis: Elsevier; 2017.
3. Goff JP. Mineral disorders of dairy cattle. *Vet Clin North Am Food Anim Pract*. 2014;30(2):359-381.
4. Gul N, Ayaz S, Gul I, Adnan M, Shams S, ul Akbar N. Tropical theileriosis and East Coast fever in cattle: present, past and future perspectives. *Int J Curr Microbiol Appl Sci*. 2015;4(8):1000-1018.
5. Gupta SK, Yadav A, Raina AK, Singh R. Theileriosis in a seven-day-old bovine calf: a case report. *Indian J Vet Med*. 2004;24:55.
6. Kasozi KI, Matovu E, Tayebwa DS, Natuhwera J, Mugezi I, Mahero M. Epidemiology of increasing hemoparasite burden in Ugandan cattle. *Open J Vet Med*. 2014;4(10):220.
7. Kohli S, Atheya UK, Thapliyal A. Prevalence of theileriosis in cross-bred cattle: detection through blood smear examination and polymerase chain reaction in Dehradun district, Uttarakhand, India. *Vet World*. 2014;7(3):168-171.
8. Radostits OM, Gay CC, Hinchcliff KW, Constable PD. *Veterinary medicine: a textbook of the diseases of cattle, horses, sheep, pigs, and goats*. 10th ed. St. Louis: Saunders Elsevier; 2010.
9. Soulsby EJJ. *Helminths, arthropods and protozoa of domesticated animals*. 7th ed. London: Baillière Tindall; 1982.

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